2. PROPOSED ACTION AND ALTERNATIVES

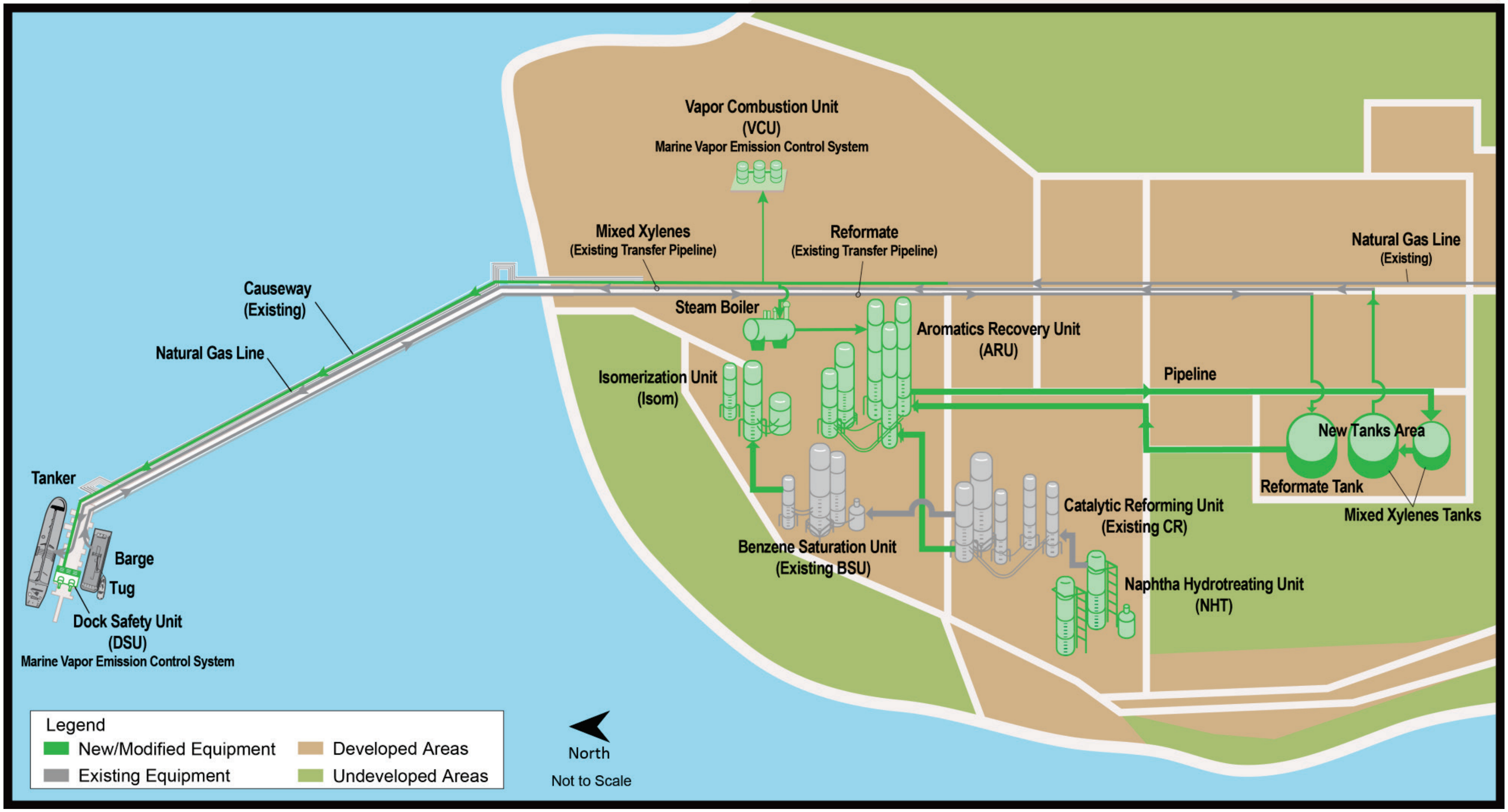
This Draft EIS evaluates potential changes in the environment that would result from the proposed Tesoro Clean Products Upgrade Project (CPUP) and the no action alternative. The objective of the proposed project is to improve the Tesoro Anacortes Refinery's capability to deliver cleaner transportation fuels and to produce a new product, mixed xylenes. The USEPA is requiring refineries to produce cleaner transportation fuels, termed Tier 3 fuels, and specifically, that refineries produce gasolines with a lower level of sulfur beginning January 1, 2017. Currently, Tesoro is using a sulfur credit averaging, banking, and trading program to comply with the Tier 3 fuel requirements. Tesoro is required to meet the Tier 3 standards in order to sell gasoline in the U.S. market.

This chapter provides an overview of existing refinery operations and describes in detail the proposed project components, as well as construction and operation of those proposed project components. Basic information about characteristics of mixed xylenes, the production of mixed xylenes, and the shipment of mixed xylenes by marine vessel is provided. Only the proposed project and a no action alternative are described below.

2.1. OVERVIEW OF PROPOSED ACTION

The proposed project involves additions and upgrades at the Tesoro Anacortes Refinery that would enable Tesoro to produce an average of 15,000 barrels per day (bpd) of mixed xylenes along with lower sulfur transportation fuels. The mixed xylenes would be loaded onto marine vessels using the existing refinery wharf structure, and exported to global markets. Tesoro anticipates approximately five additional vessels a month would be needed to support the production and shipment of mixed xylenes.

The majority of proposed project activities would occur within developed areas of the refinery. The one exception is a new storage tank area that would be constructed on upland areas that are currently leased for agricultural grazing (see Figure 2-1).



Note: Figure is not intended to be an accurate representation of the facility boundaries.

Figure 2-1: Project Components

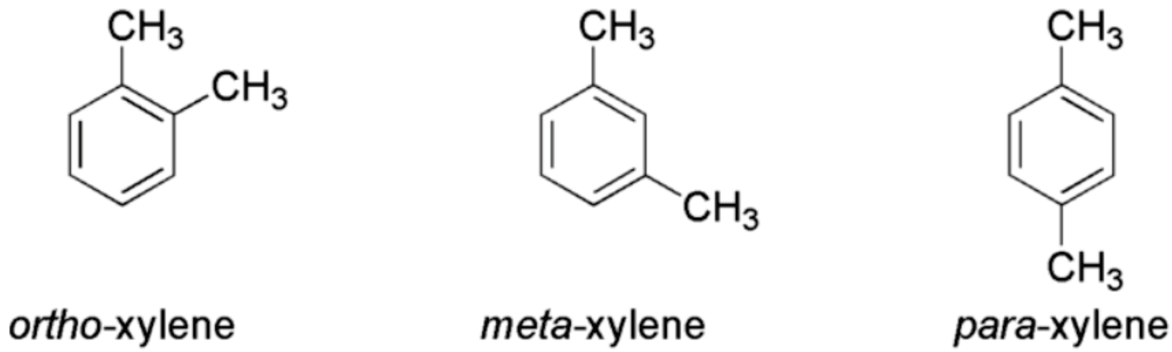
The proposed project involves expansion/construction and operations of the following components within the refinery (see Figure 2-1 and 2-2):

- Project components to produce lower sulfur fuels:
  - Expand the naphtha hydrotreater (NHT) to remove additional sulfur in the refining process.
  - Install an Isomerization (Isom) Unit to transform hydrocarbons into higher-octane gasoline components for blending.
- Project components to produce xylenes:
  - Install an aromatics recovery unit (ARU) to produce 15,000 bpd of mixed xylenes.
  - Install a steam boiler for additional energy needed to run the new process units.
  - Install a Marine Vapor Emission Control (MVEC) System to capture vapors during product loading from docked marine vessels. The MVEC System consists of two physical components: the Dock Safety Unit (DSU) located on the refinery wharf structure and the Vapor Combustion Unit (VCU) located onshore.
  - Install three storage tanks in the New Tanks Area (to store reformate and mixed xylenes).

The proposed project would produce mixed xylenes, which is a new product for the refinery. Two new process chemicals, sulfolane and aqueous ammonia, would be used in the production of mixed xylenes. The other chemicals and feedstocks used for the proposed project are materials that are routinely used at the refinery now and that do not require substantive changes to existing refinery practices. Increases in material usage due to the proposed project are discussed in Section 2.8.4.

Xylenes are one of the top 30 chemicals produced in the U.S. in terms of volume (ATSDR 2007). Xylenes are monoaromatic (i.e., containing one benzene ring) hydrocarbons, whose properties and toxicology are well understood. The term “mixed xylenes” is used because the product would not contain pure xylene, but a mixture of approximately 82 percent xylene and 18 percent ethylbenzene, another hydrocarbon with similar characteristics. There are three forms of xylene, which are referred to as isomers (i.e., compounds with the same formula but with a different arrangement and properties): ortho-xylene, meta-xylene, and para-xylene (see Figure 2-3).

Figure 2-2: Project Area and Vicinity Map



Note: The position of the methyl groups (CH3) (around the benzene ring) determines the name of the isomer.

Figure 2-3: Xylene Isomers

Mixed xylenes are already present at the refinery because they are naturally found in crude oil and are present in the fuels currently produced. The new mixed xylenes that would be produced by the proposed project would be extracted from reformate. Reformate is a high octane liquid derived from refining crude oils and commonly used in blending gasoline to get various octane ratings. Reformate includes xylenes as well as other aromatic chemicals such as toluene, trimethylbenzene, and ethylbenzene, octane, and isopropylbenzene (see Table 2-1). Reformate is currently produced from crude oil at the refinery and imported in very small amounts to the refinery via existing shipping routes, see Section 2.8.4.2. The reformate feedstock and mixed xylenes product would be stored in new storage tanks in the New Tanks Area. The proposed project anticipates loading approximately 5,475,000 barrels (bbl) per year of mixed xylenes product at the existing wharf for periodic shipping by marine vessel. Xylenes would be transferred to the wharf from the New Tanks Area using existing piping.

Table 2-1: Components of Reformate and Mixed Xylenes

Component	Reformate (wt%)	Reformate (backhaul) (wt%)	Mixed Xylenes (wt%)
Xylene Isomers	55	0	82
Toluene	7	21	0
Trimethylbenzene	21	64	0
Benzene	0	0	0
Ethylbenzene	12	0	18
Octane (and isomers)	4	12	0
Isopropylbenzene	1	3	0

See Appendix 13-A, Fate and Behavior Analysis in the Marine Environment: Reformate and Mixed Xylenes

Mixed xylenes are a clear, water-insoluble liquid with a sweet odor. If released to the environment, it volatizes quickly into the atmosphere and is degraded by ultraviolet sunlight into carbon dioxide and water (ATSDR 2007). These compounds also biodegrade in soil and water through bacterial action and are accumulated in plants and animals in only very limited amounts (ATSDR 2007). Xylenes are flammable and can be acutely toxic to ecosystems and humans, depending on the dose of the chemical (the concentration), the exposure route, and how long the exposure occurs. Xylenes are, however, less flammable than common grades of gasoline. Direct contact with xylenes can cause skin or eye irritation. If vapors are inhaled, respiratory irritation, headaches, or dizziness may result. Depending on the dose, exposure route, and the length of exposure, there is evidence that kidney damage or nervous system damage may occur in mammals (ATSDR 2007). The chemical is not a known carcinogen.

2.2. Benefits and Disadvantages of Delaying Implementation

The State Environmental Policy Act (SEPA) requires that an EIS discuss the benefits and disadvantages of delaying implementation of a proposed project (WAC 197-11-440(5)(c)(vii)). The urgency of implementing the proposal can be compared with any benefits of delay. The foreclosure of other options should also be considered; that is, if implementation of the proposal would preclude implementation of another project at a later time.

If the proposed project were postponed, the direct, indirect, and cumulative impacts associated with the project would be delayed. This delay could delay the economic benefits that could be sustained or increased by employment and tax revenues generated from the construction and operation of the proposed project. A delay would hinder Tesoro from meeting the Tier 3 sulfur reduction gasoline requirements. If the proposed project were implemented, the refinery sites for the new units and tanks would be available for future development; however, there are no proposals to use these areas for an alternative project at this time.

2.3. Proposed Project Location

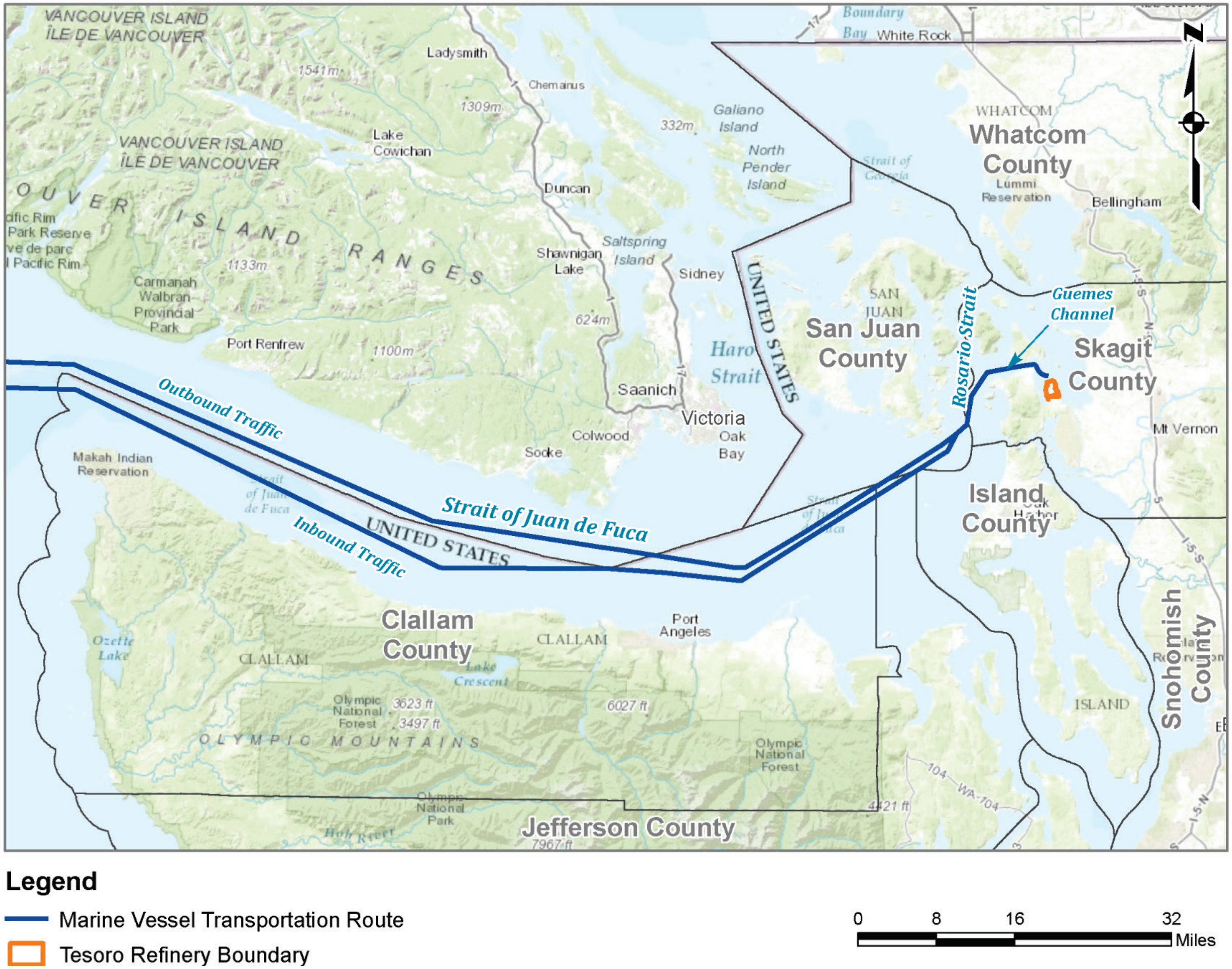
The proposed project would be located at the Tesoro Anacortes Refinery in western Skagit County on the northern half of the March Point peninsula on Fidalgo Island east of the city of Anacortes (see Figure 2-2). The refinery property is bounded by West March Point Road and Fidalgo Bay to the west; March Point Road and Fidalgo/Padilla Bay to the north; East March Point Road, several residential properties, and Padilla Bay to the east; and North Texas Road and the Shell Puget Sound Refinery to the south. The Tesoro Anacortes Refinery can be accessed via State Route 20 to the south.

The Tesoro Anacortes Refinery consists of approximately 1,020 acres. Land comprising the proposed project area is owned by Tesoro. The refinery's existing marine wharf system is located and operated on state-managed aquatic lands, consistent with the terms of the aquatic lands commercial lease with the Washington Department of Natural Resources (WDNR).

The proposed project area includes the areas planned for the proposed project components (including the NHT, Isom Unit, ARU, the DSU and the VCU [the two major components of the MVEC System], and the New Tanks Area), and the temporary construction laydown areas within the refinery boundaries, as well as the two areas planned for road improvements on North Texas Road adjacent to the refinery to the south (see Figure 2-2). North Texas Road is outside the refinery, bisects March Point into north and south and separates the Tesoro Anacortes Refinery from the Shell Puget Sound Refinery to the south. The proposed project area does not include the Chemtrade facility adjacent to the refinery that provides hydrogen sulfide and sulfuric acid processing services for the Tesoro Anacortes Refinery.

In addition to the proposed project areas within the refinery boundary, the proposed project would include transport of products along the marine vessel transportation route from the existing refinery wharf structure to the edge of U.S. territorial waters in the Pacific Ocean, approximately 12 nautical miles seaward of the entrance to the Strait of Juan de Fuca (see Figure 2-4). The marine vessel transportation route includes two lanes of traffic, both outbound (westbound) and inbound (eastbound) vessel traffic lanes. These vessel traffic lanes are jointly managed by the U.S. Coast Guard and the Canadian Coast Guard under the Traffic Separation Scheme (TSS). The TSS separates inbound and outbound vessel traffic into designated lanes. In the Strait of Juan de Fuca, the eastbound traffic separation lane is on the south (U.S.) side of the international border and the westbound lane on the north (Canadian) side (PSPA 2016). Each TSS lane is 0.5 mile wide, with at least a 0.25-mile separation zone between the lanes (PSPA 2016). The marine vessel transportation route includes passage through the Strait of Juan de Fuca and its approaches, Rosario Strait, Guemes Channel, and Fidalgo and Padilla bays (see Figure 2-4). These waters lie mostly in the U.S. and partially in Canada.

Additional transportation routes would be used to move proposed project components and materials to the refinery during construction. Proposed project components and associated materials would be delivered as ocean freight from domestic and overseas suppliers to Anacortes for subsequent overland delivery via truck to the refinery. Daily material deliveries during construction, operations, and maintenance are anticipated along local designated truck routes, primarily State Route 20 and West March Point Road.



Note: Depicts approximate track lines through Strait of Juan de Fuca. Exact track lines are available via NOAA Nautical Chart 18400.

Figure 2-4: Marine Vessel Transportation Route from the Refinery to the Pacific Ocean

2.4. Existing Refinery Design and Operations

This section provides an overview of the refinery operations focusing on the safety processes and systems in place to prevent accidents, including spills. This information is summarized from Tesoro's oil spill prevention and control plans (Tesoro 2012, 2016d), and other plans and safety information provided by Tesoro (Tesoro 2016e).

2.4.1. Existing Refinery Facilities

The refinery property consists of approximately 1,020 acres. Approximately 380 acres of the refinery is developed with the remaining 640 acres consisting of undeveloped pasture land and vegetated areas. Of the 380 acres, about 50 acres are process area with the remaining 330 acres consisting of other developed areas such as tank farms, office buildings, parking, and storage areas. Two main facilities of the refinery that are not located within the refinery property boundary are the causeway structure (wharf approach structure) and the wharf structure (Wharf Operations Manual; Tesoro 2016f).

2.4.2. Existing Refinery Operations

The refinery receives approximately 120,000 bbl of crude oil each day. Crude oil is received via three transportation methods: marine vessel, pipeline, and rail. Crude oil is supplied to the refinery via pipeline from Canada, via oil tankers from Alaska's North Slope and foreign sources, and by rail from North Dakota and the central U.S. (Tesoro 2016a). The sources and volume of crude oil received via these three transportation methods vary based on constantly changing business drivers. The delivery of crude oil to the refinery via marine vessel, pipeline, and rail is limited by the current physical constraints of the wharf facility, pipeline, rail unloading facility and refinery infrastructure. There are no permitted volume limits or permitted daily limits of crude oil received through any of these methods. The proposed project would not change the refinery's crude oil processing capacity, the capability to receive crude oil, or the method and number of crude oil deliveries via marine vessel, pipeline, or rail.

The refinery separates crude oil into its various component parts, which are further processed and blended into a variety of petroleum products. Current petroleum products produced at the refinery are gasoline, jet fuel, diesel fuel, liquid petroleum gas, and industrial fuel oil. Actual product mix and volumes vary based on market conditions; however, the refinery currently produces a range of common petroleum-based products from a barrel of crude, as illustrated on Figure 2-5.

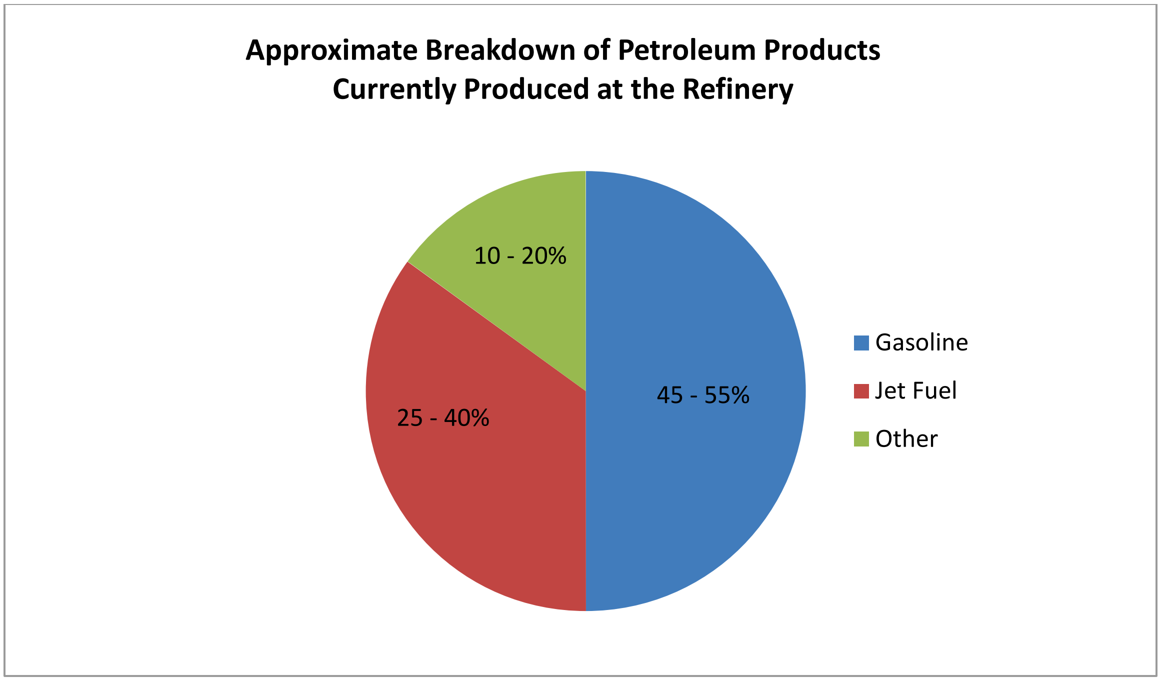


Figure 2-5: Petroleum Product Breakdown–Current Production

The refinery can deliver these products to customers through a combination of marine vessels, pipeline, truck, or rail. The refinery supplies gasoline, jet fuel, and diesel fuel to markets in Washington and Oregon through a third-party pipeline system. The facility also supplies refined products, including gasoline and its components, to other markets such as California via marine vessels and barges through the refinery's deep-water wharf facility (Tesoro 2016a). Local supplies of diesel, gasoline, and propane can also be shipped via tanker truck. The refinery currently produces an average of 118,000 bpd (annualized) of refined products (based on 120,000 bpd crude oil throughput).

The refinery has a number of programs to assure safe and reliable operations and to prevent accidents from occurring. Those programs are described in more detail in Appendix 2-A, Existing Programs and Operations.

2.5. Proposed Project

A schematic of the proposed process is shown on Figure 2-6, with the modified and new proposed project components drawn in red. The proposed project involves modifying existing units and installing a variety of new equipment and structures within the existing refinery footprint, including the existing wharf. Installation would consist of several new structures up to 195 feet high, a boiler with a stack approximately 130 feet high, storage tanks up to 60 feet high, vessels and reactors, elevated power distribution center buildings, towers, coolers, pipe racks, and other equipment. The following sections provide a brief description of each of the five major proposed project components: the NHT, Isom Unit, ARU, MVEC System, and New Tanks Area.

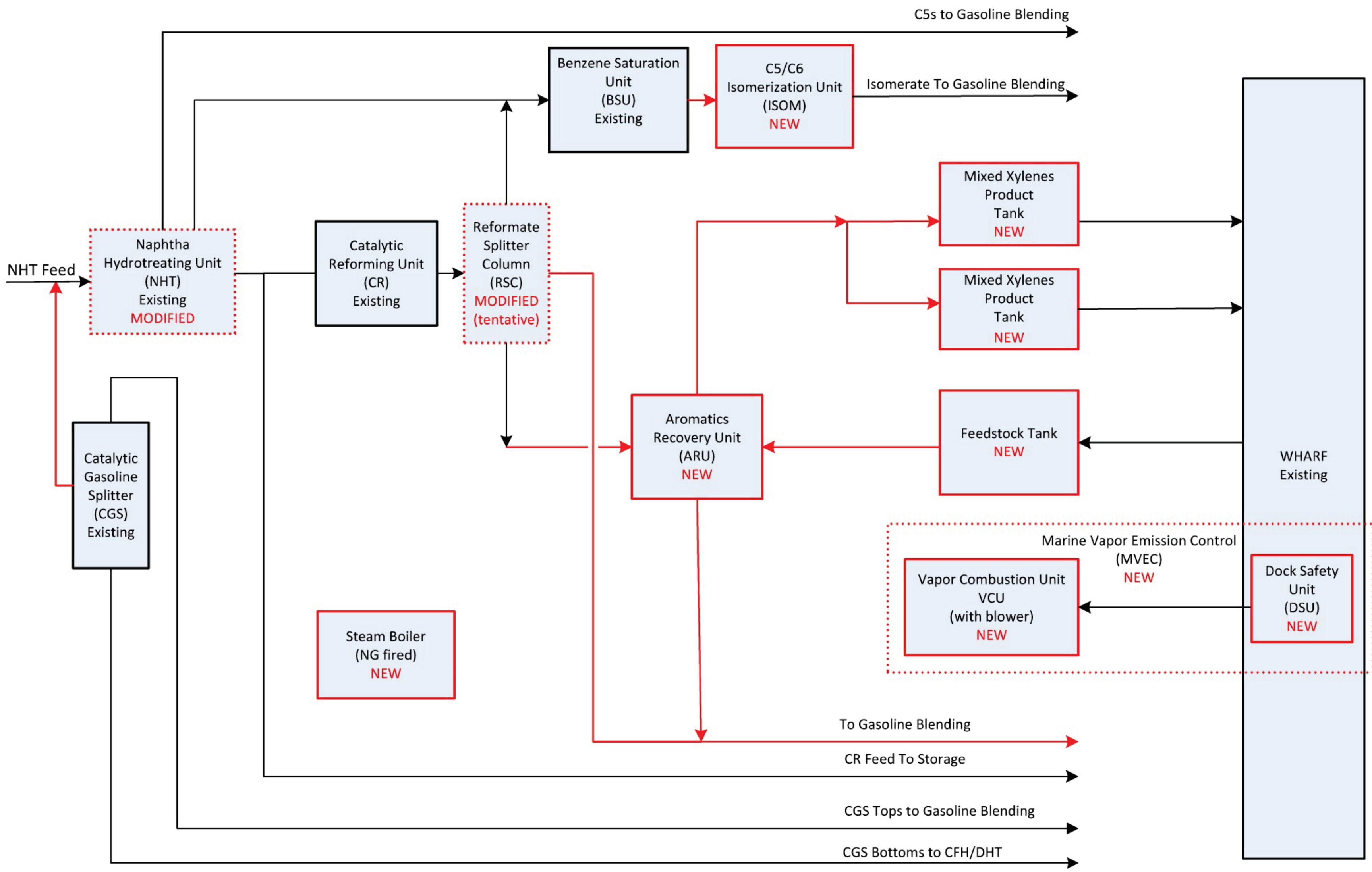


Figure 2-6: Simplified Process Flow Diagram

Overall, the refinery would produce less gasoline-like materials because the mixed xylenes (currently present as a component of the gasoline-like materials at the refinery) would be removed and sold separately. Product mix and volumes produced at the refinery as a result of the proposed project would vary based on market conditions; however, the range of common petroleum-based products that would be produced at the refinery from a barrel of crude oil following the proposed project's completion is illustrated on Figure 2-7.

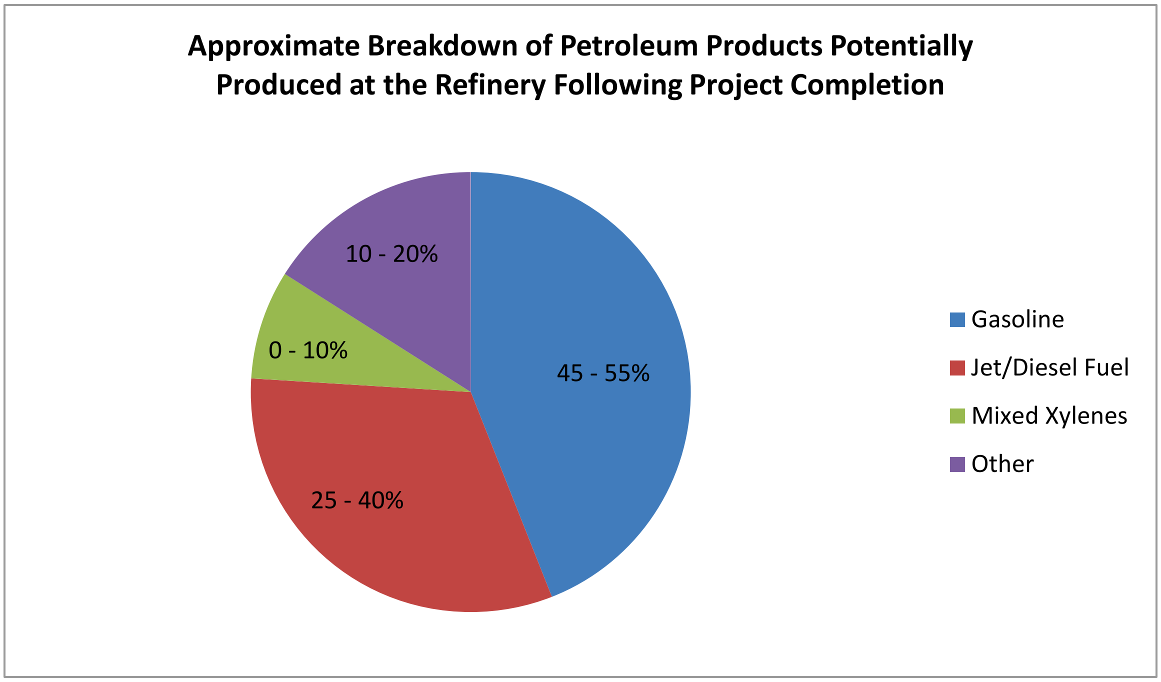


Figure 2-7: Petroleum Product Breakdown, Potential Production

2.6. Proposed Project Facilities

2.6.1. Naphtha Hydrotreater Expansion

The existing NHT would be modified to increase processing capacity and further reduce the sulfur content in gasoline, as required by the USEPA Tier 3 regulations (Tesoro 2015b). The NHT is a reactor that uses hydrogen and a catalyst to remove contaminants, such as sulfur, from the feedstock. NHT processing capacity would increase by about 15 percent, from 40,000 to 46,000 bbl of naphtha per day. The location of the NHT expansion is shown on Figure 2-8.

The product streams from the NHT are process gas, gasoline-like materials, and feed to the downstream Benzene Saturation Unit and Catalytic Reforming Unit (Tesoro 2016c).

Minor changes in operations and maintenance of the NHT would occur due to the expanded NHT. No changes are being proposed at the downstream Catalytic Reforming Unit. The Catalytic Reforming Unit currently uses a catalytic process to convert low-octane naphtha into reformate, a high-octane gasoline intermediate blendstock.

Figure 2-8: Naphtha Hydrotreater (NHT) Expansion, Isom Unit, and Aromatics Recovery Unit (ARU)

The reformate is directed to a reformate splitter column where it is currently divided into two different streams:

- Light reformate feeding the Benzene Saturation Unit
- Heavy reformate used for gasoline blendstock

A new side-draw to the distillation column would be installed as part of the proposal that would allow the reformate to be split into the following three streams instead of just two:

- Light reformate feeding the Benzene Saturation Unit which reduces the benzene concentration in gasoline prior to feeding the new Isom Unit
- Medium reformate used for gasoline blending
- Heavy reformate, consisting of several gasoline-range chemical compounds that includes mixed xylenes, that would be processed at the new ARU

2.6.2. New Isomerization Unit

A new Isomerization (Isom) Unit would be installed to process light hydrocarbons to produce a low sulfur, low benzene, relatively high octane gasoline blending component, called isomerate, to allow the refinery to economically meet the new clean fuel standards. Isomerate has a high octane rating and is used for gasoline blending to prevent knocking in internal combustion engines. Because xylene also has a high octane rating, the production of isomerate compensates for the loss of octane associated with the removal of mixed xylenes for a separate commercial product. Isomerate is also low (i.e., depleted) in both sulfur and benzene.

While the NHT expansion would reduce the overall gasoline blending ability at the refinery, the new Isom Unit would produce a high octane blending component to maintain gasoline blending viability at the refinery. Reductions in sulfur and benzene are also necessary for the refinery to meet the new clean fuel standards. Perchloroethylene, a chemical already used at the refinery, would be stored in a new tank within the Isom Unit and injected into the process as a reaction promoter. The location of the Isom Unit is shown on Figure 2-8.

The Isom Unit would be added downstream and integrated into the existing Benzene Saturation Unit; see Figure 2-8 (Tesoro 2016c). The Benzene Saturation Unit processes light naphtha from the overhead of the NHT’s dehexanizer column and light benzene-rich reformate from the overhead of the Catalytic Reforming Unit’s reformate splitter column to catalytically hydrogenate the benzene into cyclohexane. The light hydrocarbons liquid product from the Benzene Saturation Unit reactor would feed the Isom Unit (Tesoro 2015b).

2.6.3. New Aromatics Recovery Unit and New Boiler

The ARU is the proposed process unit that would be used to recover mixed xylenes from reformate. The remaining gasoline, after the mixed xylenes are removed, is a valuable gasoline blendstock (Tesoro 2015b). The ARU would process heavy reformate from the existing Catalytic Reforming Unit process, as well as reformate imported from external sources (see Section 2.8.4.2). The location of the ARU is shown on Figure 2-8.

The ARU would use both distillation and extractive distillation with sulfolane solvent to produce a mixed xylenes product that meets commercial specifications for chemical feedstock, in addition to the gasoline blendstock (Tesoro 2016c). The sulfolane used in the extraction process would be stored in a new tank located within the ARU. The process involves well-known and proven technology used at refineries and other industrial facilities worldwide. The mixed xylenes product would be stored and periodically shipped by marine vessel via the existing wharf structure. After xylenes have been removed from the reformate feedstock, the remaining ARU byproduct would be used in gasoline blending or marketed/backhauled to other refineries as a gasoline blendstock (see Section 2.8.4.2).

A new, natural-gas-fired boiler and associated feedwater tank would be installed to the ARU to provide process heat needed for the proposed project. The boiler would also supply steam to the expanded NHT. The boiler would be rated at 584 million British thermal units per hour.

The new steam boiler would be equipped with low nitrogen oxides (NOx) burners, a selective catalytic reduction device to control NOx emissions, and an oxidation catalyst to control carbon monoxide (CO) emissions. Selective catalytic reduction is a standard emission control device that uses 19 percent aqueous ammonia to convert NOx from the new boiler to nitrogen and water (Tesoro 2016c). The distillation columns in the ARU would have process vents routed to the firebox of the new boiler or to the flare gas header. If the latter, the vented gas would be recovered, treated, and directed to the fuel gas system.

2.6.4. New Marine Vapor Emission Control System

A new high efficiency/low emission MVEC System would be used to control volatile hydrocarbon emissions from marine transfer operations. The system would control emissions from the proposed loadings of mixed xylenes product and existing transfers of gasoline-range materials and crude oil. The MVEC System capacity and design is based on the highest potential emissions anticipated during transfer.

The MVEC System consists of two major components, the DSU located on the wharf, and the VCU located in the refinery; see Figures 2-9 through 2-11. Displaced vapors from loading marine vessels would be collected by vapor hoses and routed to the DSU, which enriches the vapors with natural gas, as needed, to safely manage the vapor recovery system. They would then be routed through an existing available 12-inch line on the causeway structure, through a blower, and to the new VCU in the refinery for combustion. The MVEC System would be sized for an approximate instantaneous loading rate of 13,000 bbl per hour. To adequately support the MVEC System, a new 3-inch natural gas line would be routed from an existing natural gas line within the refinery to both the DSU and the VCU (Tesoro 2016c). The line would provide enrichment gas to the DSU and support gas to the VCU to optimize combustion efficiency (Tesoro 2016c).

Figure 2-9: Marine Vapor Emission Control System (VCU and DSU)

Figure 2-10: Vapor Combustion Unit

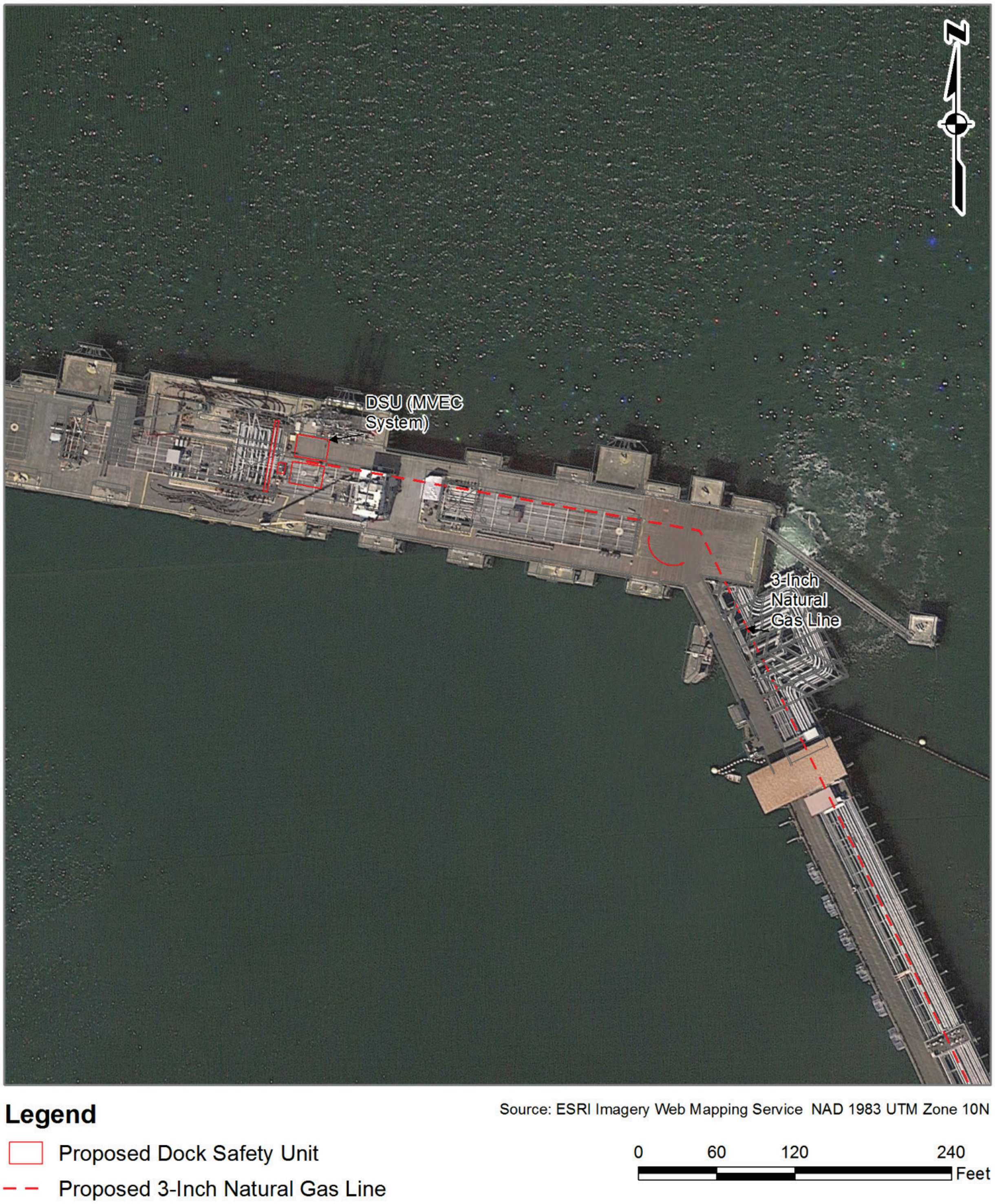


Figure 2-11: Dock Safety Unit

2.6.5. New Tanks Area

Three new storage tanks would be constructed in the tankage area of the refinery (New Tanks Area); see Figure 2-12. The new reformate feedstock storage tank (TK 285) would have a gross volume of approximately 384,000 bbl, while the new mixed xylenes product storage tanks (TK 286 and TK 287) would have gross volumes of 384,000 bbl and 193,000 bbl, respectively. Each storage tank may also be used for storing gasoline or gasoline blendstock (Tesoro 2016c). Each tank would incorporate the required volatile organic compounds (VOC) emission controls, including a floating roof with primary and secondary seals to control hydrocarbon emissions (Tesoro 2016c).

Nearly all the impervious surface created for the New Tanks Area would generate stormwater. The majority of the stormwater would fall within the tank farm diked areas, which would not be considered as a significant source of pollutant. The pump area could generate stormwater that may contain pollutants during operations and would be routed to the refinery's oily water sewer (OWS) system. Additional information on existing stormwater and oily water management at the refinery is provided in Appendix 2-A, Existing Programs and Operations.

Once operational, the outfall of each tank containment berm and associated catch basin would be controlled by opening the normally-closed valves, which would route the accumulated liquid to the Wastewater Treatment Plant (WWTP) before being discharged via Outfall 001 at the end of the wharf, in accordance with Tesoro's NPDES Industrial Wastewater Discharge Permit No. WA0000761 (CH2M HILL 2015; Tesoro 2015a; Tesoro 2016g). A copy of the current NPDES permit is included in Appendix 2-B. During rain events, accumulated stormwater would be visually inspected for any sign of oil or pollutants before draining to the stormwater sewer (SWS) system. If needed, the stormwater could be drained slowly to the OWS. Non-contact stormwater accumulation within the New Tanks Area would be routed to the existing SWS, and process area water from the pump area would be routed to the OWS. Stormwater from Tank 285 would have a drainage system routed to the OWS system to prevent escape of oil should a roof drain line develop a leak (Tesoro 2012, 2016c). Stormwater and process water that collects in the containment berms would be managed in accordance with the refinery's Wastewater Pollution Prevention Plan (Tesoro 2004).

The New Tanks Area would be located to the west and south of existing tank areas. The land is owned by Tesoro and currently leased to a cattle farmer for use as a grazing and haying pasture. Two small isolated wetlands (W47 and W48) and four artificial stormwater drainage ditches (Ditches 2, 3, 4, and 5) exist in the New Tanks Area (see Chapter 5, Section 5.5.1, Affected Environment). The ditches are isolated with no connections to existing wetlands or to ditches that connect to other surface water. The USACE has determined that these wetlands and ditches are not waters of the United States under the Clean Water Act Section 404 jurisdiction (USACE 2015). Ecology determined that no formal authorization is needed for filling these depressional areas nor is compensatory mitigation required for filling (Ecology 2015).

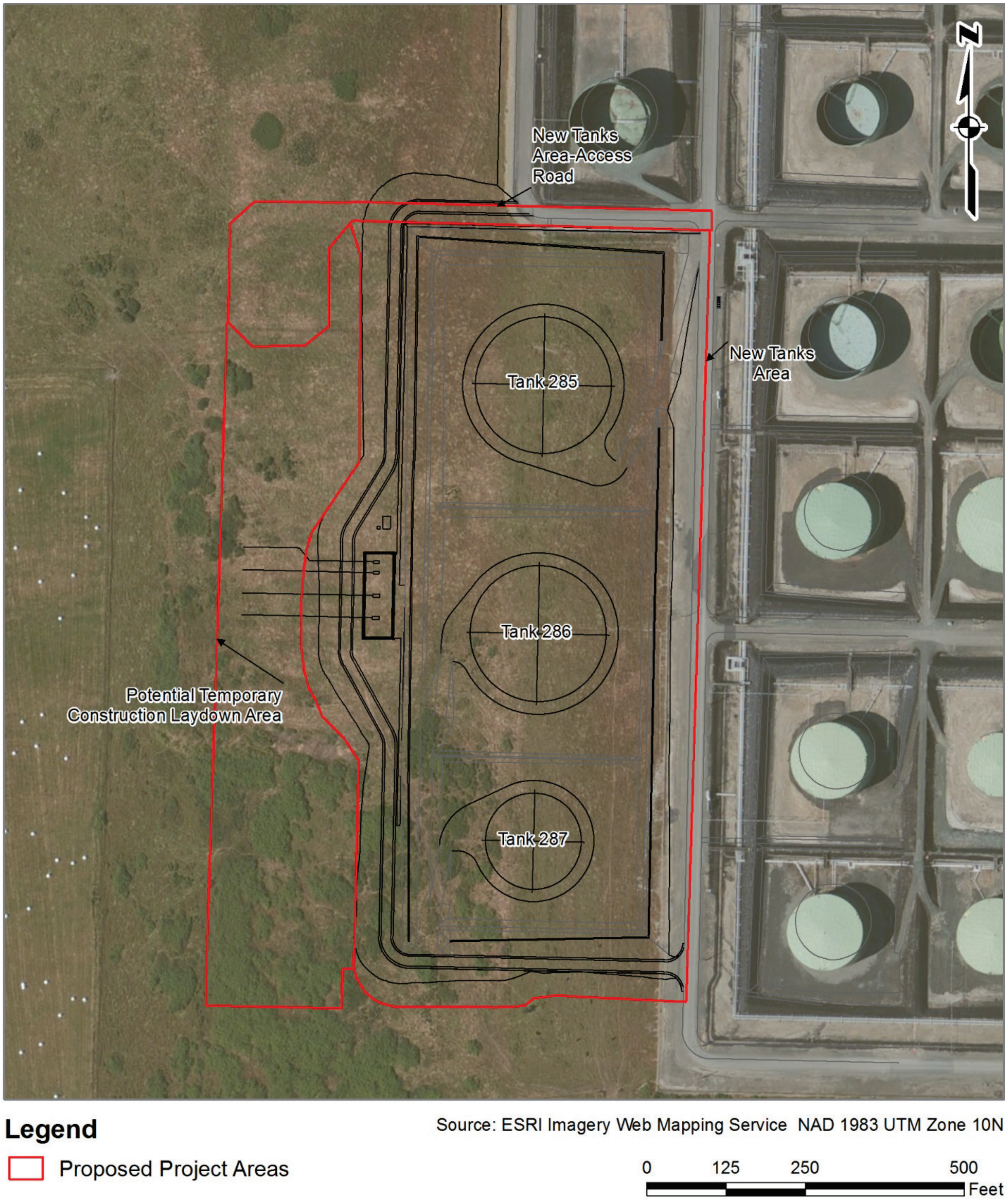


Figure 2-12: New Tanks Area

2.7. Construction of Proposed Facilities

Proposed project construction involves multiple off-site and on-site inter-related activities described in the following sections.

Once initiated, proposed project construction is anticipated to take approximately 19 months (see Figure 2-13). A list of construction equipment with quantities and duration of construction equipment use is provided in Appendix 2-C, Construction Equipment.

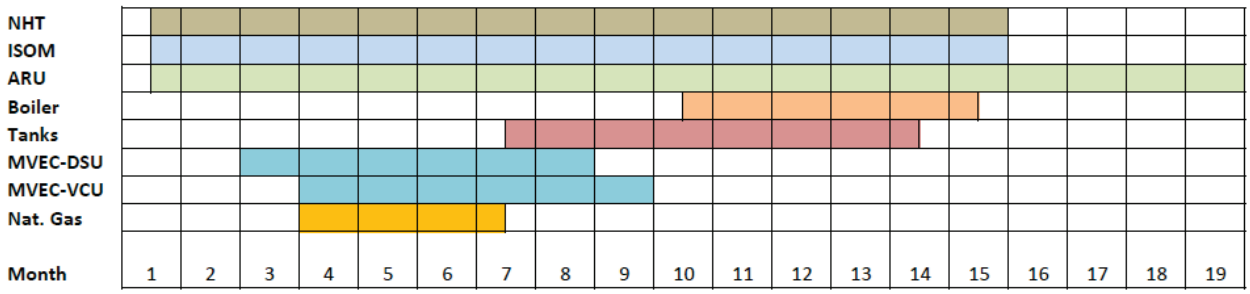


Figure 2-13: Project Construction Phase Durations

2.7.1. Individual Component Site Preparation and Construction

The majority of new components for the proposed project would be fabricated off-site and then delivered by marine vessel or barge to Anacortes, then overland via truck or rail to the refinery for assembly. The following sections describe site preparation and construction of the various proposed project components at the refinery. Preliminary construction drawings illustrating the location and design of the proposed project (Tesoro 2015b) and geotechnical cross sections illustrating the site preparation work for each of the proposed project areas are provided in Appendix 2-D, Geotechnical Drawings (AECOM 2016).

The proposed project areas would be graded with on-site cut material (approximately 165,000 cubic yards) and structural fill material (approximately 133,000 cubic yards). Over 90 percent of the fill and grade activities would occur within the area identified as the New Tanks Area for the construction of the three new tanks, associated pumps, appurtenances, and containment berms. The remaining grading and filling activities would occur at the ARU and VCU areas, and for the North Texas Road Refinements. See Table 2-2 for an overview of the proposed project components and their associated areas of surface disturbance. Approximately 15.18 acres of new impervious surface would be created as a result of the proposed project. This includes 14.66 acres for the New Tanks Area, 0.15 acres for the VCU, and 0.37 acre for North Texas Road. The 15.18 would constitute a 1.5 percent increase of new impervious surface to the 1,020 acres of the overall refinery property.

Table 2-2: Overview of Each Proposed Project Component

Project Component	Area of Soil Disturbance (acres)	Current Conditions	Proposed Conditions
NHT Expansion	0.12	Paved or hard-packed surface adjacent to existing NHT process unit	Paved or hard-packed to match the surrounding elevation and contour
Isom Unit	0.45	Paved or hard-packed surface adjacent to existing NHT process unit	Paved or hard-packed to match the surrounding elevation and contour
ARU	4	Paved or hard-packed surface within existing process area	Paved or hard-packed to match the surrounding elevation and contour
MVEC (VCU)	0.15	Grassed surface adjacent to refinery process units	Paved or hard-packed foundation pad
MVEC (DSU)	NA	Existing wharf	Existing wharf
MVEC (3-inch natural gas line)	NA	Existing pipe racks on causeway and wharf	Existing pipe racks on causeway (3,800 feet) and wharf (500 feet)
New Tanks Area	18	Permeable grassed surface on leased pasture land within refinery	Approximately 15 acres converted to paved or hard-packed surface and 3 acres of temporarily disturbance during construction then restored to pasture following development
Potential Temporary Construction Laydown Area	5	Permeable grassed surface on leased pasture land within refinery	Temporary disturbance during construction then restored to pasture following development
North Texas Road Refinement	0.37	Permeable grassed surface on shoulder of North Texas Road and exposed soil/grass surface at corner of existing livestock pen.	Hard-packed structural fill
Total	28.09		

NA = not applicable

2.7.1.1. Naphtha Hydrotreater Unit Expansion

The NHT expansion would occur adjacent to the existing NHT process unit on a developed and impervious area of the refinery. This location facilitates integration of the upgraded NHT components with the existing unit and minimizes environmental impacts.

Approximately 0.12 acre of existing impervious surface (pavement and compacted soil) would be redeveloped for the NHT expansion project. Existing underground OWS lines, firewater lines, underground controls, and aboveground fire monitors would be removed, relocated, and rerouted. Auger-cast pilings and a concrete base would be installed as the foundation. Where required, existing pavement would be removed to and some ground disturbance would occur to reroute underground lines and install new and modified foundations. The overall surface elevation of the site would not be changed. Once the foundations and underground lines are installed, the impacted areas would be backfilled and paved to match the surrounding elevation and contour.

Construction of the NHT would involve removing some of the existing hydrotreating equipment; replacing and adding other equipment including pumps, vessels, and heat exchangers; and modifying the distillation columns. The proposed project would also modify and add equipment components such as flanges, connectors, valves, pumps, and compressors that could potentially have small leaks of air pollutants to the ambient air (Tesoro 2016c). These new and modified components would be incorporated into the refinery's leak detection and repair program that tracks all applicable components and periodically checks for leaks.

The expanded NHT facility would be connected to the facility's existing stormwater conveyance system (SWS system and OWS system) for discharge to the WWTP (CH2M HILL 2015; Tesoro 2016g).

2.7.1.2. Isomerization Unit Construction

The new Isom Unit would be installed adjacent to the NHT process unit on a vacant impervious area of the refinery. This location facilitates integration of the new Isom Unit into the refining process while minimizing environmental impacts as this location is within the developed portion of the refinery.

The Isom Unit would be located within an existing developed area of the refinery and would involve redevelopment of approximately 0.45 acres of existing impervious surface consisting of paved areas and compacted soils. Site preparation for the new Isom Unit would include installing a new foundation similar to the NHT site described above. To prepare for installation of the new foundation and area paving, existing concrete paving would be removed, existing underground lines would be rerouted, and the area would be excavated by mass excavation with reinforced wall segments to create a watertight perimeter wall (known as bath tubbing). New foundations would be installed and the mass excavation would then be backfilled with select and structural fill to achieve the desired elevation and contour. Area paving would then be installed to match the existing elevation and contour.

After delivery, the new Isom Unit would be placed and secured on its foundation. The Isom Unit would require installation of the unit itself, a new vessel for storing perchloroethylene (this chemical is already in use at the facility), and a gas scrubber column (FLUOR 2016). The proposed perchloroethylene storage vessel capacity is approximately 2,245 gallons (see Section 2.8.4.3).

2.7.1.3. Aromatics Recovery Unit and Boiler Construction

The new ARU (Tesoro 2016c) would involve construction and placement of two tanks including a solvent storage tank for sulfolane, and a boiler feedwater tank (Tesoro 2016c, Table A-28 Tank 285), in addition to construction of the new boiler. The new ARU would be located in the northwest quadrant of 8th Street and E Street. This area is currently graded, has minimal slope and is used for equipment storage and laydown (see Figure 2-8). The new boiler would also be located in the northwest quadrant of 8th Street and E Street, adjacent to the new ARU.

The ARU would be located within an existing developed area of the refinery and would involve redevelopment of approximately 4 acres of existing impervious surface consisting of compacted soil. Site grading and preparation would be required to prepare for foundation installation for the ARU and the boiler. Approximately 8 inches of compacted topsoil consisting of existing imported structural fill would be removed, re-used as fill, and compacted to create a level working surface. Addition of structural fill may be required to achieve required elevations. In most cases, foundations and underground lines would be installed first, followed by placement of imported structural fill to achieve the desired elevation and contour to prepare for installing area paving.

Auger-cast piles would be installed as the foundation base. Once the concrete piles have cured properly to meet structural requirements, pile caps would be installed to receive and support the ARU and boiler modules. A total of 32 modules would be installed for the ARU as well as free-standing structures and vessels and all interconnecting structures and piping spools. A total of three modules would be installed for the boiler. Multiple cranes would be employed to execute installation and construction.

Site civil construction work would include installing ditches, underground lines, and tank retaining walls. Once the modules, associated underground piping spools, and free-standing vessels, and equipment are installed, then compacted backfill or flowable fill would be installed to bring the area to a level near grade in preparation for installing the final area paving. Flowable fill is a term used for versatile liquid soil that is placed as a flowable liquid, yet hardens and rapidly develops excellent load-bearing properties with no compaction necessary.

2.7.1.4. Marine Vapor Emissions Control Construction

The MVEC System consists of the VCU that would be located upland within the refinery and the DSU that would be placed on the wharf.

The VCU would be located in a grassed area surrounded by refinery operations. This area is adjacent to and south of the WWTP aeration basin, is currently undeveloped, and has no structures above or below ground. A portion of this area (approximately 0.15 acre) would be cleared and graded to create a foundation for the VCU. Topsoil removal and compaction would be completed where required, followed by the placement of structural fill to create a suitable base for foundation installations. The VCU foundation pad would be surfaced with Portland cement pavement or aggregate and accessed from the south via an access ramp from Third Street. Construction of the VCU would consist of installing vapor blowers, pumps, knockout drum, filters, combustion units, and associated piping and equipment (FLUOR 2015).

Installation of the DSU and new 3-inch natural gas line on the wharf system would occur over water. During work over the water, secondary containment structures, screens, and/or other applicable best management practices would be implemented to prevent materials from being discharged to the water or intertidal zone. An emergency spill containment kit is also located at the refinery wharf and employees are trained on its appropriate use and deployment measures.

The DSU consists of two units on a common skid with a common oxygen analyzer system and gas enrichment system that ensures the safety of the marine vessel’s connection to the overall MVEC System. Placement on the wharf may require using a spud barge adjacent to the wharf where the DSU would be placed (see Figure 2-11). Spud barges have several vertical steel shafts or pipes known as “spuds” connected to the bottom of the barge that can be extended and driven into the seabed to provide stability, particularly while lifting heavy loads over water. The extra stability the spuds provide may not be necessary, but would be available if needed. During construction, the DSU skid-mounted units would be lifted onto the wharf by a crane mounted on the spud barge. If required, the spuds would be deployed from the barge, which would be moored for up to 2 weeks in an area with no eelgrass. Other than the use of the spud barge, no other in-water work would be conducted at the wharf or along the causeway.

Once in place, the DSU would be securely attached to the wharf structure and connected to the associated existing piping and utility connections. Temporary scaffolding installed under the wharf would be used to facilitate the work. Scaffolding platforms would have toe boards and cross planks to prevent any material from dropping into the water, provide a base for environmental protection, and ensure worker safety.

A 3-inch natural gas line would be installed from the existing natural gas line at the refinery out along the wharf system to supply gas to the DSU. Approximately 3,800 feet of new 3-inch natural gas line would be installed on the causeway and an additional 500 feet on the wharf for the proposed project. This line would be installed in the existing pipe rack using cranes and equipment deployed from the causeway. Construction activities associated with line installation would involve installing and removing scaffolding, operating the crane to lift loads, welding, sandblasting, coating weld joints, and hydrostatic testing. To the extent feasible, multiple pipe joints would be welded together and coated onshore or on the causeway road and lifted into place in the pipe rack, minimizing welding and coating activities performed over water. Temporary scaffolding would be used to facilitate the work, provide a base for environmental protection at the welding and coating sites over the water, and ensure worker safety (Tesoro 2015b).

2.7.1.5. New Tanks

Three new storage tanks would be constructed in the tankage area of the refinery (New Tanks Area). One tank would be used for storing reformate feedstock and two tanks would be used for storing the mixed xylenes product. Two of these vertical, cylindrical tanks would be sized at about 384,000 bbl (gross volume) and the third tank would be sized at around 193,000 bbl (gross volume). Each tank would incorporate the required VOC emission controls.

The proposed project would be constructed mostly in previously developed areas within the refinery, with the exception of the New Tanks Area and Potential Temporary Construction Laydown Area, described in the next section. The three new storage tanks would be constructed on approximately 18 acres of land within the refinery. This area is currently undeveloped land consisting of upland vegetation and intermittent storm drainages used as pasture. The land slopes down from east to west. Site preparation would use a balanced cut-and-fill approach to the extent possible based on the structural integrity of excavated material. Approximately 15 acres of land would be converted to impervious surface as a result of the construction of the three new storage tanks and construction of associated pumps, containment, and access roads. The remaining 3 acres along the west slope of the containment berms would be restored to pasture following development.

Over 90 percent of the fill and grade activities for the proposed project would occur in the New Tanks Area, depending on the structural suitability of on-site materials. On-site cut materials would be inspected and tested to verify suitability before being used. Structural fill would also be required due to the expected low structural quality of the on-site soil that would be generated from cutting activities. Grading for the site would be completed using loaders, bulldozers, earthmovers, and graders. Appropriate wheeled trucks and dump trucks would be used to remove or transfer dirt or deliver other various construction materials.

If on-site excavated soil is unsuitable for use as structural fill, then the unsuitable soil would be removed and disposed of at an approved location. If additional fill is required, it would be imported by truck from an off-site location.

The tank construction area would be cleared of vegetation and excavated to a depth sufficient to remove topsoil and some subsoil to provide the required elevation for the new tanks and equipment. Grade changes would consist of excavations of about 14 to 25 feet (greatest along the east side of the New Tanks Area), as well as fills of up to about 14 to 22 feet (greatest along the west side of the tanks/perimeter access road). Most of the excavated material would be used as fill for dikes and spill containment along the construction perimeter. The grade would be raised in compacted lifts of approximately 6 inches to stabilize the fill material.

Underground piping would be bedded in sand-filled trenches. Concrete duct banks would be poured in filled areas to accommodate the electrical utilities. Precast catch basins would be installed inside each individual tank containment berm, backfilled, and compacted. Earthen tank containment berms would be covered with an asphaltic coating to prevent erosion and maintain integrity. The tank ring wall bases would be excavated, formed, concrete-cast, backfilled to fill voids, and compacted to match adjacent fill. Earthen and concrete dikes would be constructed with a containment volume of at least 100 percent of the tank capacity plus freeboard for precipitation.

Before installing outer and intermediate tank containment berms, sediment runoff would be controlled by installing and maintaining temporary silt barriers such as reinforced silt fences. Management of natural ground water accumulation and stormwater runoff would occur by sheet flow runoff through these temporary silt barriers.

Ditches associated with the New Tanks Area would be installed using best industry practices and would be connected to and integrated with the existing facility stormwater drainage system, which drains to the WWTP. A cut-and-fill process would be used; the ditch bottom and walls would be compacted to minimize erosion during periods of stormwater flow. The ditches would be designed and installed at elevation gradients that facilitate complete drainage to eliminate pooling or runoff. Typically, they would follow the perimeter of the new exterior tank containment berm and new and existing adjacent roadways. These earthen ditches would be fortified with concrete reinforcements to the ditch walls in locations where changes in flow direction or elevation would otherwise cause scouring or degradation to the ditch bottom or banks.

Two isolated wetlands (W47 and W48) are located in the New Tanks Area and would be removed as part of the proposed project (see Chapter 5, Section 5.5, Wetlands). Four manmade drainage ditches (Ditches 2, 3, 4, and 5) are also in the New Tanks Area and would be removed or altered as part of the proposed project. No work would take place in other existing wetlands or drainage ditches identified within or near the proposed project construction sites outside the New Tanks Area.

Each tank would incorporate the required VOC emission controls, including a floating roof with primary and secondary seals to control hydrocarbon emissions. One tank would be equipped with an external floating roof and the two other tanks would be equipped with an internal floating roof. A new perimeter road would be added around the New Tanks Area to provide access.

Nearly all the impervious surface created for the New Tanks Area would be non-pollution generating impervious surface (i.e., surfaces that are not considered a significant source of pollutants in stormwater runoff). After completing the tank containment berm installations, but before placing the facility in service, any stormwater accumulation within the berms would be routed to the existing stormwater system according to existing facility protocols.

2.7.1.6. Potential Temporary Construction Laydown Area

Multiple staging and laydown areas have been identified for the proposed project. Most of the areas are located in previously disturbed or previously developed areas underlain by artificial fill within the existing refinery and would not require additional site preparation. These areas are described in Section 2.7.5. In addition to these areas, approximately 5 acres may be temporarily disturbed for use as a construction laydown area west of the New Tanks Area. This area is currently pasture land within the undeveloped portion of the refinery. Clearing, grubbing, filling, excavating, grading or other permanent improvements are not planned in the potential temporary construction laydown area west of the New Tanks Area. If used, this area would be temporarily disturbed for use as an equipment storage and staging area during construction. Following proposed project development, the area would be restored to pasture.

2.7.1.7. North Texas Road Refinements

Proposed project equipment components would enter the refinery at Gate 10 near the top of North Texas Road. Accommodation of the heavy lift transport vehicles would require some widening of North Texas Road and modifications to the Gate 10 entrance. Widening of approximately 200 feet of North Texas Road would be required to provide clearance around a large boulder. The Gate 10 entrance would need to be widened to accommodate the turning radii of the transport vehicles. Both the road and gate modifications would occur primarily on Tesoro property, with some work to occur within the Skagit County right-of-way.

The heavy lift transport vehicles would need to shift to the north side of the road to avoid the large boulder (see Figure 2-14). Additional road surface and shoulder would be required on the north side opposite the boulder (about 200 feet long) to ensure adequate vehicle clearance. The proposed modification would require grading the north side of North Texas Road to match the existing roadway contour. The shoulder in this area would also need to be improved to support vehicle loads. About 150 cubic yards of structural fill would be placed within a 5-foot-wide area along the newly graded section of North Texas Road.

The current access configuration at Gate 10 does not provide sufficient turning radius for the heavy lift transport vehicles. Improvements would require placement and compaction of approximately 1,900 cubic yards of structural fill along a portion of the northwest corner of North Texas Road near Gate 10 (see Figure 2-14). The Gate 10 modifications would require relocating the existing cattle feeding pens.

About 2,050 cubic yards of structural fill would be placed for both sections of North Texas Road described above. Structural fill would come from off-site locations. Grading would be performed at both areas to achieve the desired clearance and turning. The proposed project refinements would result in an additional 16,000-square-foot increase in impervious surface as a result of the structural fill placement (about 1,000 square feet for the North Texas Clearance Refinement and about 15,000 square feet for the Gate 10 Access Refinement). Runoff would either infiltrate through the structural fill or sheet flow to the south. About 1,000 square feet of grass and shrubs would be removed. The Gate 10 Access Refinement would include soil disturbance and vegetation removal within an existing livestock pasture that consists of mostly exposed soils.

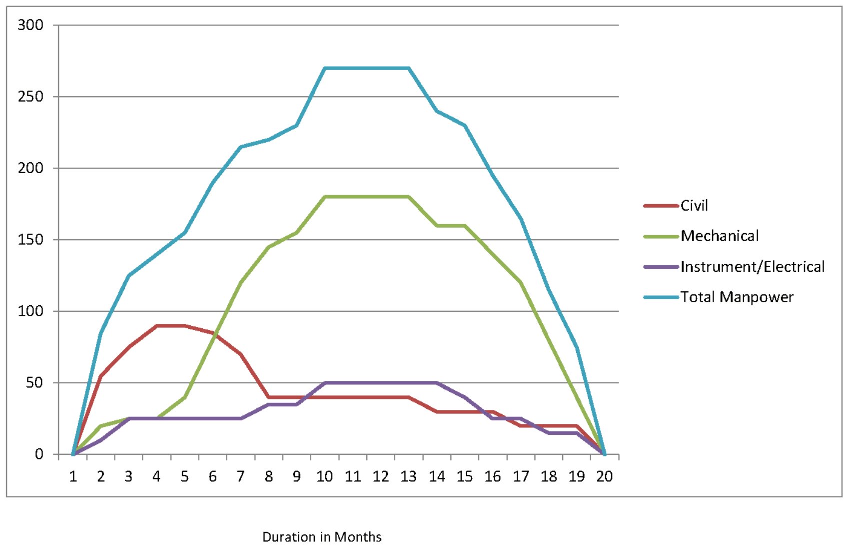
In addition to the modifications described above, Puget Sound Energy (PSE) would move power poles north of North Texas Road and place them further north on Tesoro’s property to provide adequate clearance for the over-sized loads.

Figure 2-14: North Texas Road Refinements

2.7.2. Construction Workforce

During construction, the proposed project would require an average of about 190 construction workers with a peak number of about 270 temporary construction workers, as shown on Figure 2-15. It is anticipated that all construction workers would be located within commuting distance of the proposed project area (approximate 1-hour drive) and no workers would move to the local area for the proposed project.

Month	Civil	Mechanical	Instrument & Electrical	Total
0	0	0	0	0
1	55	20	10	85
2	75	25	25	125
3	90	25	25	140
4	90	40	25	155
5	85	80	25	190
6	70	120	25	215
7	40	145	35	220
8	40	155	35	230
9	40	180	50	270
10	40	180	50	270
11	40	180	50	270
12	40	180	50	270
13	30	160	50	240
14	30	160	40	230
15	30	140	25	195
16	20	120	25	165
17	20	80	15	115
18	20	40	15	75
19	0	0	0	0



Source: Tesoro 2016b

Figure 2-15: Construction Employment over Time

2.7.3. Construction Vessel Traffic

Major equipment components of the proposed project (e.g., process modules and columns) would be fabricated off-site, delivered by marine vessel to Anacortes, and then moved overland to the refinery for assembly.

Marine vessels would arrive at the Port of Anacortes (see Figure 2-16). Upon arrival, a crane would lift the equipment components from the marine vessel to a self-propelled module transporter (SPMT) or heavy hydraulic transport truck. The transport vehicles would be used to move the equipment components to a staging area and ultimately to the refinery. The staging area would be located at the northeast tip of Fidalgo Island on the Guemes Channel in Anacortes.

The NHT and Isom Unit would be delivered to Anacortes on a single heavy lift cargo vessel. Three heavy lift cargo vessels would be required for delivering the ARU. Delivery times for the ARU equipment would be staggered at intervals of 2 to 4 weeks. These heavy cargo vessels would be expected to range from 110 to 160 meters (360 to 525 feet) in length.

2.7.4. Construction Vehicle Traffic

Proposed project components for the NHT, Isom Unit, and ARU include 52 pieces of equipment. The largest module for these transports would be 30 feet wide, 30 feet high, 100 feet long, and weigh up to 250,000 pounds. Delivery of the oversized and heavy equipment, one piece per delivery for a total of 52 deliveries, would be via an SPMT and/or truck trailer. An SPMT is a platform vehicle with a large array of wheels (see Figure 2-17). These vehicles are used for transporting massive objects such as large bridge sections, oil refining equipment, motors, and other objects that are too big or heavy for trucks. The dimensions of a standard SPMT and transport truck are provided on drawings in Appendix 2-E, Self-Propelled Modular Transporter Drawings.

Trucks may sometimes provide traction and braking for the SPMTs on inclines and descents. A typical SPMT can have a grid of several dozen computer-controlled wheels, all individually controllable, in order to evenly distribute weight and steer accurately. Each individual wheel can swivel independently from the others to allow it to turn, move sideways, or even spin in place. Some SPMTs allow the wheels to telescope independently of each other so that the load can be kept flat and evenly distributed while moving over uneven terrain. As SPMTs often carry the world's heaviest loads to be transported on wheeled vehicles, they are very slow, often moving at under 1 mile per hour while fully loaded. In addition, multiple SPMTs can be combined to transport massive building-sized objects.

For larger components, more than one SPMT would be required. To minimize disruption and the number of trips along the delivery route to the refinery and depending on the size of the components, multiple SPMTs may be aligned into a "train" for the move to the refinery.

The transportation of the 52 oversized pieces of equipment would be via the Port of Anacortes site to Tesoro along portions of State Route (SR) 20, West March Point Road, and North Texas Road to the refinery's south-side property gate, Gate 10.Transport permits would be required from the city of Anacortes and Skagit County and a Superload Transport Permit would be required from the Washington State Department of Transportation (WSDOT) for the SPMT heavy haul moves from the Port of Anacortes to the refinery (see Figure 2-17). Prefabricated proposed project component moves are planned to occur at night to minimize disruptions along the transport route. Puget Sound Energy would undertake work to relocate and modify electrical infrastructure along the heavy haul route to enable transport of the oversized equipment. Along North Texas Road, Puget Sound Energy would relocate two transmission poles and seven distribution poles, and will add one new transmission pole and one new service pole. Tesoro would coordinate with the local utility companies to ensure proper permits and approvals are obtained from the city of Anacortes, Skagit County, and WSDOT for clearance and/or relocation of utility equipment as needed.

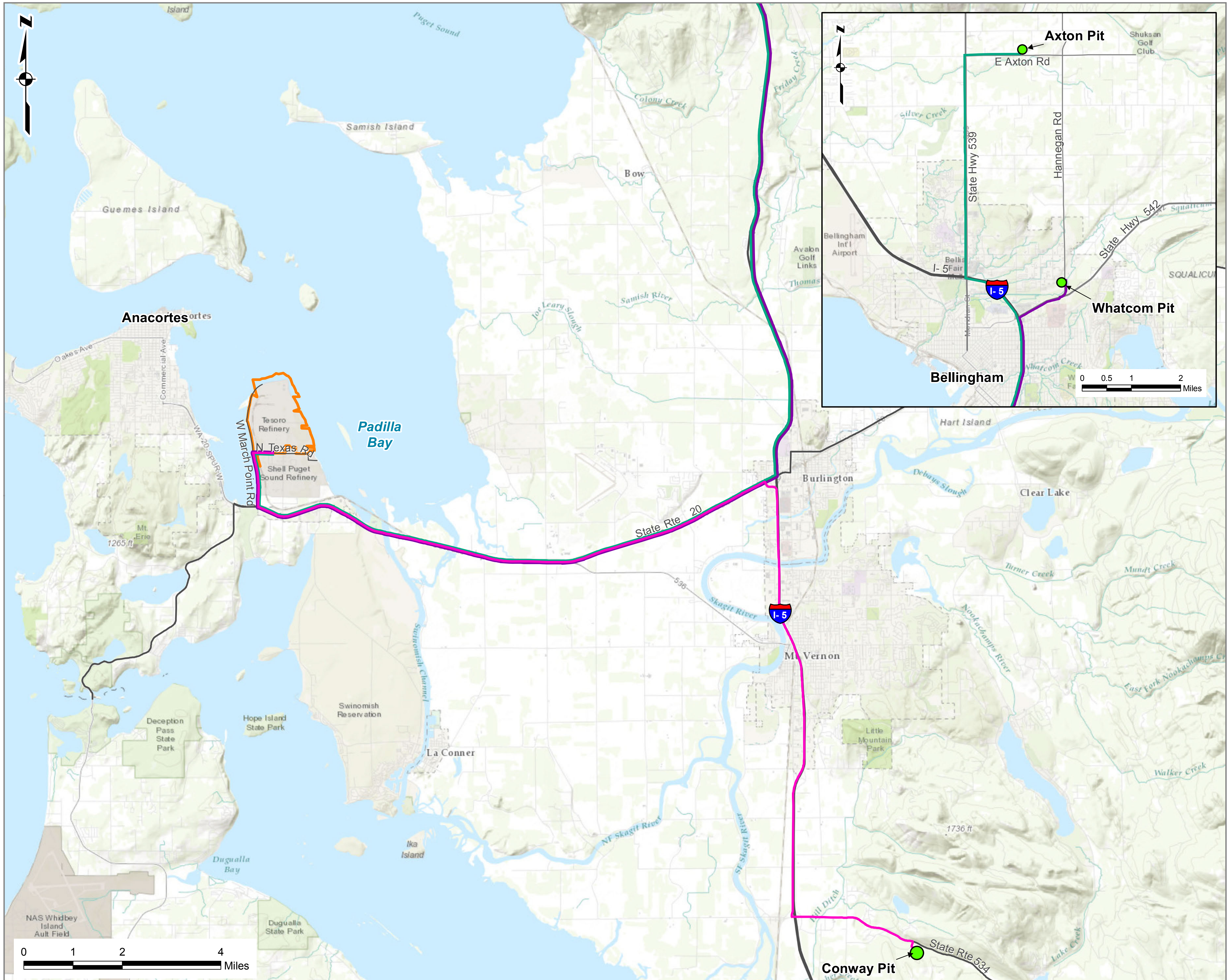
Figure 2-16: Proposed Heavy Haul Route

Figure 2-17: Typical Self-Propelled Module Transporter

In addition to the proposed project components received via marine vessel at the Port of Anacortes, Tesoro would receive prefabricated components, equipment, and supplies delivered by truck to the refinery. Typical materials that would be delivered include pipe and pipe fittings, electrical components and equipment, process pumps, process vessels, and equipment. Process loads would be transported with the appropriate number of axles in accordance with WSDOT regulations. Truck traffic would increase due to the delivery of these components and materials to the site during construction. Daily material deliveries are anticipated to range from 10 to 50 truck trips per day during the construction period, transiting on SR 20 and West March Point Road. These roads are designated as truck routes by the city of Anacortes.

Typical materials required for site civil work such as structural fill, sand, gravel, crushed stone, rebar, concrete, and structural steel would also be delivered by truck. Approximately 133,000 cubic yards of structural fill material would need to be imported from off-site, resulting in an additional temporary increase in truck trips along SR 20 and West March Point Road. Potential sources of fill include: Whatcom Pit, located in Bellingham; Axton Pit, located approximately 6 miles north of Bellingham; and the Conway Pit, located approximately 6 miles south of Mt Vernon. The truckloads of fill materials are estimated to average approximately 70 trucks per day over a 4-month period. Routes to potential fill source sites are outlined in Figure 2-18. Site preparation would use a balanced cut-and-fill approach to the extent possible based on the structural integrity of excavated material; therefore, additional truck trips are not anticipated for hauling excavated materials off-site.

During the approximate 20-month construction period, vehicle trips to the refinery would also increase due to trips generated by construction employees of approximately 190 round trips per day (on average) to the refinery through Gate 10 described in Section 2.8.1. The increase in vehicle trips would occur during normal shift change hours.



Legend

- Route to Conway Pit
- Route to Whatcom Pit
- Route to Axton Pit
- Tesoro Refinery Boundary

Source:
ESRI Topographic Web Mapping Service
NAD 1983 UTM Zone 10N

Figure 2-18
Routes to Potentil Fill Source Sites
Tesoro Anacortes Refinery
Clean Products Upgrade Project
Draft Environmental Impact Statement
Anacortes, Washington

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2.7.5. Construction Staging and Laydown Areas

Office trailers for construction management personnel would be placed on both sides of 7th Street east of Gate 14 and west of C Street. These areas of the refinery have been previously disturbed and compacted over the decades of refinery operation. Multiple staging and laydown areas have been identified for the proposed project (see Figure 2-19). Most of these areas are previously disturbed or developed.

Within the refinery boundary, about 4 acres near the construction office on the south side of 7th Street is designated for materials management laydown area. This portion of the refinery is previously disturbed by decades of refinery operation.

Three areas for column and module storage and dress-out have been designated adjacent to the primary construction area. One area would be about 2 acres west of C Street between 7th and 6th streets. A smaller area is designated on the northeast corner of C Street and 7th Street. The third storage and dress-out area is about mid-block on the east side of C Street between 7th and 8th streets. All three of these areas have been previously disturbed by decades of refinery operation.

Additional material laydown areas for pipes and tank construction have been designated south of 11th Street. The tank laydown area is a narrow strip located adjacent to and on the south margin of 11th Street between E and F streets. This area is compacted and disturbed. Two linear pipe storage areas have been designated adjacent to and on the east side of G Street. These areas are disturbed and compacted and currently used for parking.

In addition to these outdoor laydown and storage areas, the proposed project would also share space and resources within the refinery project warehouse.

2.7.6. Construction Site Controls

A number of plans are currently implemented at the refinery to manage stormwater, prevent spills and the subsequent transfer of spilled material, and to respond to spills. These include the:

- Wastewater Pollution Prevention Plan (WWPPP; Tesoro 2004)
- Oil Spill Contingency Plan (OSCP) (Tesoro 2016d)
- Spill Prevention Control and Countermeasure (SPCC) Plan (Tesoro 2012)

These plans would apply to the construction phase of the proposed project. In addition, a specific Construction Stormwater Pollution Prevention Plan (SWPPP) would be prepared, and a construction stormwater permit would be secured prior to starting construction.

Figure 2-19: Proposed Construction Staging and Laydown Areas

Under these plans, multiple layers of stormwater management, spill prevention and response measures would be implemented for construction of the proposed project. First, construction equipment would be inspected frequently for evidence of corrosion and leaks to minimize the risk of a spill due to faulty equipment and a variety of safety features would be implemented to avoid causing a spill. Second, secondary containment would be used around temporary chemical storage and equipment refueling areas. Third, in the event that a spill occurred and secondary containment measures failed, stormwater management in the proposed project area would work to prevent the release of spilled materials beyond the refinery.

The refinery currently operates SWS and OWS systems that divert stormwater runoff and oily water to the WWTP for treatment prior to discharge to Fidalgo Bay via an approved outfall. These systems are currently in operation within the developed portions of the refinery and would capture stormwater runoff from construction of proposed project components within the developed portions of the refinery (NHT, Isom Unit, ARU, and VCU).

For proposed project components outside the developed portions of the refinery (potential temporary construction laydown area, New Tanks Area and North Texas Road Refinements) temporary stormwater control measures would be in place during construction. These temporary measures and controls would remain in place at the New Tanks Area until the permanent stormwater runoff system has been installed, is functional and is connected to the existing stormwater conveyance system.

Personnel at the refinery are trained in spill response and would be available to support spill response activities associated with the proposed project, so that if a spill did occur it would be rapidly cleaned up. Spill response methods and removal techniques are determined based on the type of material spilled, the environment contaminated, and potential impacts from response actions.

Existing controls at the refinery are further described in Appendix 2-A, Existing Programs and Operations, and these would be updated to facilitate integration of the proposed project with existing refinery operation and maintenance procedures.

2.8. Operational Changes due to the Proposed Project

Operation of the proposed project would increase the use of materials handled at the refinery, and would introduce new materials to be used in the ARU and boiler. This would require changes in the transport of materials to and from the refinery. Additional staff would be employed to operate the proposed project components.

2.8.1. Vehicle Traffic

Vehicle traffic to the refinery would increase as a result of hiring new employees for operation of the proposed project. The refinery currently employs approximately 350 people directly and 280 people indirectly. An additional 20 permanent jobs with up to 20 new vehicle trips would be added per workday, and the trips would occur in different timeframes linked to shift changes at the refinery (Tesoro 2016g).

Once the proposed project is in operation, truck traffic would increase over current levels to deliver the commodity chemicals (sulfolane, aqueous ammonia, and perchloroethylene) and other supplies to the refinery. Based on expected usage rates and typical truck capacity, the proposed project would generate approximately 50 truck trips per year (Tesoro 2016g).

2.8.2. Marine Vessel Traffic

The operational phase of the proposed project would require regular shipping and receiving of materials by sea. Marine vessel traffic would increase by approximately 60 vessels per year (approximately 5 per month). Approximately 40 of those vessels would be delivering reformate feedstock from external sources. The remaining 20 vessels calling at the refinery wharf structure would be for exporting mixed xylenes.

The reformate feedstock would be received at the Tesoro Anacortes Refinery by marine vessels transiting from other West Coast refineries. Refinery locations and, therefore, the marine vessel transportation routes, would vary depending on market conditions. After the reformate feedstock is unloaded, the vessels would be loaded with gasoline blendstock from the ARU (i.e., the remaining gasoline from reformate feedstock, after the mixed xylenes have been extracted). This gasoline blendstock would then be backhauled to the original refinery that supplied that reformate feedstock.

The mixed xylenes extracted from the reformate feedstock would be transported from the refinery to international markets along the marine vessel transportation route shown on Figure 2-4.

Xylenes and reformate would primarily be transported by the following types of marine vessels:

- Tank ships with a capacity of approximately 330,000 bbl would transport outgoing mixed xylenes product from the refinery.
- Tank barges with a capacity of approximately 180,000 bbl and articulated tug and barge (ATB) vessels would transport reformate to the refinery and reformate backhaul from the refinery.
- Assist tugs would provide maneuvering assistance to cargo vessels during transit and during mooring and unmooring operations.

Examples of each vessel type are shown on Figure 2-20.

Figure 2-20: Tank Ship (above left), Articulated Tug and Barge (bottom), and Assist Tug (top right)

Marine vessels used for transporting reformate and xylene would be similar in type and size to vessels currently calling at Tesoro. The proposed project would not require construction of new wharfs, piers, lines, or other significant waterfront infrastructure, with the exception of the new DSU and 3-inch natural gas line described above. The Tesoro Anacortes Refinery wharf (see Figure 2-21) contains two marine vessel berths and is capable of conducting product transfers with two vessels simultaneously. The maximum size of the vessels calling at Tesoro is limited by several factors including the size of the wharf and the location of essential product transfer equipment and infrastructure on both the wharf and the vessel. The outside berth can accommodate vessels up to 950 feet long and with cargo capacities of up to 125,000 metric DWT (MDWT). DWT is a measure of a vessel's weight-carrying capacity, and does not include the weight of the ship itself. The inside berth can receive vessels up to 650 feet long with cargo capacities of approximately 50,000 MDWT.

Figure 2-21: Tesoro Anacortes Wharf

2.8.3. New Materials Used in the Refining Process

The proposed project would produce mixed xylenes, a new product for the refinery. Two new process chemicals, sulfolane and aqueous ammonia, would be used in the production of the mixed xylenes. The other chemicals and feedstocks used for the proposed project are materials that are routinely used at the refinery now and do not require substantive changes to existing refinery practices. Increases in material usage due to the proposed project are discussed in Section 2.8.4.

2.8.3.1. Sulfolane

Sulfolane is a volatile organic solvent composed of carbon, hydrogen, oxygen, and sulfur. It is widely used in the production of petroleum fuels at refineries and by other industries. Sulfolane is not currently used at the Tesoro refinery but is proposed for use at the new ARU. The chemical aids in the extraction of xylenes from the reformate feedstock stream.

Sulfolane would be brought to the site via two to four truck trips each year (see Section 2.8.1). Sulfolane would be stored in a new solvent tank with an internal floating roof located in the ARU processing area. Approximately 100,000 pounds of sulfolane per year (9,505 gallons per year using a specific gravity conversion of 1.26) would be used in the extraction process (Tesoro 2016c, Table A-28 Tank 285). Additional engineering controls to manage sulfolane at the refinery would include:

- A closed drain system and sump to collect and recycle sulfolane
- Closed sewer system to collect stormwater that would be isolated and quality verified to check sulfolane concentration prior to releasing to the OWS system
- Secondary containment around the sulfolane storage tank and pumps that transfer sulfolane to the ARU process
- Sulfolane management practices and procedures, including recycling and treatment methodologies, developed prior to start-up operations as a component of the refinery's process safety management (PSM) program

If a spill were to occur, sulfolane would preferentially dissolve in water. It would not significantly volatilize into air from soil or water, due to its low vapor pressure and high solubility (NHI 2016). Under aerobic conditions, the primary environmental attenuation mechanism is biodegradation, with studies finding concentrations in surface water reduced from 100 ppm to 1 ppm within 24 hours (Alaska DHSS 2010). However, if the chemical reaches groundwater (anaerobic conditions), it can persist for long periods of time (Alaska DHSS 2010). Environmental and human exposures are more likely to be from drinking water containing the chemical since it does not readily volatilize or absorb through the skin. The compound does not biomagnify, nor does it appear to absorb to soil or sediments (NHI 2016).

Sulfolane liquid may be irritating to the eyes, but not to the skin (NHI 2016). Other potential human health impacts have not been identified, and the compound is currently being further evaluated by the state of Alaska and the USEPA, as the chemical has been found in polar region groundwater, a source of drinking water (Alaska DHSS 2010; Blystone 2011). There is limited information about toxicity in animals showing that very high ingested doses caused nervous system damage (oral exposure). Some animal inhalation studies found lung irritation, but longer-term studies provide no evidence indicating the compound is carcinogenic (Alaska DHSS 2010; Blystone 2011).

2.8.3.2. Aqueous Ammonia

A solution of 19 percent aqueous ammonia would be used to control nitrogen oxide emissions from the new boiler. An estimated 73,000 gallons per year of ammonia (specific gravity conversion of 0.929) would be required for use in the boiler's pollution control system, and would be provided to the refinery via truck.

Small amounts of ammonia are naturally present in air, soil, and water as ammonia is a natural substance required for life (80 percent of ammonia production is used as fertilizer) and is naturally produced and used by all mammals as part of their normal metabolism (ATSDR 2004). If the aqueous ammonia were spilled at the refinery, high concentrations are corrosive and are irritating to the skin, eyes, and respiratory tract, causing damage at point of contact if concentrations are sufficiently high; it is not considered carcinogenic and quickly breaks down in the environment (ATSDR 2004).

2.8.4. Increased Material Usage

The proposed project would increase the amount of natural gas, reformate, and perchloroethylene used at the refinery. Increases in the use of these materials and the means by which they would be transported to the refinery are discussed below.

2.8.4.1. Natural Gas

Natural gas service is supplied to the refinery by Cascade Natural Gas via natural gas supply lines located within the refinery property. The proposed project would increase the amount of natural gas consumed at the refinery. Approximately 12 million standard cubic feet of gas per day (mmscfd, annualized) of natural gas would be needed to operate the new boiler for the ARU

(11 mmscfd) and to operate the new DSU and VCU for the MVEC System (1 mmscfd). Overall, natural gas volumes would increase at the refinery from the existing usage of approximately 17 mmscfd (annualized) to 29 mmscfd (annualized).

Natural gas would be supplied using existing pipelines. The new natural gas-operated equipment would be connected to the supply lines within the refinery property.

Cascade Natural Gas would upgrade their natural gas transmission system in the Skagit County area. The system upgrade would enable the required increase in natural gas delivery to the refinery while maintaining service to the utility's existing and potential future customer base in the region. This upgrade would also provide ancillary benefits to Skagit County communities through an expanded clean-burning natural gas capacity.

2.8.4.2. Reformate

Reformate is a petroleum-based intermediate or gasoline blendstock consisting of several gasoline-range compounds, including mixed xylenes as well as other aromatic chemicals such as benzene, toluene, and ethylbenzene. Reformate is produced at the refinery at the Catalytic Reforming Unit and used as a feedstock to blend various grades of finished gasoline. Reformate is stored in two tanks with approximate capacities of 75,000 bbl each. Reformate feedstock is also supplied to the refinery via marine vessels using the standard shipping routes from the coastal waters, through the Strait of Juan de Fuca, Rosario Strait, and Guemes Channel.

Approximately 6,716,000 bbl of additional reformate (Tesoro 2016c, Table A-28 Tank 285) would be shipped annually to the refinery. The imported reformate would be transported from the wharf to the refinery via existing piping, where it would be stored in a new tank in the New Tanks Area prior to processing at the ARU.

The additional imported reformate would come from other West Coast sources, predominantly other Tesoro refineries. Marine vessels would deliver the reformate using existing shipping routes and the refinery wharf structure. The majority of reformate deliveries would come via existing shipping routes from the coastal waters, through the Strait of Juan de Fuca, Rosario Strait, and Guemes Channel. Tesoro could also receive reformate from Pacific Northwest sources using established shipping lanes currently used to transfer petroleum-based materials.

The additional imported reformate would be used as the primary feedstock for the ARU at an annualized rate of approximately 18,400 bpd. The refinery can currently produce reformate from crude oil at an annualized rate of 32,400 bpd. All reformate currently produced at the refinery is directed to the Benzene Saturation Unit and to gasoline blending. The proposed project may direct a portion of this reformate stream to the ARU.

Reformate backhaul, a byproduct material from the ARU after xylenes have been removed, would be stored at the refinery in the various existing gasoline/intermediate storage tanks. The ARU byproduct would be used for gasoline blending at the refinery or marketed/backhauled to other refineries as a gasoline blendstock. Reformate backhaul is the common term used in this Draft EIS for the byproduct material that is shipped back to source refineries that supplied the reformate.

2.8.4.3. Perchloroethylene

Changes to the operations activities at the refinery based on the new Isom Unit involve an increase in approximately 15,000 gallons of perchloroethylene per year shipped to the site via truck. It would be stored in a new tank within the Isom Unit and injected into the process as a reaction promoter.

Perchloroethylene is a chemical that is currently used at the refinery for multiple purposes. Perchloroethylene is used at the Catalytic Reforming Unit to assist with converting the lower octane gasoline intermediate to a higher octane gasoline blendstock. It is also used at the Butane Isomerization Unit to assist with converting butane to isobutane. Current use in 2016 is estimated at 7,800 gallons per month of perchloroethylene. Perchloroethylene is received at the refinery from approximately one tractor trailer truck per month. This is approximately 21 gallons per day.

Use of perchloroethylene in the new Isom unit would increase demand for this chemical by 15,000 gallons per year (41 gallons per day, annualized basis). In the isomerization process, perchloroethylene serves as a chloriding agent; a source of chloride ion (Cl-) needed to maintain catalyst performance. The chemical would be shipped to the site via truck and stored in an approximately 2,245-gallon storage vessel within the Isom Unit (Tesoro 2016b).

Overall use of perchloroethylene once the proposed project is complete would be approximately 22,800 gallons per year (62 gallons per day total usage). The increase in truck traffic due to additional perchloroethylene deliveries is described in Section 2.8.1.

2.8.5. Operational Site Controls

As described in Section 2.7.6, the plans related to stormwater management, spill prevention, and response currently in place at the refinery for operations would be updated as necessary to incorporate the proposed project components. These plans include the:

- Wharf Operations Manual (Tesoro 2016f)
- Wastewater Pollution Prevention Plan (Tesoro 2004)
- Oil Spill Contingency Plan (Tesoro 2016d)
- Spill Prevention Control and Countermeasure (SPCC) Plan (Tesoro 2012)

These plans document multiple layers of spills prevention and response measures, which would be implemented for the proposed project during operations. The primary prevention and response measures from these plans related to the proposed project are described below.

First, the likelihood of a spill at the refinery would be minimized by: constructing tanks and other structures in accordance with the International Building Code adopted by Skagit County (SCC 15.04); undertaking routine inspection and proper maintenance of pipes and tanks; and implementing a variety of safety features to avoid overfilling tanks, including overfill alarms, tank level gauge sensors, and proper training of personnel.

Second, secondary containment would be permanently provided for tanks and pumping areas, so that, if a spill did occur, it would be captured at the immediate location, without spreading to other parts of the refinery. In the event of a spill or leak from a storage tank, the spill would be contained by secondary containment and spill detection devices would alert workers of the spill so that it could quickly be cleaned up. Storage tanks would be provided with secondary containment volume of at least 100 percent of the tank capacity plus freeboard allowance for precipitation. Additional fail-safe operating features such as monitoring and alarm systems would also be incorporated in petroleum bulk storage facilities.

Third, the NHT, Isom Unit, ARU, VCU, and New Tanks Area would be connected to the refinery's existing SWS and OWS systems that route stormwater and oily water to the refinery's WWTP. Proposed project components within developed portions of the refinery are already connected to these systems. Prior to commencing operation of the New Tanks Area, tank containment berm walls would be constructed and stormwater ditches would be installed to route stormwater from the New Tanks Area to the OWS for treatment at the WWTP. Therefore, if a release occurred and secondary containment failed, the spilled material would be routed to the WWTP.

Finally, personnel at the refinery are trained in spill response and would be available to support spill response activities associated with the proposed project, so that if a spill did occur it would be rapidly cleaned up.

The refinery currently conducts self-inspections on all tanks, secondary containment units, and response equipment at the refinery, and the proposed project components would be included in these self-inspections. Existing controls at the refinery are further described in Appendix 2-A, Existing Programs and Operations, and these would be updated to facilitate integration of the proposed project with existing refinery operation and maintenance procedures.

2.9. Alternatives Considered

SEPA requires that an EIS describe and evaluate the proposed action, the no action alternative, and other reasonable alternatives to inform decision makers. When a proposal is for a private project on a specific site, SEPA requires the lead agency to evaluate the no action alternative plus other reasonable alternatives for achieving the proposal's objectives on the same site (WAC 197-11-440(5)(d)). Reasonable alternatives are considered those that meet the objectives of the proposed project at a lower environmental cost. Specifically, two criteria are used to evaluate reasonable alternatives:

- Does the potential alternative feasibly attain or approximate the proposed project's objectives?
- Does the potential alternative provide a lower environmental cost or decreased level of environmental degradation than the proposed project?

The following were evaluated as part of this Draft EIS.

- Proposed Action: Under the proposed action, Tesoro would implement the proposed additions and upgrades to the refinery to produce 15,000 bpd of mixed xylenes and to supply cleaner transportation fuels.
- No Action Alternative: Under the no action alternative, Tesoro would not proceed with the proposed project.

Tesoro considered a number of potential alternatives for the design of the proposed project, siting of proposed project components, and transport of products to and from the refinery. In many cases, there were no alternatives identified. In other cases, the alternatives were eliminated from further analysis because they did not meet the objectives of the proposed project and/or one of the two alternatives criteria. The alternatives are described in the subsections below.

2.9.1. Technology Alternatives Considered

2.9.1.1. Options to Reduce Sulfur Content of Fuels

The current technology at the refinery that is used to remove the existing sulfur from gasoline is hydrotreating. No other feasible technologies are available, given the current configuration of the refinery, to further reduce the sulfur content of the gasoline.

The refinery currently operates an NHT to reduce the sulfur content of gasoline produced at the refinery. The NHT is a critical process unit at the refinery for producing low sulfur gasoline and processes approximately 40,000 bbl of naphtha per day. Rather than constructing a new NHT, the most cost-effective way to further reduce the sulfur content of gasoline according to the objectives of the proposed project is to expand the existing NHT to hydrotreat more naphtha at the refinery.

The reductions in sulfur content achieved through the expansion of the NHT will result in octane loss in gasoline produced at the refinery. To restore the lost octane, an Isom Unit would be constructed and integrated into the refinery's existing Benzene Saturation Unit (BSU). The integrated BSU and Isom Unit are common to refinery processing and are specifically designed to transform hydrocarbons into low benzene, higher-octane gasoline components for blending. No technology alternatives to a new Isom Unit were found to be reasonable, due to the requirement for the Isom Unit to integrate with the existing BSU.

2.9.1.2. Options to Recover Mixed Xylenes

A third-party technology provider was consulted to provide an optimized design for the refinery to produce mixed xylenes within the required product specifications. Consideration was given to using traditional distillation to recover mixed xylenes. Traditional distillation uses a process of heating a liquid until it vaporizes and then condensing it by cooling the vapor and collecting the resulting liquid. Distillation units are typically the first step used at a refinery to separate the incoming petroleum product into various fractions of different boiling ranges. It was determined that traditional distillation alone would not achieve the required specifications of the mixed xylene product, and therefore it was not a reasonable alternative. A combination of traditional distillation and extractive distillation was then considered. Extractive distillation uses a separating solvent, in this case sulfolane, during the distillation process to help separate the xylene from the reformate feedstock.

The ARU was identified as the leading technology in the industry and one used throughout the world for recovering aromatics from petroleum intermediates. The ARU was also identified as the only feasible development option that would work within the existing refinery configuration and reliably meet the mixed xylene product specifications. For these reasons, Tesoro chose the ARU as the preferred technology for the production of mixed xylenes.

The production of mixed xylenes of about 15,000 bbl per day is based on economies of scale associated with building a new ARU process unit. Mixed xylenes would be recovered in the ARU through liquid sulfolane extraction. The sulfolane process is a liquid solvent extraction process licensed by Honeywell UOP for extracting aromatics from gasoline blendstocks. The feed to the ARU would be reformate, which is produced at the Tesoro Anacortes Refinery and which would be supplemented via West Coast sources.

2.9.1.3. Options to Capture Vapor Emissions from Loading and Unloading at the Wharf

The use of a Vapor Recovery Unit was considered as a potential alternative to capture emissions from loading and unloading at the wharf. A Vapor Recovery Unit uses a vacuum pump to collect the vapors and uses sets of carbon beds to adsorb/absorb the hydrocarbon vapors. The Vapor Recovery Unit would have a VOC control performance guarantee of more than 98 percent, and an estimated capital cost of $5.5 million. The VCU would have a VOC control performance guarantee of more than 99 percent, with an estimated capital cost of $2.3 million. The Vapor Recovery Unit would meet the objective of capturing emissions at the wharf; however the Vapor Recovery Unit costs more and has a lower VOC removal efficiency as compared to the VCU, and thereby did not meet the financial or environmental performance objective. Therefore, the Vapor Recovery Unit was not considered a reasonable alternative.

2.9.1.4. Options to Provide Steam and Process Heat for Project Components

The proposed project requires both steam and heat to operate equipment and provide process heat. The refinery does not have enough steam production capacity to meet this need; therefore, a new boiler would be required. The option of using both a new natural-gas fired boiler for steam and additional natural-gas fired process heater(s) for process heat was investigated. The use of multiple pieces of equipment to provide steam and heat would require additional capital costs, multiple pieces of equipment, more space, and more ongoing maintenance compared to installing and using a single larger boiler. A single, larger boiler would supply both the steam and heat necessary to meet the needs of the proposed project. Therefore, the use of both a new boiler and additional process heater(s) was not considered a reasonable alternative.

2.9.2. Siting Alternatives

The proposed project was designed to avoid environmental impacts where possible. Where avoidance was not possible, efforts were made to minimize or reduce the amount of environmental impacts in the arrangement and placement of project components. The sites chosen are existing areas within the refinery footprint. The areas are either not being used currently or are used for equipment/materials storage and laydown. The New Tanks Area site is currently used for grazing cattle.

Proposed project components would be located in close proximity to existing refinery process equipment. Close proximity reduces construction impacts and costs and increases operating efficiencies, which are objectives of the proposed project. Siting considerations for individual components are discussed in the following sections. Alternate sites that Tesoro considered are shown on Figure 2-22.

2.9.2.1. Naphtha Hydrotreater Unit Expansion

No alternative sites were considered for expansion of the NHT since the existing unit would be modified to meet the needs of the proposed project. The footprint of the expansion is designed to connect to the existing NHT equipment which would optimize construction and operating efficiency.

2.9.2.2. Isomerization Unit

The Isom Unit would be located in close proximity and adjacent to the existing NHT, the Benzene Saturation Unit, and the new ARU. This would enable efficient interconnection to these and other process units and associated tankage.

No other feasible and reasonable alternative sites were identified for consideration.

2.9.2.3. Aromatics Recovery Unit

Two sites were considered for the ARU. Both of the sites are adjacent to existing process units and located in the developed portion of the refinery.

The alternative site is located west of the existing NHT (see Alternative ARU site on Figure 2-22). This site is not flat and would have required additional engineering analysis, along with extensive grading and filling, resulting in additional truck trips during construction.

The proposed site for the ARU is south of the existing NHT on an existing flat and graveled equipment laydown area. This location requires less excavation than the alternative site and results in fewer truck trips during construction. The selection of this site results in operating and energy efficiencies due to its closer proximity to the tank farm and ability to connect efficiently to adjacent process units.

Figure 2-22: Alternate Sites Considered

2.9.2.4. Marine Vapor Emissions Control System

The site for the MVEC System was selected for the following reasons:

- VCU: the VCU would be located within the refinery footprint on vacant undeveloped land. The site is close to the existing wharf and natural gas supply line. The VCU site is located more than 200 feet upland from the shoreline environment to minimize shoreline impacts.
- DSU: Under U.S. Coast Guard regulations, the DSU must be located on the wharf to collect displaced vapors generated while loading marine vessels. Therefore, no other locations are feasible or reasonable. The vapors would be routed from the DSU through an existing available 12-inch line on the causeway structure, through a blower, and to the new VCU for destruction. The wharf does not require modifications to structurally support the DSU.
- Natural gas line: A new natural gas line would be routed along the existing pipe rack structure attached to the wharf system between the VCU and the DSU.

No other alternative sites were identified for consideration.

2.9.2.5. Boiler

The boiler would be used to provide the heat required for operating the ARU. The preferred site was selected adjacent to the ARU to efficiently interconnect these units. An alternative site adjacent to the other existing boilers in the refinery was determined to be less cost effective and energy efficient than placing the new boiler adjacent to the ARU.

2.9.2.6. New Tanks Area

Three tank sites were considered early in the proposed project's conceptual phase. All three sites were located adjacent to existing tanks (see Figure 2-22).

The two alternative tank sites, Alternative Tank Area 1 and Alternative Tank Area 2 (see Figure 2-22) would have required substantial filling and grading to level the sites and also would have impacted a greater area of wetlands than the selected site:

- The Alternative 1 site is located on the east side of the existing tank farm and adjacent to the west side of the East March Point wetland. Construction would directly impact three wetlands (W33, W43, and W46) and potentially the buffer for the East March Point wetland.
- The Alternative 2 site is located south and west of the existing tank farm. Construction would directly impact two wetlands (W44 and W45) with the potential to indirectly impact several more adjacent and interconnected wetlands and drainage ditches (W49, W4, W3, and Ditch 6).

The site selected for the new tanks (New Tanks Area on Figure 2-20) would be located in relative close proximity to the existing industrial process units resulting in energy savings and operational efficiencies. More importantly, the site minimizes permanent impacts on wetlands. The two small wetlands located along the southeastern edge of the New Tanks Area (W47 and W48) are isolated and neither are considered jurisdictional by the USACE (USACE 2015). Additionally, Ecology concluded that the isolated wetlands do not require formal authorization to fill and that compensatory mitigation is not required for filling (Ecology 2015). The potential temporary construction laydown area west of the New Tanks Area also avoids impacts on wetlands.

2.9.3. Alternative Methods of Transport

Consideration was given to alternative methods of transport of reformate from West Coast sources to the refinery to meet the objectives of the proposed project, including overland transport of reformate by pipeline, rail, and tanker truck.

Maintaining tight quality control of reformate that would be received at the refinery is extremely important to successfully operate the ARU and meet quality control specifications of mixed xylene products. There is no existing dedicated pipeline for reformate, and therefore, transport by pipeline was not feasible.

Transport of reformate by tanker truck would require approximately 1,100 tanker truck return trips each month. Transport of reformate by rail would require approximately 8 unit train deliveries (100 train cars per unit train) each month. Transport by tanker truck or rail would require transport of reformate through towns and cities, which would present an increased risk of fire or explosion in populated areas in the event or a road or rail accident. Further, the use of tanker trucks or rail cars to transport reformate to the refinery is not considered economical or logistically feasible due to the large numbers of trucks and rail cars required to meet the objectives of the proposed project.

Tesoro identified marine transportation as the only economical or logistically feasible option to transport reformate between other West Coast refineries and the Anacortes Tesoro refinery, due to the large volumes of materials needed and the origin of these materials with respect to the refinery.

No feasible alternatives to marine vessel transport were identified to export the mixed xylene product to global markets. Because the mixed xylene product will be exported overseas, overland transport is not possible. Shipments would follow the established marine vessel transportation route leading to and from ports within the Strait of Juan de Fuca, Puget Sound, and adjacent waters. Transport vessels are required to follow this shipping route, which is regulated by the U.S. and Canadian governments and managed by the U.S. Coast Guard or Canadian Coast Guard. The route is currently used for transporting crude oil and petroleum products to and from the Tesoro refinery from other West Coast refineries.

2.9.4. No Action Alternative

Under the no action alternative, Tesoro would not proceed with the proposed project. The refinery would be unable to meet the upcoming federal Tier 3 standards for reduced-sulfur gasoline in sufficient quantity to remain economically competitive and would not produce a new product, mixed xylenes. In the short term, the refinery would continue to operate as it does today, likely in a reduced capacity.

2.10. RELATED ACTIONS

There are no planned future additions, expansions, or further activities related to or connected with the proposed project (Tesoro 2016g). As described in Section 2.8.4.1, Cascade Natural Gas is planning upgrades to their regional transmission system, which would provide the additional quantities of natural gas necessary for the proposed project. The Cascade Natural Gas project is proceeding as a separate project subject to its own SEPA analysis.

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