INEOS BAYPORT FACILITY ESPN PROJECT

PASADENA, HARRIS COUNTY, TEXAS

Alternative Analysis

Per Section 404 of the CWA and related regulations, it is necessary to analyze alternatives to the proposed project that achieve its purpose. The purpose of the Enhanced Specialties Production in North America (ESPN) project (Project) is to manufacture Acrylonitrile Styrene Acrylate (ASA) product at an ASA-dedicated plant at a location proximate to necessary feedstocks and existing utilities to generate a high-quality specialty product to meet market demands.

No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed project, which would have less adverse impact on the aquatic ecosystem. "The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." 40 C.F.R. § 230.49(q). After considering several alternatives, the Applicant has concluded that to meet the overall project purpose the preferred alternative is the least environmentally damaging practicable alternative (LEDPA) and that all onsite impacts to waters of the U.S. have been avoided to the maximum practicable extent possible.

The off-site alternative locations have been eliminated as the LEDPA based on practicability and in some cases an expected higher extent of impacts to wetlands and other waters of the U.S. The alternative sites include: Chocolate Bayou (Off-site), Green Lake (Off-site), and Bayport (preferred alternative). The off-site locations were selected because they are adjacent to existing INEOS facilities and therefore had the most reasonable likelihood of supporting the project purpose. In addition, multiple Bayport site layouts were reviewed in consideration of minimization and avoidance and are presented as alternatives below.

Alternative 1 -No Action Alternative

Because no other practicable alternative was identified that would not require USACE 404 authorization, a permit denial would result in INEOS cancelling the Project. INEOS would be unable to construct the Project and the Project's purpose and need would not be achieved. The no-action alternative would not result in potential impacts to wetlands or Waters of the U.S. and would not affect threatened and endangered species, nor cultural resources. A USACE 4345 permit application package and required additional information would not be required, no coordination with the Texas State Historic Preservation Office would be required, no Texas Commission on Environmental Quality coordination would be required, no coordination with U.S. Fish and Wildlife Service would be required, no coordination with the Texas General Land Office would be required, and no coordination with Texas Parks and Wildlife would be required.

Alternative 2- INEOS' Chocolate Bayou Site

The Chocolate Bayou Site is located at FM 2004, Alvin, Brazoria County, Texas. This facility lies directly adjacent to Chocolate Bayou, which is tidally influenced. The INEOS property consists of approximately 2,400 acres. None of the key raw materials (Acrylonitrile, Butyl Acrylate, Ethylbenzene, and Styrene) are produced or stored at this existing facility and therefore all would have to be transported to the Site. Pipeline installation and construction of tank storage would be required to support Project needs thereby increasing the Project footprint, adding land impacts, and presenting logistical and cost

constraints. Significant upland acreage previously available for further site development has been used for or dedicated to planned plant expansion. This alternative is not considered practicable because it would not locate the ASA plant proximate to necessary feedstocks and would require new infrastructure such as significant pipeline lengths both on- and off-site (estimated to be over 20 miles) and new tankage. Therefore, it does not meet the Project's purpose and need. Costs for the additional infrastructure to transport raw materials not readily available onsite would be substantial, thereby making this project cost prohibitive.

In addition, the Project footprint would be expected to impact wetlands more extensively than the preferred alternative due to the likely prevalence and dispersion of wetlands, based on digital wetlands data and soil survey data, in the available acreage and the larger necessary Project footprint.

Alternative 3- INEOS' Green Lake Site

Green Lake is located at 13050 TX-185, Port Lavaca, Texas, adjacent to Green Lake along the Victoria Barge Canal, and consists of approximately 4000 acres. The facility is located approximately 22 miles south of Victoria, Texas, within an undeveloped area of Calhoun County. Acrylonitrile is the only project feedstock produced at this site. The additionally required materials for the Project, including Butyl Acrylate, Styrene, and Ethylbenzene, are not available on or near this site. In order to utilize this facility, installation of significant lengths of pipeline would be required in order to transport required materials from Port Lavaca (approximately 20+ miles). Additional pipeline installation onsite and construction of tank storage onsite would be required to support Project needs thereby significantly increasing the Project footprint, adding land impacts, and presenting logistical and cost constraints. Alternative to a long pipeline, the Green Lake barge dock, located on the Victoria Barge Canal, would need to be upgraded to support this plant with related on-site pipelines and tankage, which would result in logistical limitations and substantial additional wetland and waters impacts. This alternative is not considered practicable because it would not locate the ASA plant proximate to necessary feedstocks and would require new infrastructure such as significant pipeline lengths both on- and off-site and new tankage or upgraded and additional barge dock/pipeline/tankage. Therefore, it does not meet the Project's purpose and need. Costs for the additional pipeline infrastructure to transport raw materials not readily available onsite would be substantial, thereby making this project cost prohibitive.

In addition, the Project footprint would be expected to impact wetlands more extensively than the preferred alternative due to the likely prevalence and dispersion of wetlands, based on digital wetlands data and soil survey data, in the available acreage and the larger necessary Project footprint. In particular, if there were an upgraded and additional barge dock/pipeline/tankage, it would impact both significant wetlands and open water.

Alternative 4- Bayport (Preferred Alternative)

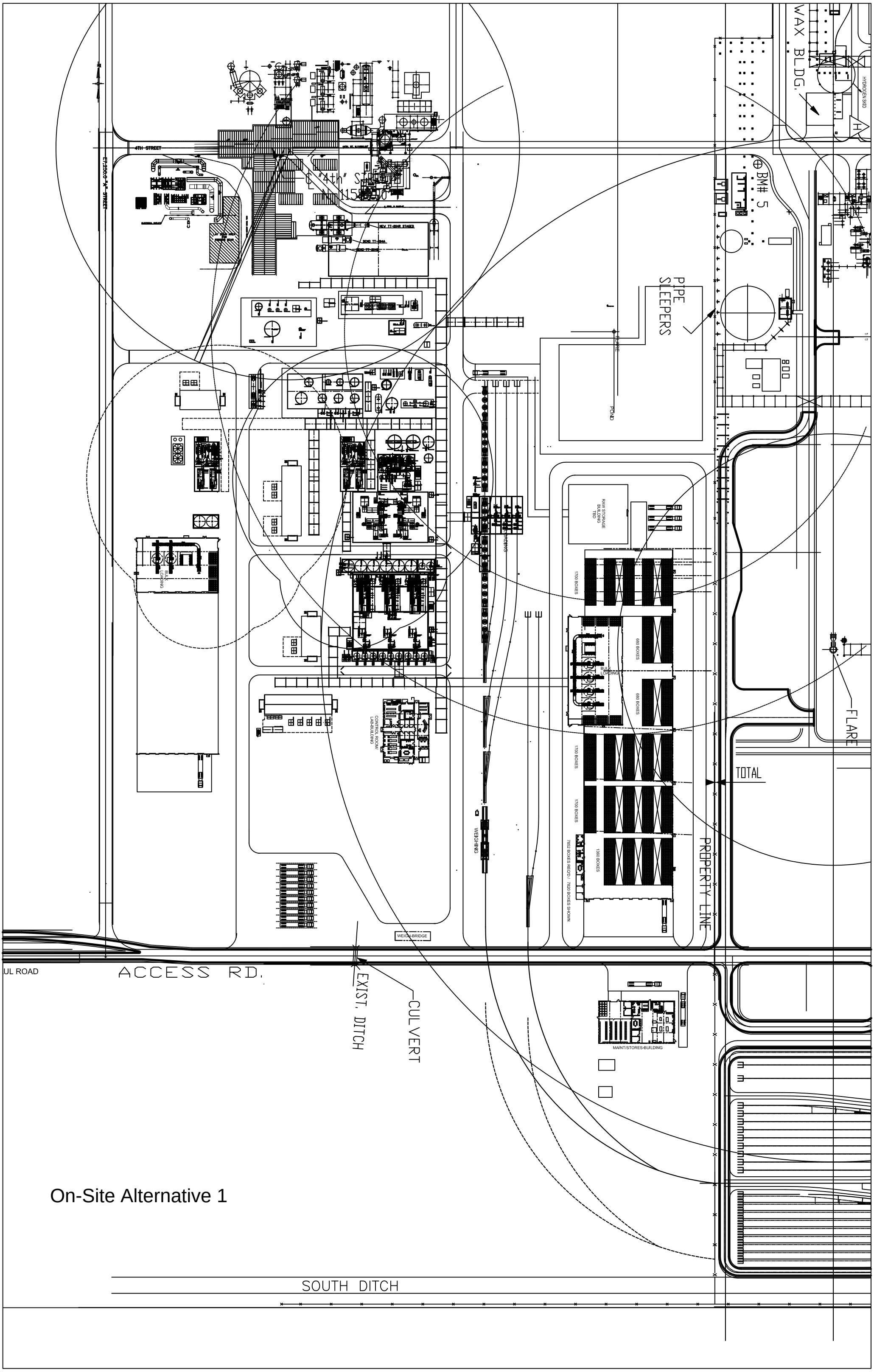
Bayport is located at 12222 Port Road, Pasadena, Harris County, Texas. This facility currently produces Styrene and Ethylbenzene and has existing pipeline access to Acrylonitrile and Butylacrylate tankage across Port Road. The ASA plant requires all four of these chemicals, thus allowing for a smaller Project footprint as additional tanks and pipelines will not be necessary for transportation of materials from distant offsite locations. Facility owned, marginally developed and undeveloped land lies directly south of the existing plant and is available for construction. The ability to rely on access to feedstock and to use steam from the boilers at the existing plant for this Project supports the purpose and need. Availability of land and limited logistical and cost constraints make this alternative practicable.

Because this Preferred Alternative is the only practicable alternative, INEOS focused further on the evaluation of on-site alternatives. While desktop review initially indicated some wetlands and open waters, the Jurisdictional Determination (SWG-2018-00613) issued by the US Army Corps of Engineers (USACE) on January 9, 2019, established the wetlands and other Waters of the U.S. that ultimately drove adjustments to the Project. Based on the Jurisdictional Determination, INEOS completed a detailed engineering and land use review of the Project site to avoid impacts to jurisdictional features, wetlands or waters, and/or minimize those unavoidable impacts through a careful review of the infrastructure design. Below are the on-site alternatives for the Bayport facility that were considered.

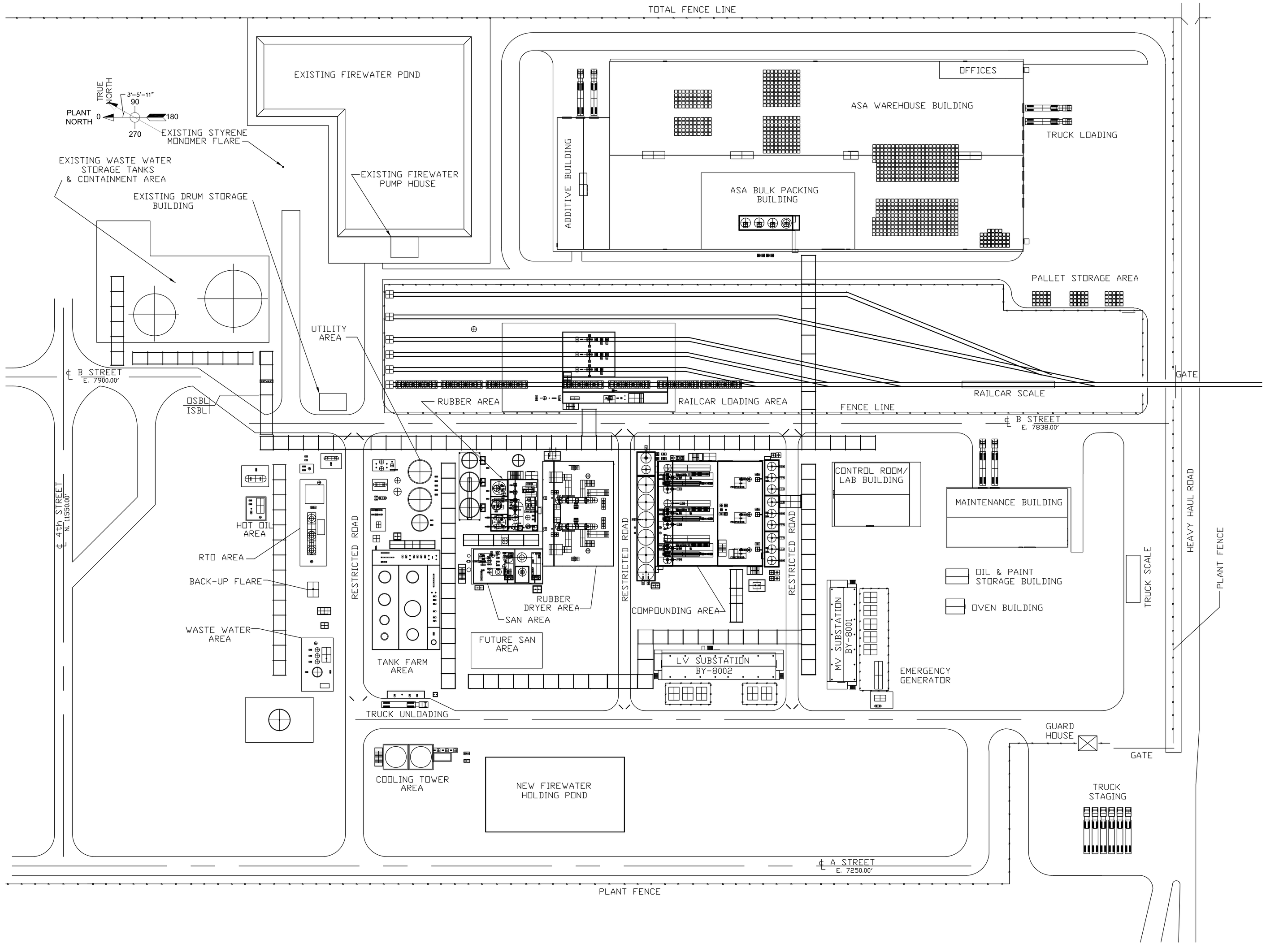
On-Site Alternative 1- See attached Overall Plot Plan Alternative 1. This alternative includes construction of plant support buildings and multiple rail spurs south of the access road. In addition, this alternative includes construction of plant support infrastructure including a raw storage building and bulk truck loading and storage building, as well as a roadway surrounding both within an area south of the existing fire water pond that contains wetlands estimated to be approximately 1.168 acres, though the full extent was not finally delineated. Based on the extent of wetland areas south of the access road and south of the existing fire water pond, this alternative would impact approximately 3.365 acres wetlands and upwards of 0.051 acres of open waters. Accordingly, this alternative is not the LEDPA.

On-Site Alternative 2- See attached Overall Plot Plan Alternative 2. This alternative includes construction of plant support buildings including the Additive Building, ASA Bulk Packaging Building, and ASA Warehouse Building within an area south of the existing fire water pond that contains wetlands estimated to be approximately 1.168 acres, though the full extent was not finally delineated. The rail spur is consolidated to a single rail line below the access road, branching as needed north of the access road. This alternative would impact upwards of approximately 2.495 acres of wetlands and approximately 0.037 acres of open waters. Accordingly, this alternative is not the LEDPA.

On-Site Alternative 3 (Preferred On-Site Alternative)- See attached Overall Plot Plan Alternative 3. This alternative avoids and minimizes wetland and waters impacts to the maximum extent practicable through engineering and design adjustments. The Project elements were concentrated north of the access road where wetlands are less prevalent and shifted to the west to the maximum feasible, to entirely avoid the wetlands below the existing firewater pond. The rail spur is consolidated to a single rail line below the access road, branching as needed north of the access road. Impacts to open waters were minimized and limited to three culverts, one associated with the railway and two associated with driveways for the parking area located within an upland area south of the access road. This alternative would impact approximately 1.327acres of impacts to wetlands and 0.037acres of open waters. Accordingly, this alternative is the proposed LEDPA.



On-Site Alternative 1



GENERAL NOTES:

GENERAL HOLDS:

NOTES:

HOLDS:

REV	DATE	DESCRIPTION	BY	CHK	APP	CLIENT
C	03/07/2018	ISSUED FOR USE	MN	DS	DS	TB
B	02/12/2018	ISSUED FOR SQUAD CHECK	MN	DS	DS	TB

WorleyParsons
resources & energy

INEOS
STYROLUTION

CLIENT/PROJECT TITLE

ENHANCED SPECIALTIES PRODUCTION IN NORTH AMERICA (ESPN)

PROJECT NO.
208005-00071
WP#:208005-00071-00-PI-DPP-0001

ASA PLANT
ESPN - INEOS STYROLUTION
BAYPORT PLANT, PASADENA, TX. USA
PLOT PLAN

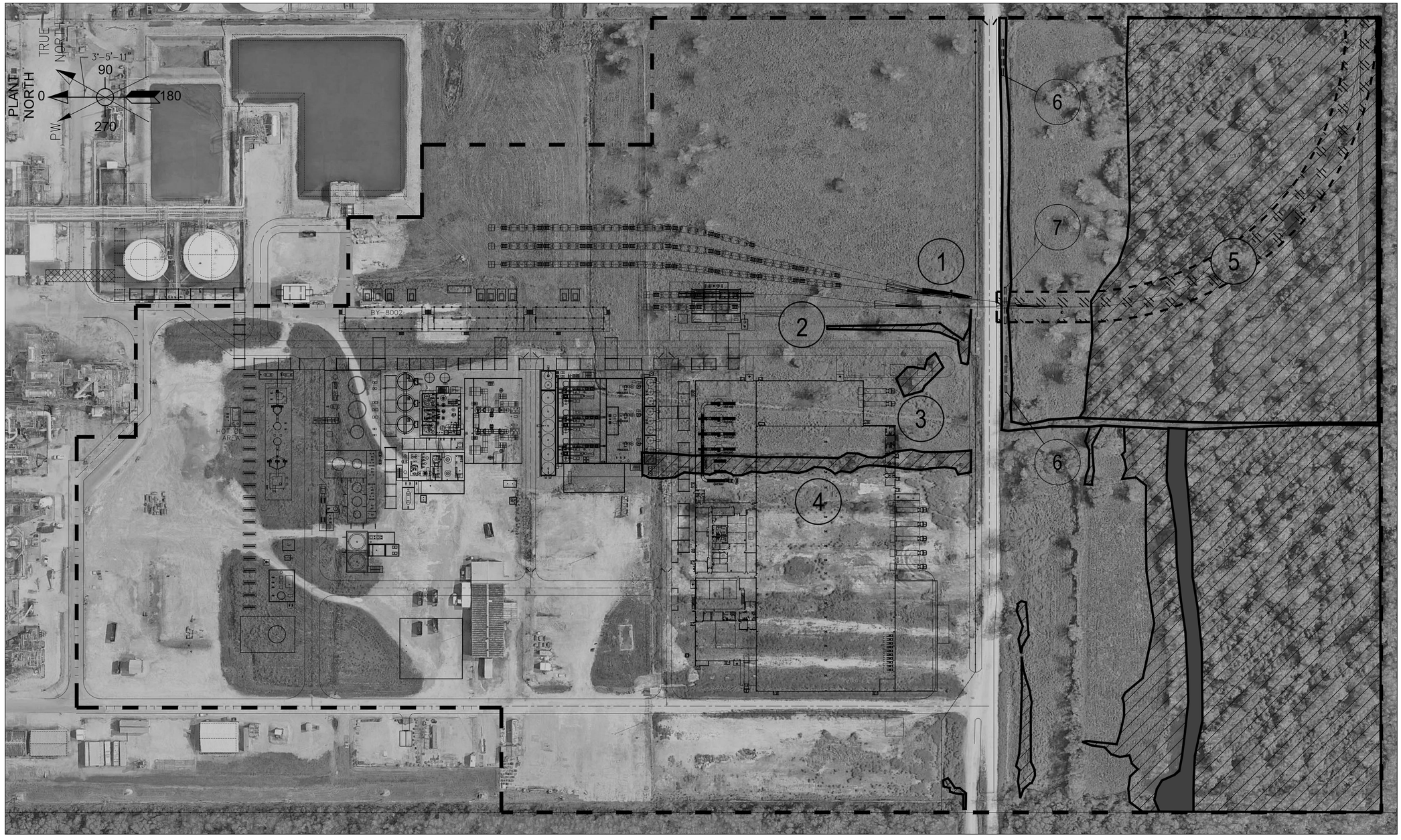
SCALE
3/16"=12'-0"

DWG. NO.
03-D-01000-0001

REVISION
C

D 34 x 22

On-Site Alternative 2



SEE WETLANDS PROJECT IMPACT DRAWING FOR WETLANDS AREA FILL INFORMATION.

On-Site Alternative 3 (Preferred Alternative)

LEGEND

FUTURE	WATERS OF THE US	WETLANDS
NEW CONSTRUCTION	AREA OF INTEREST	50' CLEARANCE @ RAILROAD

ASA WETLAND SITE PLAN

REV	DATE	DESCRIPTION	BY	CHK	APP	CLIENT
D	05/09/2019	ISSUED FOR USE	REE	HC	DS	
C	01/16/2019	ISSUED FOR USE	TN	HC	DS	
B	01/02/2019	RE-ISSUED FOR WETLAND PERMIT	TN	HC	DS	
A	07/24/2018	WETLAND PERMIT DRAWING	RW			

WorleyParsons resources & energy

INEOS STYROLUTION

CLIENT/PROJECT TITLE

ENHANCED SPECIALTIES PRODUCTION IN NORTH AMERICA (ESPN)

PROJECT NO.
208005-00071
WP#: 208005-00071-00-CI-DSK-0002

ASA PLANT
AREA X
WETLAND SITE PLAN LOCATIONS
WETLAND PROJECT IMPACT

SCALE
1:1000

DWG. NO.
208005-00071-00-CI-DSK-0002

REVISION
D

D 34 x 22