Essential Fish Habitat Assessment

Equistar Chemicals Channelview

Methanol Unit Restart Project

Channelview, Harris County, Texas

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AND

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E.S. Executive Summary

Equistar Chemical Company (Equistar) owns and operates a chemical manufacturing complex (Channelview Site) located in Harris County, Texas. Equistar proposes to restart the Methanol (MeOH) Unit (Project) at the Channelview Site. The project would include: refurbishing an existing steam methane reformer furnace, installation of a new cooling tower, and associated new and modified components. The project would be located within the exiting Channelview Site footprint. Equistar has determined that the proposed project will require a Prevention of Significant Deterioration (PSD) permit issued by the U.S. Environmental Protection Agency (EPA) for greenhouse gas (GHG) emissions. In accordance with 40 CFR Part 52.21(o), the USEPA Region 6 has determined that the project is subject to compliance and the provisions of Section 7 of the Endangered Species Act (ESA).

Equistar has retained the services of URS Corporation (URS) to prepare a Biological Assessment (BA) and Essential Fish Habitat (EFH) Assessment to evaluate the potential for the proposed Methanol Restart (Project) to affect designated EFH area and managed species adjacent and downstream to the Channelview Complex.

A review of air emissions and dispersion modeling data, expected changes in the volume and chemical composition of the wastewater effluent, wastewater effluent dilution modeling, and a review of current literature and publicly available data was conducted to determine the potential effect that the Project would have on EFH in the San Jacinto River Tidal and on the seven listed Gulf of Mexico Fishery Management Council (GMFMC) managed species with potential for occurrence within the San Jacinto River Tidal. The proposed project will not change the structure of the San Jacinto River; changes to runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable. Further, there is no preferred habitat for any of the seven species within the Action Area. Based on the aforementioned information, no adverse effects on EFH in the San Jacinto River, nor on the seven listed GMFMC managed species with potential for occurrence within the San Jacinto River, are anticipated from the Project.

1.0 Introduction

Equistar Chemical Company (Equistar) owns and operates a chemical manufacturing complex (Channelview Site) located in Channelview, Harris County, Texas (Figure 1). Equistar proposes to restart the Methanol (MeOH) Unit (Project) at the Channelview Site (Figure 1). The project will include: refurbishing an existing steam methane reformer furnace, installation of a new cooling tower, selective catalytic reduction (SCR) system, equipment associated with the SCR system, and process sampling analyzers (Figure 2). Equistar has determined that the proposed project (Project) will require a Prevention of Significant Deterioration (PSD) permit issued by the U.S. Environmental Protection Agency (USEPA) for Greenhouse Gas (GHG) emissions. In accordance with 40 CFR Part 52.21(o), the USEPA Region 6 has determined that the Project is subject to compliance and the provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended.

The MSFCMA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect Essential Fish Habitat (EFH). As defined by 16 USC 1802(10), EFH constitutes those aquatic and associated land areas, specifically enumerated as the water way substrate, water column, and water properties required for any life cycle stage for aquatic organisms.

Equistar has retained the services of URS Corporation (URS) to prepare a Biological Assessment (BA) and EFH Assessment to evaluate the potential for the Project to affect designated EFH area adjacent to the Channelview Chemical Complex. URS' *Biological Assessment for the Equistar Chemicals Channelview-Methanol Restart* dated September 2012*,* evaluated the Project's potential to effect federally-protected threatened and endangered (T&E) species and/or their potential habitat (URS 2012).

2.0 Project Description

2.1 Project Location

The proposed project is located approximately 1 mile southeast of the intersection of US-90 and Sheldon Road (Figure 1). The site is located on the Highlands and Jacinto City United States Geological Survey (USGS) Quads, at 29.833° north latitude and 95.117° west longitude.

The Channelview Site is broken up into two operating areas and each area operates under a unique Texas Commission on Environmental Quality (TCEQ) Regulated Entity Number (RN) and Customer Number (CN):

- North Plant operated by Equistar Chemicals, LP (RN100542281, CN600124705), and
- South Plant operated by Lyondell Chemical Company (RN100633650, CN600344402).

For the purpose of federal regulatory applicability, the North and South Plants are contiguous and under common control and hence considered as one site. The Channelview North Plant is authorized to produce Highly Purified Isobutylene (HPIB) and store/load methanol under TCEQ New Source Review

(NSR) Permit No. 8125. Construction of the proposed project (Project Site) would occur in the North Plant.

2.2 Project Purpose

The purpose of the project is to restart the methanol unit at the Equistar Channelview Site (Figure 2). The project would also include refurbishing an existing steam methane reformer furnace, installation of a new cooling tower, selective catalytic reduction (SCR) system, sampling analyzers, and modification of associated equipment. A detailed list for the methanol restart project can be found in the *Biological Assessment*.

2.3 Construction Information

Although the Project will require the new process equipment and modification to an existing process unit, physical ground disturbance will be limited to the construction of the proposed furnace site. Equistar has identified several areas of the Channelview Site that will be used temporarily during construction of the proposed project, such as: a laydown and warehouse area, new equipment laydown, construction material laydown, project parking area, and project blast resistant building (brb) locations. These areas are also labeled on Figure 2. Construction is scheduled December 2012 to December 2013.

2.4 Operations

The rated capacity of the Channelview MeOH process unit is approximately 273 million gallons of high purity methanol per year using light hydrocarbon (normally natural gas) as a feedstock. The unit also has the capability of injecting carbon dioxide (CO_2) as a supplemental feed.

The feedstock is compressed, preheated, and pretreated to remove sulfur and chlorine compounds. The treated feed is then mixed with steam before being sent to the reformer.

The reformer consists of a large number of catalyst-filled tubes suspended in the radiant section of a process heater. The process stream containing light hydrocarbons and steam flows into the tubes where it is heated to reaction temperature to produce the synthesis gas.

Steam required to operate the unit is produced from waste heat in the reformer. The synthesis gas is cooled, compressed, reheated, and sent to the methanol converter. The methanol converter effluent is cooled with the crude methanol, separated as a liquid phase, and sent to product purification. The off-gas is recycled to the methanol converter. The purge gas is normally used as fuel in the reformer fuel gas.

Light ends are removed in the topping column from the crude methanol and normally used as fuel in the reformer. The topped product is sent to a refining column, where the high purity methanol is removed as the overhead stream, cooled and sent to storage tanks and the bottom stream consisting of water with a trace of hydrocarbons is sent to on-site wastewater treatment. A refining column side stream containing water and mixed alcohol is returned to the process as feed.

Water Use

The source of the Channelview Site's water is Lake Houston. Equistar estimates a 2.59 million gallon per day (MGD) increase in fresh water intake for the project. Water discharge is estimated to be approximately 0.17 MGD, which would be approximately 0.10 MGD process wastewater and 0.07 MGD cooling tower blow down. The remaining 2.42 MGD supply is lost to evaporation at the cooling tower. The project is not expected to change the characteristics of the discharge water.

2.5 Action Area

The Action Area of potential effect has been defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involve in the action" according to federal regulation (50 CFR 402.2). For the basis of this EFH Assessment, the project's Action Area was defined by the following parameters: 1) areas where ground disturbing activities would occur within the Channelview Site; 2) areas where criteria air pollutants exceed significant impact levels (SIL); and 3) the wastewater effluent drainage channel and dilution area within the receiving water body, a portion of the San Jacinto River Tidal downstream of the Channelview Site (Figure3).

Although the proposed project involves the refurbishment of a methanol reformer unit and modification to existing equipment, physical ground disturbance will be limited to the construction of the proposed furnace site. Equistar has also identified several areas of the Channelview Site that will be used temporarily during construction of the proposed project, such as: a laydown and warehouse area, new equipment laydown, construction material laydown, project parking area, and project blast resistant building (brb) locations. Based on the previous conversion and continual use of these areas for industrial use, these additional areas are not included in the project's Action Area.

The analysis of managed species likely to be affected by the proposed project focused on impacts within the Project Site's Action Area, which is approximately 9.87 acres and includes 5.67 acres of aquatic areas including the wastewater effluent ditch, Wallisville Gully, and San Jacinto River Tidal adjacent to and downstream of the property boundary. Approximately 4.2 acres of land is contained within the defined Action Area which includes process areas (fill or concrete), maintained grasses, mixed woodland, and riverine. A significant portion of these habitats have historically been constructed, manipulated, or otherwise impacted by industrial activities.

3.0 Essential Fish Habitat

MSFCMA (16 United States Code [U.S.C.] 1801-1882) provided added measures to describe, identify, and minimize adverse effects on EFH (50 CFR Part 600). The Gulf of Mexico Fishery Management Council (GMFMC) retains the responsibility for management of EFH species in Texas, Louisiana, Mississippi, and Florida. By definition, EFH includes those waters and substrate necessary for fish and shellfish spawning, breeding, feeding, and growth through maturity. "Waters" include aquatic areas and associated physical, chemical, and biological properties currently or historically utilized by the fisheries. "Substrate" includes any sediment, hard bottom, structures underlying the waters, and associated biological communities (GMFMC 1998). As defined by 16 USC 1802(10), EFH constitutes those aquatic and associated land areas, specifically enumerated as the water way substrate, water column, and water properties required for any life cycle stage for aquatic organisms.

3.1 EFH within the Project Action Area

According to the NMFS EFH Mapper, EFH has been designated for species throughout the San Jacinto River, San Jacinto Bay, and Galveston Bay. Approximately 1.66 acres of EFH lie within the Project Action Area. The EFH mandate applies to all species managed under the GMFMC Fishery Management Plans, including red drum, reef fishes, and shrimp can occur in EFH in the San Jacinto River Tidal. Table 1 provides a list of EFH designated species identified by the GMFMC in San Jacinto River Tidal based on occurrence and habitat (GMFCA 2004). Designated essential fish habitat for these species was identified by the GMFCA based on occurrence and habitat (NOAA-NMFS 2012). Details regarding specific habitat requirements for each of these species are provided in Section 3.2. The EFH within the Project Site's Action Area includes tidally-influenced riverine habitat.

Table 1 - Species with Essential Fish Habitat in the San Jacinto River Tidal

Category	Common Name	Species Name	Life Stage
Gulf of Mexico Shrimp	Brown shrimp	*Penaeus aztecus*	Post Larval Juvenile
	White shrimp	*Penaeus setiferus*	Post Larval Juvenile
Gulf of Mexico Red drum	Red drum	*Sciaenops ocellatus*	Larval Post Larval Juvenile Adults
Gulf of Mexico Reef fishes	Dog snapper	*Lutjanus jocu*	Juvenile
	Dwarf sandperch	*Diplectrum bivittatum*	Adult
	Lane snapper	*Lutjanus synagris*	Juvenile
	Red snapper	*Lutjanus campechanus*	Juvenile

3.2 Species Descriptions

Brown Shrimp *(Penaeus aztecus)*

Brown shrimp are a common, commercially fished species found within the Gulf of Mexico. Adult tails are characterized by red, dark green, and on occasion light blue pigmentation and rounded uropods. The upper midline of the head and the lower region of the abdomen are broadly grooved. Eggs are demersal and approximately 0.27 mm in diameter. Post larvae are approximately 13 mm in length and maximum adult length is approximately 195 mm for males, 236 mm for females.

Brown shrimp are opportunistic omnivores that feed on algal species and small invertebrates. Brown shrimp utilize both estuarine and marine habitats during various life stages, but are especially dependent on near-shore estuaries and littoral zones. Brown shrimp populations thrive when associated with vegetated habitats, and as a result areas with extensive wetland systems will yield larger harvestable populations than areas with less wetland area. In addition to vegetated habitats, brown shrimp post larvae and juveniles can be found in areas with silty sand and non-vegetated mud bottoms. Post larvae and juveniles have been observed in estuaries ranging from 0 to 70 parts per thousand (ppt) in salinity. Sub-adults can be found across a wide range of habitat from estuaries to the continental shelf (Haas et al. 2004, SMS 2012).Adult brown shrimp spawn offshore during flood tides in the spring and summer, with peak spawning in October and November. Hatching occurs within 24 hours. Post larvae typically migrate during late winter and early spring to estuaries and remain there until spawning. Brown shrimp range from Massachusetts to the Yucatan. This species is considered abundant throughout its range and typically have a high catch rate regulation. Brown shrimp are considered rare in the HSC and Upper San Jacinto Bay (Seiler et al. 1991).

White shrimp *(Penaeus setiferus)*

White shrimp are typically bluish white with black specks. The uropods are black near the base with bright yellow and green margins. White shrimp have longer antennae and rostra than brown or pink shrimp. Larvae are approximately 0.3 mm long, post-larvae are approximately 7 mm long, and maximum adult length is approximately 118 mm in males, 140 mm in females.

White shrimp are omnivorous, with a diet that includes zooplankton and phytoplankton (SMS 2012). White shrimp utilize both estuarine and marine environments during their life and have been collected at depths up to 80 m in the Gulf of Mexico. They are most dependent, however, on estuaries and the inner littoral zone and prefer shallow, brackish wetlands. Post-larval and juvenile white shrimp inhabit primarily areas with mud or peat bottoms and relatively heavy amounts of decaying organic matter or vegetative cover; juveniles are also frequently found in tidal rivers and tributaries. Adult white shrimp prefer soft mud or silt bottoms, and their range extends offshore (GMFMC 1998).

Offshore spawning occurs from March to September within the Gulf of Mexico. Eggs hatch within 10-12 hours. Upon hatching, white shrimp will go through several larval stages before entering the post-larval stage and migrating to estuarine nursery grounds in late May and June, approximately 2 weeks after spawning (SMS 2012).

White shrimp are considered highly abundant throughout their range. Reports have indicated that adult white shrimp are rare to common in Galveston Bay, while juvenile white shrimp abundant (CCMA 2011). White shrimp have moderate habitat usage of the San Jacinto River, Upper San Jacinto Bay, and HSC (GMFMC 2004).

Red Drum *(Sciaenops ocellatus)*

Red drums are large fish that can be identified by a single black spot on the upper part of the tail base and an overall coloration ranging from nearly black to silver. The Texas record weight for red drum is 59.5 pounds (TPWD 2012). Red drum diet changes throughout their life cycle: Larvae primarily feed on detritus while juveniles and adults are predatory. Juvenile diet consists of small crabs, shrimp, and marine worms, while adults consume larger crabs, shrimp, and small fish. Red drums are preyed upon by birds, larger fish, and turtles and are also important recreational fishing species.

Red drum habitat is broad and includes both marine and estuarine areas along the coast. They are known to be found in areas with submerged vegetation and soft mud along jetties, and among pier pilings over a variety of substrates including mud, sand, and oyster reef (GMFMC 1998). Juveniles are typically limited to near-shore areas including bays, marshes, and intertidal zones and are preferential to shallow areas with grassy or muddy bottoms. Adults migrate and can be found further from shore in the Gulf of Mexico and are known to forage in shallow bay bottoms and oyster reefs (GMFMC 2004).

Red drums reach sexual maturity within 3-4 years. In the Gulf of Mexico, spawning occurs from August to October near shorelines. Eggs incubate for 24 hours before hatching. Newly hatched larvae are transported to shallow, near-shore areas by the tide.

Red drum range includes the Atlantic Ocean and near-shore waters from Massachusetts to Mexico. Although adult and juvenile red drums are common in Galveston Bay throughout the year they have a relatively low usage pattern for the Upper San Jacinto Bay and San Jacinto River. This species is virtually absent from the HSC (GMFMC 2004, Seiler et al. 1991).

Dog snapper *(Lutjanus jocu)*

Dog snappers are brown fish with lighter coloration along the sides. A single pair of canine teeth is notably enlarged and is visible even when the mouth is closed. Adults typically develop a pale triangle and a light blue interrupted line below the eye and can reach a weight of 30 pounds. Adult dog snappers feed on fish, mollusks, and crustaceans and inhabit offshore rocky areas and reefs at depths of 16 to 100 feet. Juveniles inhabit estuaries and are known to occur in near-shore portions of freshwater rivers (FMNH 2010). Dog snappers spawn in early March, primarily in waters off Jamaica and the northeastern Caribbean (FMNH 2010). Eggs and larvae are then dispersed by ocean currents towards estuaries and other near-shore areas where post-larvae will develop into juveniles. Juveniles migrate toward coral reefs or rocky bottom habitats where they will remain as adults. Dog snappers range from Massachusetts to Brazil.

Dwarf sandperch (*Diplectrum bivittatum*)

Dwarf sandperch have a slender, elongate body. Coloration on the back and sides is typically pale yellow brown with white underparts. Irregular vertical bars are located on the lateral sides. Distinguishable blue lines transect the head. One group of spines extends from the angle of the preopercle. This species can reach 25 cm in length. Adult dwarf sandperch typically inhabit soft bottom habitats and can occasionally inhabit hard bottom areas as well. They have been found at depths ranging from 1-100m (GMFMC 2004). Juveniles are typically found in hard bottom areas. Dwarf sandperch range from Bermuda to Brazil excluding the Bahamas and West Indies. This species is commonly used as bait for commercial and recreational fishing in the Gulf of Mexico.

Lane snapper *(Lutjanus synagris)*

Lane snappers have a rounded anal fin which distinguishes it from other related species. As adults, lane snappers can reach 60 cm in length. Coloration ranges from silver to reddish and lane snappers typically have a green dorsal surface with dark vertical bars. A series of 7 – 10 yellow horizontal stripes extend along the sides with diagonal yellow line above the lateral line. A softened black spot is present above the lateral line. Lane snappers are euryphagic carnivores and are preyed upon by humans, sharks, and other large fish. They typically inhabit waters that range in temperature from 16.1 – 28.9 C. Adult lane snappers are found offshore in water with salinities of approximately 35 ppt. Adults can be found over all substrate types, but may have a preference for sandy or rocky bottoms (Vergara 1978). Juveniles inhabit vegetated estuaries with a fluctuating tidal cycle.

Lane snappers spawn offshore from March to September. A single female can lay up to 990,000 eggs which take 23 hours to hatch. The eggs are pelagic and are approximately 0.03 inches in diameter.

Lane snappers are found in the Atlantic Ocean from North Carolina to Brazil. Robust populations of lane snappers are found by Antilles, Panama, and on the northern coast of South America. Reef fish have relatively low habitat usage in the San Jacinto River, Upper San Jacinto Bay and HSC (GMFMC 2004).

Red snapper (*Lutjanus campechanus*)

Red snappers are a popular game finish that is distinguished by their first and second dorsal fins that appear continuous with a subtle notch connecting them. Red snappers also lack the distinctive black spot located on the pectoral fins of the blackfin snapper. As adults, red snappers can reach 100 cm and can weigh up to 20 pounds. Juveniles can have blue bands appear on their sides. Adult body and fins possess a pink to red coloration with lighter underparts. This species typically has small red eyes and a pointed snout. Red snappers are carnivorous. Juveniles are associated with soft bottom water bodies which contain a food supply of invertebrates. Adult red snappers inhabit offshore habitats associated with hard bottom substrate with depths ranging from 7 – 146 m. Adults can be found near continental shelves, over deep reefs, banks.

Red snappers are oviparous and spawn from June through August. Spawning occurs at depths of 60-120 ft over soft bottom areas. A single female can produce over 9 million eggs in one reproductive event. Eggs hatch approximately 24 hours. Larvae utilize shell beds for protection from predators. Adults generally stay in hard bottom habitats such as reefs. Red snappers range from Massachusetts to Brazil including the Gulf of Mexico.

3.3 Habitat Areas of Particular Concern

Habitat Areas of Particular Concern (HAPC) are geographic sites that fall within the distribution of EFH for federally managed species. HAPCs are areas of special importance that may require additional protection from adverse fishing effects. Specific to fishery actions, HAPCs are areas within EFH that are rare and are either ecologically important, sensitive to disturbance, or may be stressed. According to the NMFS EFH Mapper, there are no EFH HAPCs identified within, or adjacent to, the Action Area (NOAA-NMFS 2012).

4.0 Air Quality Assessment

Equistar conducted dispersion modeling of the proposed emissions of air pollutants from the proposed project in accordance with USEPA Prevention of Significant Deterioration (PSD) permit requirements. The objective of the modeling was to demonstrate that the total concentration, including an appropriate background, would not exceed the applicable NAAQS and PSD Increment. The project is subject to PSD review for nitrogen dioxides (NO_2), carbon monoxide (CO), and particulate matter ($PM/PM_{10}/PM_{2.5}$). The model parameters specified for the modeled location, such as meteorological data, rural versus urban dispersion coefficients, and receptor grid are discussed below. Modeling was performed using the regulatory default options, which include stack heights adjusted for stack-tip downwash, buoyancy-induced dispersion, and final plume rise. Air emissions resulting from the proposed project are discussed in detail in Sections 4.0 and 6.1 in the URS' *Biological Assessment* dated September 2012 for the proposed Methanol Restart Project (URS 2012).

Table 2 shows the maximum predicted concentrations due to the project for each pollutant and averaging period. Note: These are not total ambient concentrations. These are predicted increases in ground level concentrations due to new emissions from the proposed project.

Table 2 – Maximum Predicted Air Emission Concentrations

Pollutant	Averaging Period	Highest Modeled Concentration (µg/m^3)	Modeling Significance Level (µg/m^3)	Significant?
CO	1-hour	66.81	2,000.0	No
	8-hour	29.59	500.0	No
PM_{10}	24-hour	0.34	5.0	No
$PM_{2.5}$	24-hour	0.34	1.2	No
	Annual	0.04	0.3	No
NO_2	1-hour	6.55	7.5	No
	Annual	0.23	1.0	No
SO_2	1-hour	0.22	7.8	No
	3-hour	0.16	25.0	No
	24-hour	0.07	5.0	No
	Annual	0.01	1.0	No

Based on the modeling, there were no concentration values that exceeded the SIL outside the Channelview Site. A significant impact level (SIL) is a concentration that represents a *de minimis*, or insignificant, threshold applied to PSD permit applicants. The SIL is a measurable limit above which a source may cause or contribute to a violation of a PSD Increment for a criteria pollutant.

Additional modeling was conducted to determine if any criteria pollutant might exceed SILs within the boundaries of the Channelview Site. PM and NO_2 are predicted to exceed SILs within the property boundary (Figure 4). These exceedances are not expected to extend over Outfall #001, Wallisville Gully, nor San Jacinto River Tidal. Impacts to EFH and managed species from air quality impacts outside of the area determined to exceed SILs are unlikely. Therefore, it is reasonable to assume that impacts from SIL exceedances for PM or NO_2 are unlikely to adversely affect EFH and managed species outside of the property boundary.

4.1 Particulate Matter

The potential impacts to EFH from the increase in PM were considered. Nitrates and sulfates are the PM constituents of greatest and most widespread environmental significance. Other components of PM, such as dust, trace metals, and organics can at high levels affect plants and other organisms. The low concentration of PM over a relatively large volume of water would not be expected to cause changes in pH or eutrophication that would adversely impact to EFH nor managed species using these habitats.

4.2 Nitrogen

The potential impacts of airborne nitrogen on aquatic ecosystems including acidification and eutrophication were considered. The effects of acidification on water quality, whether introduced by direct acid deposition or leaching from adjacent terrestrial ecosystems, include increased acidity, reduced acid neutralization capacity, hypoxia, and mobilization of aluminum. Given the low concentration of airborne pollutant that is below SIL limits, no emission resulting from the project is expected to affect surface water pH from airborne nitrogen.

5.0 Water Quality Assessment

The water quality analysis included dilution modeling to predict the distance at which the effluent concentration would result in a 1% effluent within the ambient environment of the receiving water body (San Jacinto River Tidal) and a toxicity assessment of the chemical constituents discharged from Outfall #001.

5.1 Estimated Discharge Increase

The source of the Channelview Site's water is Lake Houston. Equistar has estimated approximately 2.59 million gallon per day (MGD) increase in fresh water intake for the project. Water discharge is estimated to be approximately 0.17 MGD, which would be approximately 0.10 MGD process wastewater and 0.07 MGD cooling tower blow down. The remaining 2.42 MGD supply is lost to evaporation at the cooling tower. The project is not expected to change the characteristics of the discharge water.

5.2 Current and Anticipated Discharge Constituents

The concentrations of permitted chemical constituents in the treated effluent from Outfall 001 are below the authorized levels set forth by a TPDES permit (Table 3 and Table 5). The effluent quality from the proposed project is anticipated to be approximately the same as the current discharge for the following reasons:

1. The increase in flow and organic load are well within the design capacity of our existing treatment facility. As organic load increases, more carbonaceous bacteria grow within the aeration system to biologically treat the organic constituents. The new load will be consistent with what the aeration treatment system currently receives. No new constituents will be added nor sent to treatment.
2. Methanol is a product that is preferentially consumed by the carbonaceous bacteria in the treatment unit and will be consumed at or near 100%.
3. The outfall will continue to meet currently permitted effluent limits, including bio-toxicity limits.

The existing wastewater treatment facility is sufficient to treat the larger volumes of wastewater produced by the proposed project. With the expanded wastewater, the amount of augmentation will be reduced to give similar treatment.

Table 3-Permitted Concentrations vs. Sampled Concentrations from 2010 vs. Anticipated Concentrations

Parameter	Outfall #001 Permitted Concentrations Daily Max (ug/L)	Outfall #001 Effluent Results Max of Samples (ug/L)	Anticipated Outfall #001 Effluent Concentrations (ug/L)
Acenapthene	25.6	<10.0	<10.0
Acenaphthylene	25.6	<10.0	<10.0
Acrylonitrile	103.7	<20.0	<20.0
Anthracene	25.6	<10.0	<10.0
Benzene	59.1	<1.0	<1.0
Benzo (a) anthracene	25.6	<10.0	<10.0
3,4-Benzofluoranthene	26.5	<10.0	<10.0
Benzo (k) fluoranthene	25.6	<10.0	<10.0
Benzo (a) pyrene	26.5	<10.0	<10.0
Bis (2-ethylhexyl) phthalate	121.2	<10.0	<10.0
Carbon Tetrachloride	16.5	<1.0	<1.0
Chlorobenzene	12.1	<5.0	<5.0
Chloroethane	116.5	<5.0	<5.0
Chloroform	20.0	19.0	19.0
2-Chlorophenol	42.6	<10.0	<10.0
Chrysene	25.6	<10.0	<10.0
Di-n-butyl phthalate	24.8	<10.0	<10.0
1,2-Dichlorobenzene	70.9	<5.0	<5.0
1,3-Dichlorobenzene	19.1	<5.0	<5.0
1,4-Dichlorobenzene	12.1	<5.0	<5.0
1,1-Dichloroethane	25.6	<5.0	<5.0
1,2-Dichloroethane	91.7	<1.0	<1.0
1,1-Dichloroethylene	10.8	<1.0	<1.0
1,2-trans Dichloroethylene	23.5	<5.0	<5.0
2,4-Dichlorophenol	48.6	<10.0	<10.0

Parameter	Outfall #001 Permitted Concentrations Daily Max (ug/L)	Outfall #001 Effluent Results Max of Samples (ug/L)	Anticipated Outfall #001 Effluent Concentrations (ug/L)
1,2-Dichloropropane	99.9	<5.0	<5.0
1,3-Dichloropropylene	19.1	<10.0	<10.0
Diethyl phthalate	88.2	<10.0	<10.0
2,4-Dimethylphenol	15.6	<10.0	<10.0
Dimethyl phthalate	20.5	<10.0	<10.0
4,6-Dinitro-o-cresol	120.3	<20.0	<20.0
2,4-Dinitrophenol	53.4	<20.0	<20.0
2,4-Dinitrotoluene	123.8	<10.0	<10.0
2,6-Dinitrotoluene	278.4	<10.0	<10.0
Ethylbenzene	46.9	<5.0	<5.0
Fluoranthene	29.6	<10.0	<10.0
Fluorene	25.6	<10.0	<10.0
Hexachlorobenzene	0.5	<0.5	<0.5
Hexachlorobutadiene	21.3	<10.0	<10.0
Hexachloroethane	23.5	<10.0	<10.0
Methyl Chloride	82.6	<20.0	<20.0
Methylene Chloride	38.6	<20.0	<20.0
Naphthalene	25.6	<10.0	<10.0
Nitrobenzene	29.6	<10.0	<10.0
2-Nitrophenol	30.0	<20.0	<20.0
4-Nitrophenol	53.9	<20.0	<20.0
Phenanthrene	19.1	<10.0	<10.0
Phenol	11.3	<2.0	<2.0
Pyrene	29.1	<10.0	<10.0
Tetrachloroethylene	24.3	<1.0	<1.0
Toluene	34.8	<5.0	<5.0
1,2,4-Trichlorobenzene	60.7	<10.0	<10.0
1,1,1-Trichloroethane	23.5	<5.0	<5.0
1,1,2-Trichloroethylene	23.5	<5.0	<5.0
Trichloroethylene	23.5	<1.0	<1.0
Vinyl Chloride	116.5	<1.0	<1.0

5.1 Mass Loading

The estimated increase in treated effluent discharge from Outfall #001 will result in minor increases in pollutant mass loading to the receiving water resulting in additional elements discharged into the surrounding environment. However, the relative toxicity is expected to be discountable, and the existing permit will not result in a deficiency of the Texas Surface Water Quality Standards.

5.2 Temperature

Temperature is independent of both concentration and mass loading parameters. The water temperature of Outfall #001 effluent is affected by raw water temperature, ambient air temperature, and physical limitations of the cooling tower. Due to its consistency with maintaining relatively close to ambient temperature (72°F), a temperature limit was not issued in the TPDES permit. Respectively, the summer months will result in the highest average discharge temperatures. Although the Project will increase the treated effluent discharge volume from Outfall 001, the increase in effluent temperature is expected to be discountable and will not be an impairment of Texas water quality standards.

5.3 Area of Impact Dilution Modeling

Dilution modeling was conducted to demonstrate compliance with TCEQ and EPA standards for aquatic life. The analysis was used to estimate the concentration of pollutants discharged into the aquatic environment and predict the area of the plum in the San Jacinto River Tidal. The dilution modeling was used to determine what portions of the aquatic environment to include within the Action Area. Channelview Site background water quality data was not available for Wallisville Gully and San Jacinto River Tidal that included the chemical constituents that are contained within the Channelview Site effluent. TCEQ and USGS databases along with an extensive public search for water quality and sediment concentrations resulted in no comparable data. Because there was no publicly available data concerning the appropriate pollutants characterizing Outfall 001, then a 1% effluent was used as a conservative method to define a return to ambient conditions. The potential exists that the effluent discharge could be lower than ambient conditions and in a sense cleaner than the receiving water body. The plume area includes that area in the San Jacinto River Tidal to a point of 1% effluent; at this point the project is determined to have no significant impact on federally threatened and endangered species. The Action Area includes the wastewater effluent drainage channel, Wallisville Gully, and dilution area within the receiving water body, a portion of the San Jacinto River Tidal along and downstream of the Channelview Site boundary (Figure 3).

5.3.1 Methods

Parameters required for the dilution modeling include the width, depth, and flow rate in the drainage channel and Wallisville Gully, along with the current speed and depth of the San Jacinto River Tidal. Width, depth, and flow rate within the drainage channel were provided by Equistar, based on site observations, aerial photographs, and the average discharge from the January 2011 to December 2011 Discharge Monitoring Reports for the Channelview Site. No recorded data are available that provide Wallisville Gully characteristics. From the USGS topographic map it appears that the gully is about 100 feet wide at 5 feet elevation. To estimate the dilution of the drainage channel into Wallisville Gully, thence into San Jacinto River, data from the TPDES permit, TPDES Renewal Application from 2007, TCEQ database queries, aerial photographs, and the Southern Region Climatic Data Center for the Baytown station was utilized. The San Jacinto River Tidal, in the vicinity of the mouth of the discharge channel, was assumed to be approximately 20 feet deep and 320 feet wide in the model based on average near-shore depths in the area. The river is deep relative to the tidal range (approximately 20 feet deep to 1 foot tide). Therefore, the velocities were considered to be sufficiently representative for this study. The current speed in San Jacinto River was estimated from measured flow and velocity data in the river at a

USGS station near the Highway 90 crossing. The Highway 90 Bridge is about 4 miles upstream from confluence of Wallisville Gully. The Oct 19 through Nov. 3 1994 data were collected during a large storm event (100 year +) so it may not be representative of smaller events or non-storm conditions.
Two major stages of mixing can be identified for a waste discharge into a water body, the near-field and the far-field. In the near-field the discharge geometry and flow governs mixing, i.e. the initial momentum and buoyancy of the discharge determine the rate of dilution. In the far-field the effects of the initial momentum and buoyancy have dissipated, and the ambient turbulence and currents determine further mixing. In the far-field mixing can occur during a buoyant spreading phase and a passive diffusion phase. In the buoyant spreading phase the buoyancy tends to damp mixing so mixing is generally small, the plume spreads laterally and thins out vertically. During the passive diffusion phase the plume diffuse in the horizontal and vertical directions. The plume will enlarge and become more dilute. The modeling indicated that the initial width of the plume was assumed to be about 65 feet (~20 m).

There are several length scales that can be calculated that relate to the size of plume to the bending of the jet and the amount of dilution expected in the near-field. However, since the near-field is buoyancy dominated the dilution in the near-field will be small. However, the plume may still spread on the surface of the water and spread across the river. For this reason the dilution in the near-field was ignored and only dilution due to passive diffusion was calculated for the far-field. Jones, Nash, and Jirka (1996) provide relationships that can be used to estimate the size of the plume in the near-field. The edge of the near-field is generally near the source.

The dilution due to passive diffusion can be calculated as:

$$S = \frac{2b_v b_h}{L_m L_Q} \qquad (1)$$

Where b_v and b_h are the width and thickness of the plume. L_m is a length scale related to the distance from shore where the plume becomes bent over, and L_Q is the distance over which the geometry of the discharge is important. When the plume fully occupies the water depth, b_v is replaced by the water depth.

The depth and width of the plume were calculated using the following equations:

$$b_v = \left(\frac{\pi E_z x}{u_a} + b_{vi}^2 \right)^{1/2} \qquad (2)$$

$$b_h = \left(\frac{\pi E_y x}{u_a} + b_{hi}^2 \right)^{1/2} \qquad (3)$$

$$S = \frac{2\,bvbh}{Qo} * ua \qquad (4)$$

Where u_a is the current speed and b_{vi} and b_{hi} are the intial thickness and width, respectively. The vertical and horizontal diffusivities in Column 2 (Table 4), takes into account the friction velocity (u*) and the Darcy-Weisbach friction factor (f) for the river. For the analysis a value of 0.03 was used for the friction factor (f). This is equivalent to the familiar Mannings n value of 0.022. Equation 3 assumes that the discharge in the river is uninfluenced by the shoreline. Since the discharge is a shoreline discharge the principle of superposition results in the concentration in the plume being doubled at any distance x. Dilution is the mass balance between the flow through the plume and the discharge flow rate and is shown in Equation 4. Based on these calculations and modeling, the Project Site's Action Area was defined.

5.3.2 Results

Using the above relationships, the calculated dilution was conducted for river velocities of 0.5, 1.0, and 2.0 feet/s. In order to determine the reach of the concentrations down the San Jacinto Bay towards potential foraging grounds for species of concern, the velocity, 0.5 feet/s, was used in the dilution modeling. The slower velocity was chosen to identify the EFH in the Action Area because it would encompass a larger area that could potentially impact higher numbers of species based on area. Due to the speed of the current, the concentrations will be less dilute and be distributed the furthest. The faster velocity of 2.0 feet/s was also considered and would reach 1% effluent in a shorter distance (approximately 197 feet with a plume of 46 feet). This area would become more dilute at a shorter distance due to the rapid current and is entirely encompassed within the Action Area based on the 0.5 feet/s velocity (Figure 3). The initial width of the plume was assumed to be about 65 feet (~20 m). The percent effluent drops to less than 10% of the plume about 16 feet downstream of the discharge and when the plume is about 66 feet wide (Table 4). The plume is less than 5% effluent approximately 59 feet from the discharge when the plume is about 69 feet wide. The plume will flow into deep water within the San Jacinto River; therefore, it is expected to only occupy the top of the water column.

Table 4 - Channelview Site Dilution of Discharge to San Jacinto River Tidal

Assumptions	
Width of Discharge Channel (ft)	25.0
Depth of Discharge Channel (ft)	2.0
Discharge Flow Rate (MGD)	7.2
Temperature of Discharge (^oF summer)	91.6
Salinity of Discharge (ppt)	1.2
Current Speed in San Jacinto River (ft/s)	0.5
Depth in San Jacinto River near Discharge (ft)	20.0
Ambient Water Temperature (^oF summer)	88.7
Ambient Salinity (summer, ppt)	2.92

Distance From Discharge Point at San Jacinto River (ft.) (1)	Width of Plume (measured from shoreline, ft.) (2)	Bulk Dilution (3)	% Effluent (4)
3.3	65.1	5.1	20%
6.6	65.4	6.9	15%
9.8*	65.6	8.3	12%
13.1	65.8	9.6	10%
16.4	66.0	10.7	9%
19.7	66.3	11.8	8.5%
23.0	66.5	12.7	7.9%
26.2	66.7	13.6	7.3%
29.5	67.0	14.5	6.9%
32.8	67.2	15.3	6.5%
36.1	67.4	16.1	6.2%
39.4	67.6	16.8	5.9%
45.9	68.1	18.3	5.5%
52.5	68.5	19.7	5.1%
59.0	69.0	21.0	4.8%
65.6	69.4	22.2	4.5%
72.2	69.8	23.5	4.3%
78.7	70.3	24.6	4.1%
85.3	70.7	25.8	3.9%
91.8	71.1	26.9	3.7%
98.4	71.5	28.0	3.6%
105.0	72.0	29.1	3.4%
111.5	72.4	30.2	3.3%
118.1	72.8	31.2	3.2%
131.2	73.6	33.3	3.0%
147.6	74.7	35.8	2.8%
164.0	75.7	38.2	2.6%
180.4	76.7	40.6	2.5%
196.8	77.6	42.9	2.3%
229.6	79.6	47.5	2.1%
262.4	81.4	52.0	1.9%
295.2	83.3	56.4	1.8%
328.0	85.1	60.7	1.6%
393.6	88.6	69.2	1.4%
459.2	91.9	77.6	1.3%
524.8	95.2	85.4	1.2%
590.4	98.3	88.2	1.1%
656.0	101.3	91.0	1.1%
820.0	108.5	97.4	1.0%

984.0	115.3	103.5	1.0%
1312.0	127.8	114.7	0.9%

Note: For Column 2, the vertical and horizontal diffusivities were calculated using the following variables:
$E_z = 0.2\ u^*H$; $E_y = 0.6\ u^*H$; $u^* = (f/8)^{0.5} * u_a$; $u_a = 0.5$ ft/s; H = 20.0 ft; $Q_o = 11.1\ ft^3/s$

For the data used in the analysis E_z and E_y are equal to 0.004 m^2/s and 0.013 m^2/s respectively as shown below.
U* = (0.03/8)^.5 * 0.5 ft/s = 0.031 ft/s
E_z = 0.2 * 0.031 ft/s * 20. ft = 0.124 ft^2/s
E_y = 0.6 * 0.031 ft/s * 20 ft = 0.372 ft^2/s

Sample Calculation for width and depth of the plume at 3.3 feet distance:

Half width $$bv = \left(\frac{\pi * 0.124 \frac{ft2}{s} * 3.3 ft}{0.5 \frac{ft}{s}} + (0.687\ ft)^2\right)^{.5} = 1.74\ ft.$$

Half width of plume $$bh = \left(\frac{\frac{(\pi * 372\ ft^2}{s} * 3.3\ ft}{0.5\ ft/s} + (32.44\ ft)^2\right)^{.5} = 32.6\ ft.\ \text{(full width = 65.3 ft.)}$$

Dilution $$S = \frac{2 * 1.74\ ft * 32.6\ ft}{11.1\ \frac{ft^3}{s}} * 0.5 = 5.11$$

The modeling results indicated that the initial width of the plume was assumed to be about 65 feet (~20 m). The percent effluent drops to less than 10% of the plume about 16 feet downstream of the discharge and when the plume is about 66 feet wide. The plume is less than 5% effluent approximately 59 feet from the discharge when the plume is about 69 feet wide. Within 820 feet of the mouth of the drainage channel, the plume will contain 1% effluent, and the width of the plume will have expanded to 108 feet. The plume will flow into deep water within the San Jacinto River; therefore, it is expected to only occupy the top of the water column.

5.3.3 Conclusions

Within 820 feet of mouth of the drainage channel, the plume will contain 1% effluent, and the width of the plume will have expanded to 108 feet. Outside of this plume area, there is little mixing of the effluent with surrounding surface water. In the absence of background water quality information, this 1% effluent concentration in the plume was used to define the Action Area for the aquatic environment within San Jacinto River Tidal. Due to the deflection of the plume down the river, the conservative Action Area for the San Jacinto River is confined to the portion of the river that is yields 1% effluent concentration.

The dilution modeling used is a conservative model because it assumed that there was no mixing of effluent with surface water neither in the drainage channel nor in Wallisville Gully, and it also assumed that the depth of the San Jacinto River Tidal near the mouth of the discharge channel was only 20 feet deep. In reality, the effluent would be diluted within the discharge channel prior to entering the San Jacinto River. The result of this conservative modeling approach is that the modeling should overestimate the areal extent of the plume in the San Jacinto River Tidal.

As shown in Table 3, the current concentrations within the effluent stream are relatively low in comparison to the permitted levels. These sampled values are taken before the effluent undergoes treatment which will result in a further decrease in concentration levels before being discharged into the San Jacinto River Tidal. Therefore, this dilution model is a conservative view of the maximum concentration dilution.

5.4 Toxicity Assessment

Wastewater that is generated on site and discharged is subject to effluent limitations set in TPDES Permit No. WQ0000391000. Multiple outfalls are utilized by the Channelview Site; however, the proposed project will primarily affect Outfall #001 which is located on the northwest corner of the facility and drains southeast. Outfall #001 is approximately 300 m south of Lyondell Road. The wastewater from Outfall #001 discharges to a non-tidal drainage channel prior to discharging into Wallisville Gully, thence into San Jacinto River Tidal in Segment No. 1001 of the San Jacinto River Basin. The San Jacinto River Tidal is expected to contain aquatic life. Segment No. 1001 is currently listed on the State's inventory of impaired and threatened waters, Texas 2006 Clean Water Act Section 303 (d) list for elevated levels of dioxin, PCBs in fish tissue. The discharge from Outfall #001 does not include these pollutants; therefore, the effluent is not expected to elevate dioxin and PCB concentrations in the impaired segment. Increased levels of permitted chemical concentrations are not expected to be discharged from the affected effluent and will remain within the TPDES limitations. As a result, the proposed project is not anticipated to require an amendment to the existing TPDES Permit (Permit No. WQ0000391000).

Based on a maximum permitted discharge, an assessment of the aquatic life impacts that would be associated with wastewater from the facility was performed using the TCEQ TexTox Menu 10 model. This model is used to calculate effluent discharge limitations to maintain the surface water quality standards based upon the most recent in stream criteria established in 30 Texas Administrative Code (TAC) 302.6 (c) and (d). Numerical water quality criteria were established by the TCEQ for specific contaminants where adequate toxicity information was available and have the potential to adversely impact the water in the state. Applicable criteria were developed in accordance with current EPA guidelines for calculating site-specific water quality criteria. The current permitted water quality discharge limitations were created from the results of a series of effluent sampling as required for the most recent permit amendment. Mixing zone and toxicological assumptions are built into the model. Potential toxic effects on aquatic life resulting from the wastewater discharge were established by the TCEQ for specific toxic compounds where adequate toxicity information is available and that have the potential for exerting adverse impacts on water in the state. The appropriate criteria for aquatic life protection were derived in accordance with current EPA guidelines for developing site-specific water quality criteria. The average of monthly sampling of total suspended solids (TSS), chemical oxygen demand (COD), ammonia (NH_3), chromium (Cr), copper (Cu), lead (Pb), and nickel were sampled is shown in Table 5.

Table 5 - Channelview Site Parameter Concentrations (ug/L) with Permit Limits in Parenthesis

Parameter	TSS	COD	NH_3	Cr	Cu	Pb	Nickel
(lbs/day)	**(7467)***	**(14,420)**	**(434)**	**(2.54)**	**(4.10)**	**(16.6)**	**(15.0)**
(ug/L)	**(124,276.01)**	**(239997.34)**	**(7223.22)**	**(42.27)**	**(68.24)**	**(276.28)**	**(249.65)**
1/01/11-1/31/11	199.72	1551.83	7.16	0.17	0.50	0.17	0.33

02/01/11-02/28/11	264.30	1284.04	5.99	0.17	0.50	-	-
03/01/11-03/29/11	164.60	1427.00	6.16	0.00	0.33	-	-
04/01/11-04/30/11	199.72	1537.18	6.16	0.17	0.33	-	0.02
05/01/11-05/31/11	179.75	1301.84	3.99	0.17	0.33	0.17	-
06/01/11-06/30/11	251.81	1609.25	5.33	0.17	0.33	-	-
07/01/11-07/31/11	220.03	1413.02	8.65	0.17	0.33	-	-
08/01/11-08/31/11	15.64	273.62	86.88	0.17	0.17	-	-
09/01/11-09/30/11	241.33	1591.61	7.32	0.17	0.17	-	-
10/01/11-10/31/11	171.93	1355.44	7.32	0.17	0.17	-	-
11/01/11-11/30/11	235.17	1604.09	7.66	0.17	0.17	-	-
12/01/11-12/31/11	151.95	1301.68	4.49	0.17	0.17	-	-

Note: lbs/day ÷ MGD ÷ 8.345= mg/L*1000= ug/L

* Sample Calculation =7467 lbs/day ÷ 7.2 MGD ÷ 8.345 * 1000= 199.72 ug/L

The federal guidelines 40 CFR part 133 will standardize the discharge of domestic wastewater, and 40 CFR 414 will regulate the discharge of process wastewater. Discharge limitations of the current TPDES permit will remain the same. The Channelview Site has conducted whole effluent toxicity testing routinely as a requirement of the permit. The TCEQ has defined unique dilution factors to assess Outfall #001's drainage channel, Wallisville Gully, and the San Jacinto River Tidal based on applicable discharge volumes, critical low flow, and harmonic mean stream flows. Based on preliminary data for an amended TPDES permit, freshwater criterion will be used for assessing the effluent discharge from the end-of-the-pipe for freshwater features and a marine criterion will be applied in assessments involving the tidal river. The Aquatic Life Surface Water Risk-Based Exposure Limits (SWRBELs) and National Pollutant Criteria Database were used to compare maximum discharge limitations as criteria for aquatic life. Applicable criteria were developed in accordance with current EPA guidelines for calculating site-specific water quality criteria. The Aquatic Organism Bioaccumulation Criteria was used to compare discharge limitations as a criterion for human health consumption of marine fish tissue. The TCEQ used data from the original TPDES permit application to determine current discharge limitations. Effluent dilutions, aquatic organism bioaccumulation, dissolved oxygen, toxicity of aquatic life, toxicity of human health in consumption of marine organisms were modeled using TCEQ guidelines and procedures. As mentioned above, TCEQ will require whole effluent toxicity tests (WET tests) biomonitoring and "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organism, Third Edition" (EPA-821-R-02-014) in order to assess or control potential toxicity. Studies have shown that alternative test organisms used in WET testing are dependable, biological indicators of potential toxic effects and represent listed vertebrate species toxicologically (Mayer et al. 2008; Dwyer et al. 2005; Sappington et al. 2001). Nineteen chronic WET tests have been analyzed for Outfall #001 within 5 years with no demonstration of significant toxicity. Mysid shrimp (*Mysidopsis bahia*) and inland silverside (*Menidia beryllina*) were used in the testing because these species demonstrates the potential for effluent discharges to impact common invertebrate prey species. However, the documentation does not clearly define which dilution factor was used in the test, and the following test showed no significant lethality.

Based on available analytical data screened against calculated water quality-based effluent limitations for the protection of aquatic life, none of the reported data exceeded 70% of the calculated daily average water quality-based limitations for the protection of aquatic life. Therefore, the expected projected discharge which will continue to be below the permitted parameter limitations is believed to be insignificant. Adverse toxicological impacts to aquatic life, including those species in designated essential fish habitat downstream, are not likely to be adversely affected by the proposed Methanol Restart Project.

5.5 Potential Effects to EFH Managed Species

This section presents the results of the analysis of potential impacts to EFH designated species and their potential habitats within the defined Action Area (as defined in Section 2.5) for the proposed project. This analysis is based on the proposed air emissions and dispersion modeling data, proposed changes in the flow rate, chemical composition of the wastewater discharge at Outfall #001, effluent dilution modeling and background review data collected by URS. The following impact sources are included in the analysis:

- **Direct actions on the San Jacinto River Tidal structure:** The proposed Methanol Restart Project will not alter the structure of the San Jacinto River Tidal, and no disturbance to the current substrate is anticipated.
- **Control of run-off during construction and operation:** The Project Site, or area of direct construction disturbance, begins approximately 1,400 meters west of the San Jacinto River. The Action Area has been defined to include the drainage channel, Wallisville Gully, and approximately 1.66 acres of EFH in the San Jacinto River. Current best management practices (BMPs) will be used to prevent additional runoff including sediments or chemicals resulting from construction and operation.
- **Deposition of emissions from operation of the proposed Methanol Unit:** Atmospheric deposition of airborne constituents is expected to be negligible and have no effect on water quality or aquatic habitats in areas where ground-level SIL concentrations for regulated constituents are not exceeded. There is no surface water that is contained within the area of SIL exceedance for NO_2 and PM. The SIL exceedance area does not include EFH within the San Jacinto River and no changes to water quality or EFH should result from deposition. Detailed information about the air emissions analyses can be found in the *Biological Assessment.*
- **Discharge of wastewater:** Operation of the proposed methanol unit will increase the discharge volume of cooling tower blowdown and treated wastewater effluent from the Channelview facility. The treatment facility is equipped to handle the increase and can effectively treat the effluent with corresponding augmentation. The discharge concentrations from the facility (Outfall #001) are not expected to increase and will remain below current TCEQ permitted limitations. A new permit will not be required. Any changes in water quality that result from the Project are expected to be discountable. This is discussed in Section 5.0.

Because the Project will not change the structure of San Jacinto River, project site runoff will be minimized to negligible levels using BMPs, deposition of emissions over the San Jacinto River are expected to be negligible, and effects from the increase in volume of wastewater are expected to be discountable, the proposed project is not expected to significantly affect EFH.

The assessment of potential impacts is limited to protected species within the Action Area. Seven species were identified by the GMFMC for the San Jacinto River. Each of the species is evaluated based on the presence of preferred habitat, potential of occurrence, and potential affects to the species resulting from the proposed project.

Brown Shrimp (Penaeus aztecus)

Brown shrimp are likely to occur within San Jacinto River Tidal, although there is no preferred habitat within the Action Area. Any occurrence of brown shrimp in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on brown shrimp are anticipated as a result of the proposed Project.

White shrimp (Penaeus setiferus)

White shrimp are likely to occur within San Jacinto River Tidal, although there is no preferred habitat within the Action Area. Any occurrence of white shrimp in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on white shrimp are anticipated as a result of the proposed Project.

Red Drum (Sciaenops ocellatus)

Red drums are unlikely to occur within San Jacinto River Tidal and there is no preferred habitat within the Action Area. Any occurrence of red drum in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on red drum are anticipated as a result of the proposed Project.

Dog snapper (Lutjanus jocu)

Dog snappers are unlikely to occur within San Jacinto River Tidal and there is no preferred habitat within the Action Area. Any occurrence of dog snappers in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on dog snappers are anticipated as a result of the proposed Project.

Dwarf sandperch (*Diplectrum bivittatum*)

Dwarf sandperch are unlikely to occur within San Jacinto River Tidal and there is no preferred habitat within the Action Area. Any occurrence of dwarf sandperch in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on dwarf sandperch are anticipated as a result of the proposed Project.

Lane snapper (Lutjanus synagris)

Lane snapper may occur within San Jacinto River Tidal, although there is no preferred habitat within the Action Area due to its industrial nature. Any occurrence of lane snapper in the Action Area would be incidental or transient. Because the Project will not change the structure of Upper San Jacinto Bay, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on lane snapper are anticipated as a result of the proposed Project.

Red snapper (*Lutjanus campechanus*)

Red snapper are unlikely to occur within San Jacinto River Tidal and there is no preferred habitat within the Action Area. Any occurrence of red snapper in the Action Area would be incidental or transient. Because the Project will not change the structure of San Jacinto River Tidal, and effects of runoff, emissions deposition, and wastewater discharge are expected to be negligible and discountable, ***no adverse effects*** on red snapper are anticipated as a result of the proposed project.

6.0 Mitigation Measures

6.1.1 Air Emissions

Equistar plans to utilize the BACT to control emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. The proposed emissions of each pollutant subject to PSD review are consistent with both the TCEQ BACT guidance and the most stringent limit in the RBLC; and, are considered to be the top level of control available for the new and modified facilities.

6.1.2 Water Quality

Wastewater discharges will be subject to TPDES permit limitations, which have been designed to be protective of aquatic and marine species. All wastewater will be treated before being discharged into the SJB Segment No. 2427. A current Stormwater Pollution Protection Plan (SWPPP) will be employed for further precaution.

All wastewater associated with construction and operation of the project will be treated onsite. The project is not expected to produce a substantial wastewater impact.

7.0 Conclusions

A review of air emissions and dispersion modeling data, expected changes in the volume and chemical composition of the wastewater effluent, wastewater effluent dilution modeling, and a review of current literature and publicly available data was conducted to determine the potential effect that the Project would have on EFH in San Jacinto River Tidal and on the seven listed GMFMC managed species with potential for occurrence within San Jacinto River Tidal. The Project will not change the structure of San Jacinto River Tidal, and changes to runoff, emissions deposition, and wastewater discharge are expected to remain negligible and discountable. Further, there is no preferred habitat for any of the seven species within the Action Area. Based on the aforementioned information, ***no adverse effects*** on EFH in San Jacinto River Tidal, nor on the seven listed GMFMC managed species with potential for occurrence within San Jacinto River Tidal, are anticipated from the Project.

8.0 References

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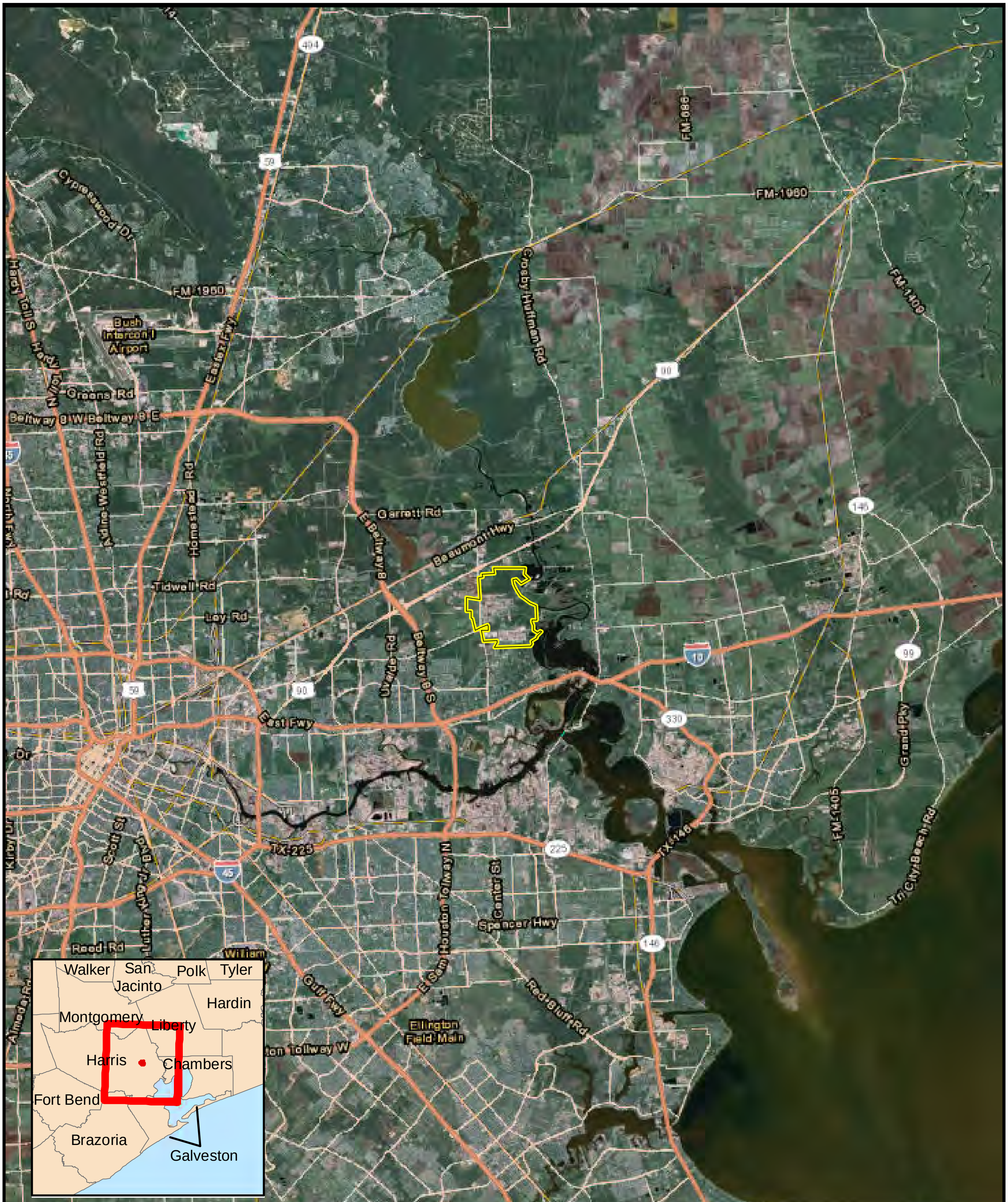
Figures



URS

Equistar - Channelview Site

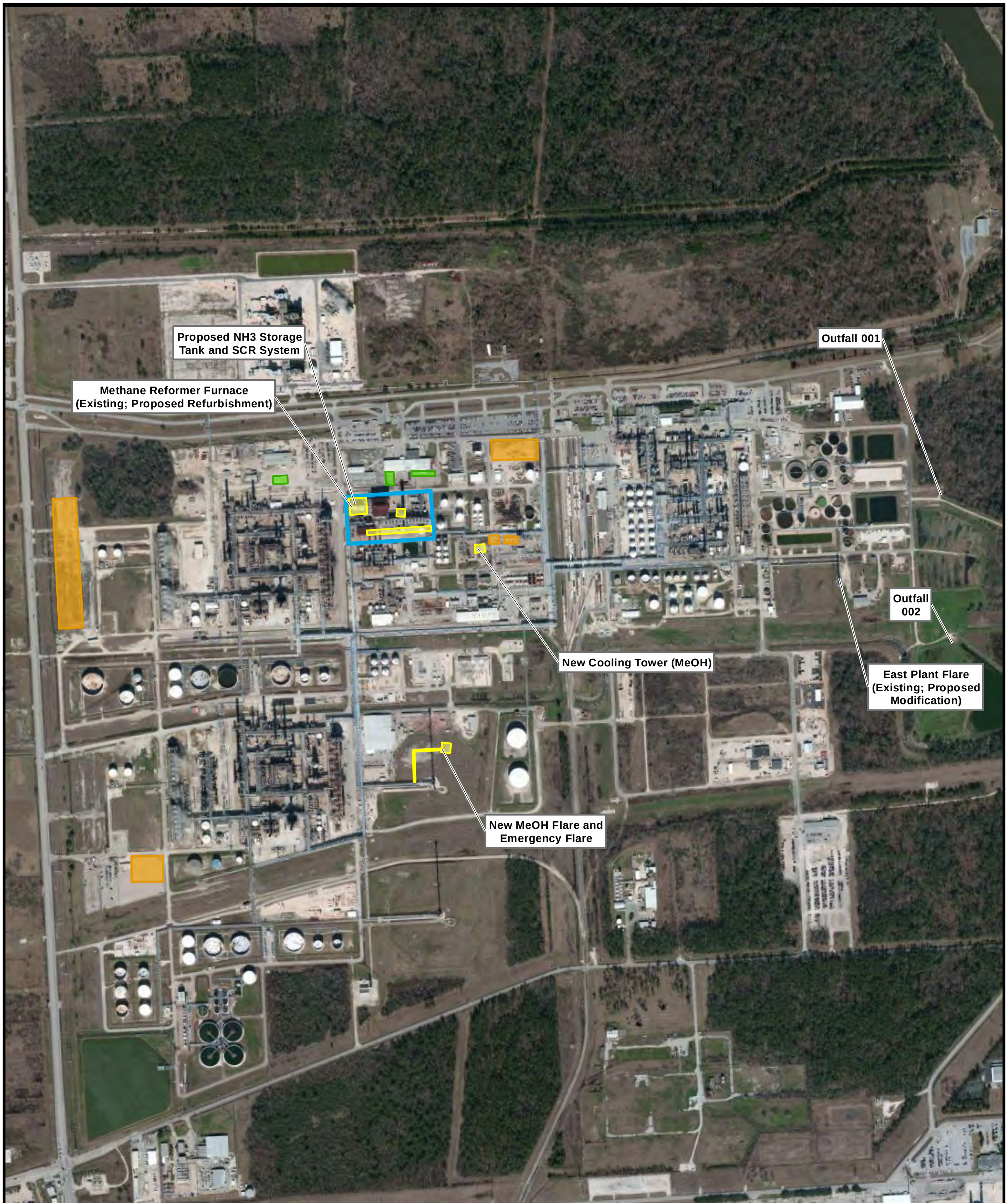
N

0 2.5 5 Miles

Title:	**Vicinity Map**
Project:	**Essential Fish Habitat Assessment Methanol Restart**
Client:	**Equistar Chemicals, L.P.**

Drawn by:	Date:	Project No.:	
AM	9/21/2012	25014882	Figure 1

Path: K:\ENV\ENV30\25014882\GIS\MXD\CV-EFH_MeOH\Fig_1_Vicinity Map.mxd



URS

Property Boundary
Methanol Unit
Blast Resistant Building Locations
Proposed Construction Limits (Ground Disturbance)
Construction Material Laydown and Extra Workspace (Existing)

N

0 500 1,000 Feet

Title:	**Project Area**
Project:	**Equistar Channelview Methanol Restart Project**
Client:	**Equistar Chemicals Company**

Drawn by:	Date:	Project No.:	
AM	12/13/2012	25014882	Figure 2

Path: K:\ENV\ENV30\25014882\GIS\MXD\CV-MeOH\Fig_3_Cultural_Site Layout.mxd

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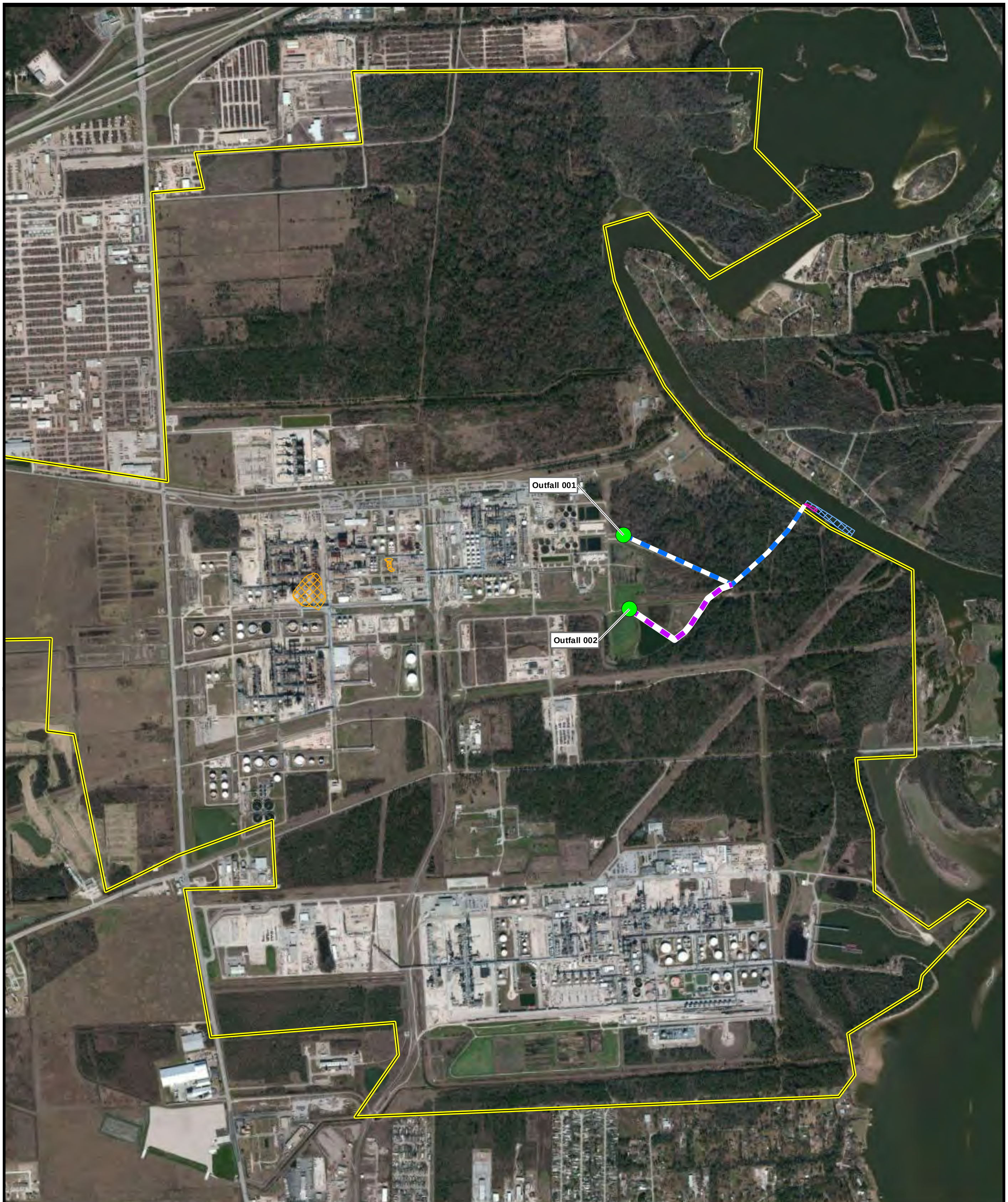

URS

Legend

- Outfall
- Outfall 002 drainage
- Property Boundary

Action Area

- Outfall 001 drainage
- SIL Exceedance Area
- Effluent Dilution Area in EFH 2.0 ft/s
- Effluent Dilution Area in EFH 0.5 ft/s

N

0 750 1,500 Feet

Title: **Action Area Map**

Project: **Essential Fish Habitat Assessment Methanol Restart**

Client: **Equistar Chemicals, L.P.**

Drawn by:	Date:	Project No.:	
AM	12/14/2012	25014882	Figure 3

URS

Legend

- NO2 1-HR SIL
- PM2.5 Annual SIL
- PM2.5/PM10 24-HR SIL
- Property Boundary

N

Feet
0 250 500

Title:	Significant Impact Level Exceedance Map
Project:	Essential Fish Habitat Assessment Methanol Restart
Client:	Equistar Chemicals, L.P.

Drawn by:	Date:	Project No.:	
AM	9/21/2012	25014882	Figure 4

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