2.0 Alternatives Including the Proposed Action

2.1 Introduction

This chapter discusses the alternatives available to the USACE and to Sabine, including the No Action Alternative, and development of the proposed Rusk Permit Area (the Proposed Action). This chapter also describes a variety of alternatives that have been considered by the USACE and Sabine, but which have been rejected as infeasible for one or more reasons including environmental, technological, and economic considerations (see Section 2.3); these alternatives are not analyzed in detail in this EIS. **Table 2-1** summarizes the alternatives considered in this document and their primary attributes. These alternatives, including the rationale for their consideration or elimination from consideration in this EIS, as applicable, are discussed in detail in the following sections of this chapter.

2.2 Alternatives Available to the USACE

The USACE has determined that the Proposed Action requires authorization under an IP pursuant to Section 404 of the CWA (see Chapter 1.0). There are three alternatives relative to the Proposed Action available to the USACE: 1) issue the permit, 2) issue the permit with special conditions, or 3) deny the permit. Permit denial is referred to as the No Action Alternative (see Section 2.6).

2.3 Alternatives Available to the Applicant

Sabine considered various alternatives during feasibility studies for the construction and operation of the proposed Rusk Permit Area. In addition, the USACE identified potential alternatives to the Rusk Permit Area based on issues identified during project evaluation. No alternatives were identified during the public scoping process. The alternatives considered included alternatives in the method of constructing and operating the Rusk Permit Area including: the Sabine River crossing location, dragline and haul road corridors, dragline scenarios, lignite transport scenarios, mining scenarios, lignite resource areas, and use of public roads. All of these alternatives were considered relative to their technological and economic feasibility as well as their apparent likelihood to reduce environmental impacts. The USACE has reviewed the data and analyses provided by Sabine including review of the associated costs. Based on the available data, the USACE believes Sabine's analysis to be reasonable. Based on the USACE's evaluation, the following alternatives have been considered but subsequently eliminated from detailed analysis in this EIS. This section describes the rationale for their elimination.

2.3.1 Sabine River Crossing Location

This alternative considered alternate corridor locations for dragline and bridge crossings of the Sabine River, including separate corridors for the dragline and bridge crossings. Sabine considered the potential alternative locations in coordination with the USACE and TPWD.

Sabine evaluated a potential crossing location approximately 1,000 feet downstream of the currently proposed location. This location would have crossed on a coal shoal and then onto a property for which Sabine does not have right-of-entry. Although the coal shoal would provide additional stability, the temporary reroute of the Sabine River would have been difficult due to the river geomorphology at this location. The channel lacked the necessary sinuosity to provide a location to re-route and culvert the Sabine River around the dragline crossing location. In order to use the coal shoal location, additional disturbance would have been required, resulting in additional environmental impacts to the Sabine River. In addition to the property ownership and geomorphological issues, this location would not provide any apparent environmental advantages over the Proposed Action. Therefore, it was eliminated from further consideration.

Table 2-1 Summary of Alternatives Considered and their Primary Attributes

Alternative	Advantage	Disadvantage	Reason for Eliminating from Consideration, if Applicable
Alternatives Considered in Detail			
No Action	• Eliminates environmental impacts to the natural or human environment related to Rusk Permit Area development	• Would prevent Sabine from meeting their contractual obligations with SWEPCO's existing Pirkey Power Plant	• Fails to meet Sabine's purpose and need; however, analyzed in detail in accordance with NEPA
Rusk Permit Area (Proposed Action)	• Would allow Sabine to meet their contractual obligations with SWEPCO's existing Pirkey Power Plant by providing a reliable long-term lignite fuel source	• Triggers various adverse environmental impacts as discussed in detail in Chapter 3.0	• Retained for analysis as the Proposed Action as it meets the project purpose and need
Alternatives Considered but Eliminated from Detailed Analysis			
Sabine River Crossing Location	• None identified	• Right-of-entry issues with landower • Geomorphological issues • Longer haul road • No apparent environmental advantages	• No apparent environmental advantages over the Proposed Action
Split Transportation Corridor	• Dragline walkway would be shorter in length (and more cost-effective) than the proposed haul road	• Would result in additional habitat fragmentation	• Identified advantages would not offset the environmental disadvantages
Dragline Disassembly and Reassembly	• None identified	• Substantial economic costs • Would reduce lignite production and delivery to SWEPCO's existing Pirkey Power Plant	• Would preclude Sabine from making the required fuel delivery and meeting its contractual obligations
Purchase of New Draglines	• None identified	• Substantial economic costs	• Economic costs render this impractical

Table 2-1 Summary of Alternatives Considered and their Primary Attributes

Alternative	Advantage	Disadvantage	Reason for Eliminating from Consideration, if Applicable
Lignite Transport by Conveyor or Rail	• Minor reduced surface disturbance related to haul road width	• Lack of substantial environmental advantage • Lack of redundant backup for lignite deliveries	• Operational issues and costs render this impractical • No apparent substantial environmental advantages over the Proposed Action
Deeper Mining at Existing South Marshall Permit Area	• Would eliminate Rusk Permit Area-related environmental impacts	• Pit stability and safety issues • Not economically feasible with existing mine equipment	• Operational costs and safety issues render this impractical
Underground Mining of Rusk Permit Area	• Reduced surface disturbance	• Geologic conditions are not conducive to underground mining • Lower level of resource recovery • Need for additional processing facilities with associated environmental effects	• Environmental considerations, operational issues, safety issues, and costs render this impractical
Alternate Mine Layout and Mine Sequencing	• None identified	• Increased environmental issues • Increased costs due to increased overburden handling and need for additional equipment	• Environmental and cost considerations render this impractical
Use of Public Roads for Lignite Transport	• None identified	• Use of public roads for lignite haulage would compromise public safety • Increased costs	• Operational costs and safety issues render this impractical
Mining of Other Lignite Resource Areas	• Would eliminate Rusk Permit Area-related environmental impacts	• Reduced lignite quantity and/or quality • Increased environmental impacts at existing operation or another location • Increased costs • Use of public roads for lignite haulage would compromise public safety	• Identified advantages would not offset the disadvantages

Other potential Sabine River crossing locations initially were considered but subsequently were eliminated as they would not enable the haul road corridor to be directly aligned with the Pirkey Power Plant, resulting in a longer haul road and associated additional environmental disturbance and cost. A longer haul road also would require the purchase or lease of additional property rights, resulting in additional costs. The currently proposed bridge alignment would facilitate the potential future addition of a conveyor from the Rusk Permit Area to the Pirkey Power Plant, should Sabine decide to construct and operate a conveyor in the future. Note that a conveyor is not part of the Proposed Action; it is considered a RFFA in the cumulative impact assessment (see Section 2.7).

2.3.2 Split Transportation Corridor

This alternative considered separate corridors for the dragline walkway and haul road south of the Sabine River; the Sabine River crossings of the dragline walkway and haul road would be the same as the Proposed Action. South of the Sabine River, the corridors would remain separate over their entire length across the Sabine River floodplain until entering uplands close to the proposed pit locations. Sabine initially considered this alternative as the dragline walkway would have been shorter in length (and more cost-effective) than the proposed alignments. However, this alternative would have resulted in additional habitat fragmentation. At the direction of the USACE and the TPWD, this alternative was eliminated from consideration, and the proposed corridors were co-located between the Sabine River and the mine pits as described under the Proposed Action (see Section 2.5.1.6). Additionally, the proposed haul road alignment would be located to parallel an existing natural gas pipeline right-of-way (ROW), to the maximum extent practicable, in an effort to further reduce habitat fragmentation.

2.3.3 Dragline Disassembly and Reassembly

As an alternative to the proposed construction of a dragline walkway across the Sabine River from the South Marshall Permit Area of the South Hallsville No. 1 Mine to the proposed Rusk Permit Area, Sabine considered dragline disassembly, transport, and reassembly. Under this alternative, environmental impacts associated with the proposed dragline walkway would not occur. Sabine proposes to relocate up to four draglines to the Rusk Permit Area. Sabine estimates it would require approximately 18 months to disassemble, transport, and reassemble each dragline at an approximate cost of $15 million per dragline (in 2009 dollars) or a total of approximately $60 million. This cost includes labor, equipment, materials and supplies, transport, tear-down, and erection pad construction. The draglines would be moved in 6- to 7-year increments during the life of the project; therefore, the costs would be incurred over a 25- to 30-year period with the associated increase in costs. This estimated cost is approximately $45 million more than the cost of construction and operation of the dragline walkway, including the removal and replacement of fill material and reclamation of the walkway following transfer of the final dragline.

Each of Sabine's four draglines is required to operate at full capacity to meet the Pirkey Power Plant's operational requirement of approximately 4 million tons of lignite per year. Sabine is contractually obligated to meet the entire fuel requirement of the power plant. Based on Sabine's current strip ratios and the annual volume of overburden handled by each dragline, loss of a dragline for approximately 18 months per dragline (total of 6 dragline years) would substantially reduce lignite production and delivery to the power plant. The reduced lignite production rate for 18 months for each dragline would preclude Sabine from making the required fuel delivery and meeting its contractual obligations; therefore, this alternative was eliminated from further consideration.

2.3.4 Purchase of New Draglines

As an alternative to the proposed construction of a dragline walkway across the Sabine River and transfer of Sabine's existing draglines, Sabine considered the purchase of one or more new draglines for the proposed Rusk Permit Area. Under this alternative, environmental impacts associated with the proposed dragline walkway would not occur. The cost of a new dragline (in 2009 dollars) would be approximately $50 to $100 million for a total maximum cost of $400 million for four draglines. In addition to the cost of the new draglines, the existing four draglines at the South Hallsville No. 1 Mine would need to be idled and/or sold as mining of the remaining lignite reserves is completed. It is anticipated that, due to the age and

2.3.5 Lignite Transport by Conveyor or Rail

Although these alternatives would slightly reduce the required width for the transportation corridor, a haul road and dragline crossing of the Sabine River still would be required. Mobile equipment would need to access the mine areas for pre-stripping operations and mine maintenance.

The construction cost for a troughing conveyor, including a conveyor maintenance facility, is estimated at three-to-four times the cost of constructing a bridge across the Sabine River. Conveyor operational costs would be substantially less than the proposed truck haulage costs. A conveyor also would require construction of new coal handling facilities at the Rusk Permit Area to prepare the run-of-mine lignite for transport by conveyor, including a truck dump and crushing and transfer equipment; these costs are included in the cost estimate. Based on the estimated combined capital construction costs and operational costs, an overland conveyor is not currently cost-effective.

Although at the time of the economic evaluation a conveyor was not a feasible option, future conditions may require a re-evaluation of a conveyor option. The primary factor will be tons of lignite delivered per mile of conveyor required. As time progresses, the percentage of total tons of lignite deliveries from the Rusk reserves compared to total contractually obligated tons of lignite delivered would increase. Therefore, at some point in the future, a conveyor option may become economically feasible. Other factors that would influence the future economic feasibility of a conveyor would include diesel fuel costs and costs and availability of tires for mobile equipment. As Sabine may consider the future construction and operation of a conveyor, it is considered as a reasonably foreseeable future action in the cumulative impact assessment (see Section 2.7).

The construction cost for a rail line between the Rusk Permit Area and the Pirkey Power Plant is estimated at approximately four times the cost of the proposed haul road. Rail haulage operational costs are estimated to be substantially less than the proposed truck haulage costs. Like a conveyor, rail transport would require construction of new lignite handling facilities at the Rusk Permit Area; these costs were included in the cost estimate.

A significant operational problem would result from the lack of a redundant backup for lignite deliveries in the event of a temporary failure of either a conveyor or rail transport of lignite from the Rusk Permit Area to the Pirkey Power Plant. Note that, in effect, the haul road would provide the access required for backup; however, Sabine would not have the trucking capacity necessary to meet the power plant demand with either a conveyor or rail line for lignite transport. These alternatives were eliminated for this reason, as well as cost and lack of substantial environmental advantage.

2.3.6 Deeper Mining at Existing South Marshall Permit Area

Deeper mining is not technically or economically feasible for the existing South Marshall Permit Area of the South Hallsville No. 1 Mine. The existing draglines are capable of digging approximately 95 feet below ground surface (bgs); however, additional lignite seams in the deposit exceed this depth. In addition, the stripping ratio would increase for the deeper seams. Deeper pits also would reduce pit slope stability, and safety factors required to ensure safe operations would result in an operating configuration with flatter slopes and associated higher costs for overburden removal. Thus, it would not be economically feasible to remove overburden at greater depths with the existing draglines. Mining the lignite resource at a greater depth and stripping ratio would require purchase of a minimum of two additional draglines (at an approximate cost of $50 to $100 million per dragline) to handle the additional overburden. Another method to handle the increased volume of overburden would be to pre-strip multiple benches using mobile

equipment. It is estimated that approximately twice the number of mobile equipment units (e.g., track-hoes, shovels, end-dumps, etc.) that currently are operating at the South Hallsville No. 1 Mine would be required to mine the deeper reserves with this method. Therefore, this alternative was eliminated from further consideration based on safety issues and cost.

2.3.7 Underground Mining of Rusk Permit Area

Underground mining of the proposed Rusk Permit Area lignite resources is not technically or economically feasible due to geologic conditions, including the instability of the overburden material. The potential roof of an underground mine at this location would consist of consolidated sands and clays typical of the Wilcox Formation. These materials are very unstable as roof materials and prone to collapse once the lignite is removed. Safety issues would preclude underground mining. Underground mining of this lignite resource also would result in a lower level of resource recovery and increased costs and environmental effects associated with the need for additional processing. Therefore, this alternative was eliminated from further consideration.

2.3.8 Alternate Mine Layout and Mine Sequencing

Alternate mine plans are technically achievable; however, they would result in additional costs associated with increased overburden handling, including the need for additional mobile equipment. In addition to economic issues, consideration also was given to the presence (and avoidance) of cultural resources. Directional changes in mining would cause pits to cross varying terrain, complicating Sabine's ability to handle in-pit runoff, as well as affecting additional watersheds at the start of the project. Therefore, this alternative was eliminated from further consideration based on environmental and cost considerations.

2.3.9 Use of Public Roads for Lignite Transport

Based on the proposed lignite haulage requirements, there would be an estimated 500 haul truck round-trips per day (based on daily lignite requirements for the Pirkey Power Plant of 12,500 tons and the use of 25-ton over-the-road [OTR] trucks) between the proposed Rusk Permit Area and the Pirkey Power Plant. The use of public roads would compromise public safety due to the intermingling of private cars and trucks with lignite haul trucks. The use of public roads would require different lignite haul trucks suited for highway usage and would greatly increase the maintenance requirements for the public roads. Because these trucks are substantially smaller than the off-road lignite haulers used by Sabine, this method would increase lignite haulage costs. Increased road maintenance requirements, as well as additional fuel costs for the longer transport distance, would be cost-prohibitive for Sabine. Using OTR trucks on public roads would approximately double the haul distance that could be achieved using the proposed haul road and off-road haulers. The OTR trucks haul less tonnage and would travel twice the distance; the incremental per-ton cost would be much higher using OTR trucks than using the proposed 240-ton haul trucks. Therefore, this alternative was eliminated from further consideration based on cost.

2.3.10 Mining of Other Lignite Resource Area

Several other lignite resource areas exist within Sabine's current permit area; however, these areas were eliminated due to portions of the alternate resource area being outside of Sabine's or SWEPCO's control, or due to extensive other encumbrances (e.g., power lines, gas transmission lines, cultural resources, more extensive aquatic resources including forested wetlands, etc.). Additional areas were eliminated due to floodplain issues and haul distances exceeding twice those of the proposed Rusk Permit Area that would result in additional environmental impacts within a longer corridor and additional habitat fragmentation. Many of the potential alternate resource areas are small and would be exhausted within approximately 5 to 10 years, or require the redisturbance of previously mined and reclaimed areas. It is assumed that development of a comparable alternate lignite resource would result in a total disturbance area similar to Rusk. Based on the proposed lignite haulage requirements (12,500 tons per day) and the use of 25-ton OTR trucks for haulage between an alternate lignite source and the Pirkey Power Plant, Sabine estimates that 38 OTR trucks would need to be purchased. As discussed above in Section 2.3.9, Use of Public Roads for Lignite Transport, increased haulage costs, increased road maintenance

requirements on affected public roads, and additional fuel costs associated with an increased haulage distance would be cost-prohibitive for Sabine. Also as discussed in Section 2.3.9, the use of OTR haulage would compromise public safety. Other variables (e.g., lignite quality, overburden depth, overburden-to-lignite ratio, property control, aquifer depressurization requirements, reclamation feasibility, etc.) also were evaluated. Any one of these variables would prohibit development of the alternate mine areas. As a result, development of an alternate lignite resource was eliminated from further consideration.

2.4 Existing Operations

Sabine initiated lignite mining at the South Hallsville No. 1 Mine in 1984 (**Figure 2-1**), and under contract has supplied up to 4.4 million tons of lignite annually to SWEPCO's Pirkey Power Plant, located adjacent to the mine. Sabine also has supplied up to 350,000 tons of lignite per year to Norit Americas' activated carbon plant in Marshall, Texas. The currently permitted mine area encompasses approximately 44,400 acres.

Existing operations at Sabine's South Hallsville No. 1 Mine include open-pit lignite mining operations within the currently authorized South Marshall Permit Area and supporting infrastructure. Infrastructure components include a truck dump for stockpiling lignite for use at SWEPCO's Pirkey Power Plant, a coal barn for stockpiling of lignite for subsequent loading onto Norit Americas' highway haulers, mine offices, a truck shop, a fueling station, a truck wash, and warehouse facilities. Lignite reserves within the existing South Marshall Permit Area would be depleted in approximately 2027.

The original mine permit area, located approximately 10 miles southeast of Longview in Harrison County, encompassed approximately 20,770 acres, of which approximately 10,545 acres comprised the mine pit (that incrementally was reclaimed), 430 acres were for haul roads, and 43 acres were for ancillary mine facilities. The initial facilities included a dragline erection area and an area for mine personnel, equipment storage, and maintenance facilities. An estimated 9,750 acres surrounding the area to be mined were anticipated to be affected by mining activities. The original mine had a projected 24-year mine life, with an average mining rate of 2.8 million tons per year (tpy) of lignite (USEPA 1982).

The original mine comprised two dragline pits and used conventional digging and side-casting procedures. Upstream reservoirs were constructed to control drainage from undisturbed areas. Temporary stream diversions were constructed for a portion of Hatley Creek and several of its unnamed tributaries. SWEPCO constructed a road from Interstate 20 (I-20) south around the mine site and west to FM 968 (USEPA 1982).

In 1995, the South Hallsville No. 1 Mine was expanded to include the South Marshall Permit Area. The South Marshall Permit Area is located in Harrison County within the Sabine River drainage, adjacent to and east of the original mine. The South Marshall Permit Area supplies approximately 3.8 million tpy of lignite to the Pirkey Power Plant; operation is anticipated to continue through the year 2027. There are two mining areas utilizing two 92-cubic-yard, one 85-cubic-yard, and one 25 -cubic-yard electric-powered walking draglines. Surface water drainage from disturbed areas passes through a sediment control pond or a series of sediment control structures prior to discharge through Texas Pollution Discharge Elimination System (TPDES)-regulated outfalls in accordance with the project's existing TPDES permit criteria. Temporary stream diversions divert overland flow and shallow groundwater flow from undisturbed areas around disturbed areas. Existing facilities in two areas associated with the initial South Hallsville No. 1 Mine support operations in the South Marshall Permit Area; these include: 1) mine personnel office, storage, and maintenance facilities, and 2) general storage. Additional facilities constructed in the South Marshall Permit Areas include a maintenance and bathhouse facility inclusive of a shop, operations offices, bathhouse, indoor parts storage area, outdoor parts storage area, equipment and vehicle parking, fuel storage yard, and fueling area. Currently, there are approximately 260 employees and contractors working at the South Hallsville No. 1 Mine, including the South Marshall Permit Area. In total, approximately 17,600 acres are authorized for disturbance at the South Hallsville No. 1 mine, inclusive of the South Marshall Permit Area.

2.5 Description of Proposed Action

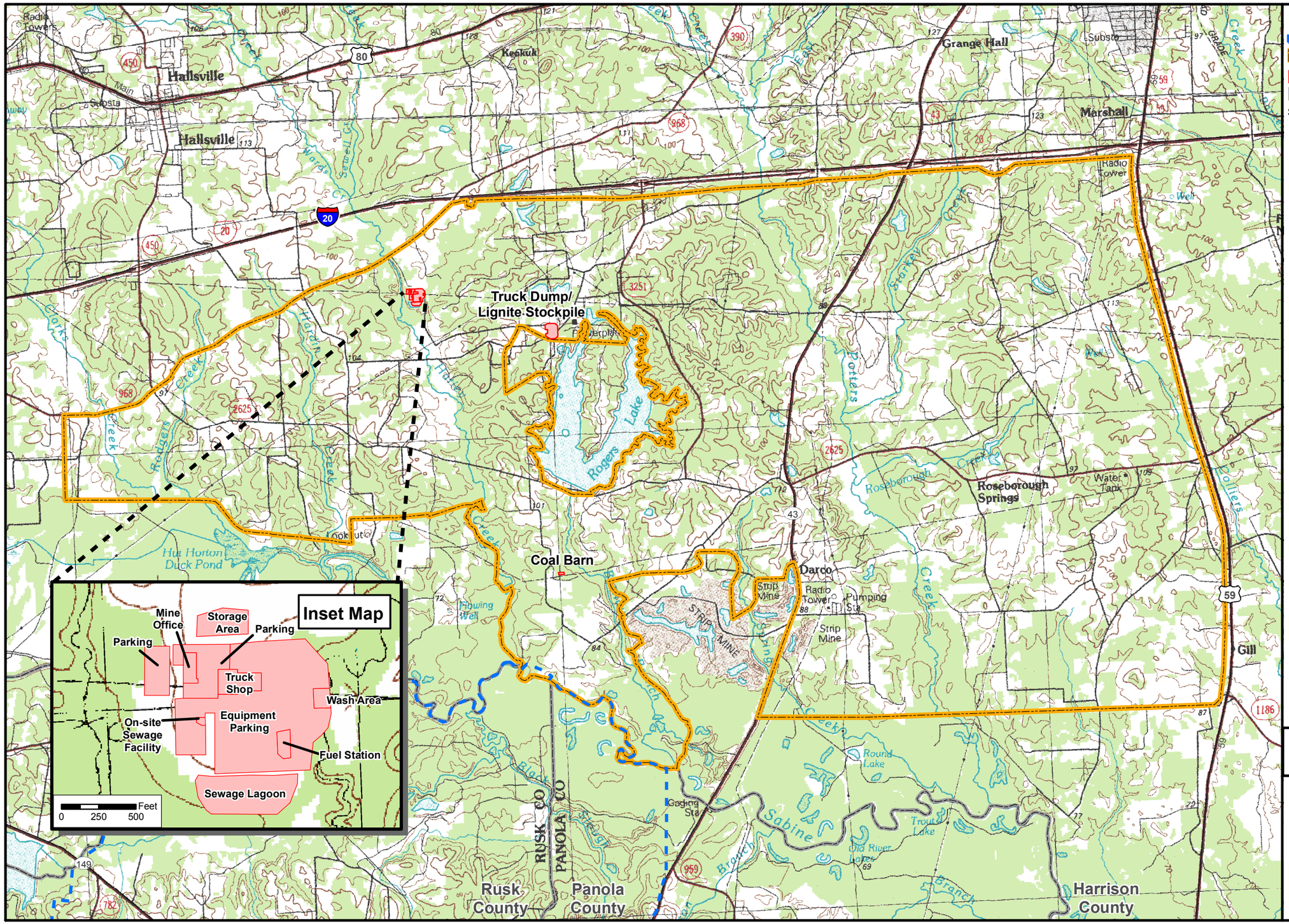
As described in Chapter 1.0, the proposed Rusk Permit Area requires a mine permit from the RCT; the RCT permitting process is concurrent with the NEPA process for the proposed Rusk Permit Area. The description of the Proposed Action in this EIS is based on Sabine's initial application to the RCT for the South Hallsville No. 1 Mine - Rusk Permit; Sabine submitted this application to the RCT in May 2009 (Sabine 2009a). The specific construction, operation, and reclamation/closure details of the Rusk Permit Area evolve during the RCT permit process, generally resulting in a reduction of impacts. The EIS analysis of potential environmental impacts associated with the proposed Rusk Permit Area is therefore considered conservative since the operation as described in Sabine's initial RCT application (Sabine 2009a) is being refined in the RCT permitting process, through project redesign and associated environmental protection measures.

Under the Proposed Action (**Figure 2-2**), the proposed mine expansion into the Rusk Permit Area would encompass an additional 20,377 acres located south of the existing South Hallsville No. 1 Mine (located in Harrison County) and would cross the Sabine River into Rusk and Panola counties (**Figure 1-2**). The proposed mine expansion is designed to initially supplement and eventually replace lignite production at the South Marshall Permit Area of the South Hallsville No. 1 Mine, which would be depleted in 2027. During concurrent operations (through 2027), approximately half of the total lignite production would come from declining reserves in the South Marshall Permit Area and half would come from the Rusk Permit Area. Following depletion of the reserves at the South Marshall Permit Area, the Rusk Permit Area would operate at full production, thus providing a reliable long-term lignite fuel source to the existing Pirkey Power Plant (Sabine 2010a). Sabine submitted a permit application for the proposed Rusk Permit Area to the RCT in May 2009. A preliminary draft IP application was submitted to the USACE in accordance with Section 404 of the CWA in April 2009, with the final IP application submitted in January 2010, and revisions and additions submitted in March 2010.

Equipment proposed for use at the Rusk Permit Area is identified in **Table 2-2**. The number of personnel to be employed at the mine by phase of activity is shown in **Table 2-3**. Sabine plans to conduct operations at the Rusk Permit Area 24 hours per day, 365 days per year. The estimated annual payroll for the proposed project, including benefits, would be approximately $29 million. In addition, taxation income to Rusk and Panola counties would be generated from real and personal property taxation and sales taxes related to the mine.

The proposed Rusk Permit Area would utilize existing infrastructure at the South Hallsville No. 1 Mine (**Figure 2-1**), which would eliminate new disturbance for these facilities. This infrastructure would include the mine office, truck shop, truck wash, and warehouse facilities, a portion of the existing haul road, and the lignite truck dump and coal barn. New infrastructure facilities proposed for the Rusk Permit Area include temporary lignite storage stockpiles, a 138-kilovolt (kV) transmission line, an equipment fueling and parking area, a water truck fill station, non-lignite storage areas, and a dragline workover area (**Figure 2-2**). No lignite preparation or cleaning facilities are proposed within the Rusk Permit Area.

Prior to initiation of mining at the Rusk Permit Area, the proposed transportation and utility corridor would be constructed. This corridor, inclusive of the proposed dragline walkway and primary haul road, would facilitate transfer of South Hallsville No. 1 Mine draglines to the proposed mine and would provide for transport of lignite from the proposed mine to the existing lignite truck dump or coal barn at the South Hallsville No. 1 Mine. The disturbed areas associated with the proposed Rusk Permit Area by major category are presented in **Table 2-4**.



Legend

- Proposed Rusk Permit Area Boundary
- Existing South Hallsville Permit Boundary
- Existing South Hallsville Facilities
- County Boundary

Source: Sabine 2010a.

N

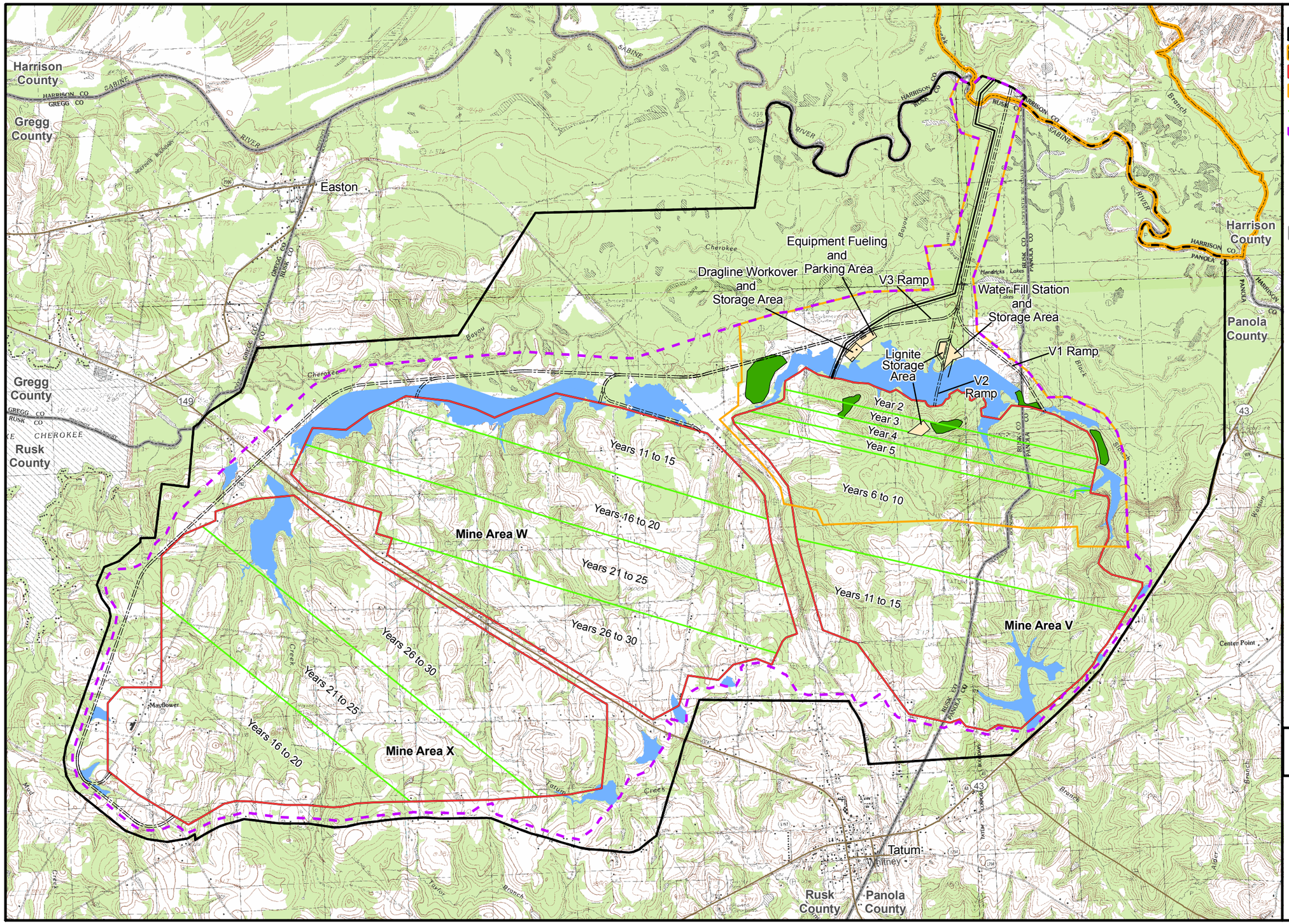
0 1 2 Miles

Rusk Permit Area EIS

Figure 2-1

Existing
South Hallsville No. 1
Mine Area

3/23/10



Legend

- Proposed Rusk Permit Area Boundary
- Existing South Hallsville Permit Boundary
- Proposed Mine Areas
- Proposed First 5-year RCT Permit Term Disturbance Boundary
- End of Period Mining Extent
- Proposed Life-of-mine Disturbance Boundary
- Sediment Control Pond
- Mine Facilities
- Oxidized Overburden Stockpiles (temporary)
- Main Haul Roads
- Dragline Walkway
- County Boundary

Source: Sabine 2009a,b, 2010c.

N

0 0.5 1 Miles

Rusk Permit Area EIS

Figure 2-2

Proposed Action

07/21/10

Table 2-2 Equipment List for Existing and Proposed Operations[1]

Quantity[2]	Description	Horsepower Rating[3]	Trips/Day (round trip)	Miles/Trip (one-way)[4]
Mobile Fleet				
1	Water Truck (18,000 gallons)	1,050	15	20
1	Water Truck (20,000 gallons)	1,050	15	20
1	Water Truck (33,000 gallons)	1,487	15	20
9	150-Ton End Dump	1,487	15	20
1	240-Ton – Kress	1,700	15	20
2	Van – 15-Passenger	301	4	20
1	Van – 12-Passenger	245	4	20
2	Pick up – 2-Door	300	5	20
27	Pick up – Crew Cab	300	5	20
1	Pick up – Extended Cab	300	5	20
1	Tahoe	320	1	20
2	Suburban	320	1	20
1	Fuel/Lube Truck	408	5	20
2	Ford Welders Truck	300	2	20
1	Ford F600 Mechanics Truck	300	10	20
1	Ford Boom Truck	300	2	20
1	Lowboy w/Tractor (Komatsu 330M)	1,050	--	--
1	Tire Truck	300	--	--
1	Hydromulcher	140	--	--
Non-mobile Equipment				
2	Bucyrus Erie 1570 (92-cubic yard bucket)	Electric	--	--
1	Marion 8200 (85-cubic yard bucket)	Electric	--	--
1	Page 736 (25-cubic yard bucket)	Electric	--	--
2	Easi-Miner	1,200	--	--
1	Komatsu WA-450 (New)	272	--	--
1	Komatsu WA-450	272	--	--
1	Cat 992C	690	--	--
1	O&K Shovel	2,000	--	--
2	PC-1800 Excavator	908	--	--
2	637 Scraper	250	--	--
1	Galeon 850 Grader	165	--	--
2	16G Grader	275	--	--
2	16H Grader	275	--	--
1	Komatsu PC300	246	--	--
1	Komatsu PC400	345	--	--

Table 2-2 Equipment List for Existing and Proposed Operations[1]

Quantity[2]	Description	Horsepower Rating[3]	Trips/Day (round trip)	Miles/Trip (one-way)[4]
1	Compactor – Cat 825C	310	--	--
1	Wheel Dozer – Cat 834B	481	--	--
1	Cat D7R – Winch	240	--	--
1	Cat D8N – Winch	310	--	--
2	Cat D10N – Winch	580	--	--
1	Cat D11N – Ripper	850	--	--
1	Cat D11RCD	850	--	--
1	Kom D375A-5	525	--	--
1	Kom D275AX-5	452	--	--
2	Cat D9T – Winch	410	--	--
3	Cat D10T – Winch	580	--	--
1	Cat D6T	200	--	--
1	Ford 555 Backhoe	90	--	--
6	6-inch Diesel Pumps	120	--	--
7	4-inch Diesel Pumps	80	--	--
5	Low-head Pumps	60	--	--
10	Pumps	60	--	--
3	16-inch Gator Pumps	130	--	--
1	Poly Pipe Fusion Machine	11	--	--
5	Pump Tractor/Skidder	103	--	--
4	Kubota Cable Tractors	103	--	--
1	Ford CL-45 Loader	45	--	--
1	65-Ton Grove Crane	430	--	--

[1] Sabine's existing equipment fleet, and new equipment as noted in the table, would be shared by existing operations at the existing South Marshall Permit Area of the South Hallsville No. 1 Mine and the proposed operations at the Rusk Permit Area through 2027. After that time, all equipment would be operational at the Rusk Permit Area (Sabine 2010a).

[2] Assumes that equipment units would be replaced with similar model units when their useful life expires.

[3] Horsepower rating based on equipment manufacturer information and internet sources.

[4] One-way distance is estimated to be the average distance from the proposed Rusk Permit Area to the existing truck dump for SWEPCO's Pirkey Power Plant.

Source: Sabine 2009b.

Table 2-3 Employment Numbers by Mine Phase

Mine Phase (Mine Year)	Existing Sabine Employees[1]	New Hires[1]	Contract Workers[2]	Total
Construction (years 1 to 1.5)	260	0	150	316
Operations (years 1 to 30)	260	0	40	266
Closure and final reclamation (years 30 to 35)	100	0	40	160

[1] Sabine's existing work force of approximately 260 employees would remain constant during the transition between existing operations at the South Marshall Permit Area of the South Hallsville No. 1 Mine and proposed operations at the Rusk Permit Area (Sabine 2010a,b).

[2] The majority of the contract workers would be new hires.

Source: Sabine 2010a,b.

Overburden and interburden (the material to be removed above and between the lignite seams, respectively) primarily would be removed using 25- to 92-cubic yard capacity draglines to allow access to the lignite seams. Both highwall and spoil side positions would be used by the draglines. No blasting is proposed. The volume of overburden and interburden production would vary with the depth at which mining would occur. The minimum mineable lignite thickness considered to be recoverable is 0.25 feet. Projected material production by year for the first 5 years and subsequent 5-year periods for the life of the mine is shown in **Table 2-5**, and the projected individual mine blocks by year are shown in **Figure 2-2**.

Once an initial box pit is excavated, overburden and interburden from each subsequent pit would be backfilled into the previous pit to establish a graded surface at approximately the same elevation as the pre-mining surface. Overburden material would be selectively handled to ensure placement of a minimum 4-foot cover of suitable oxide material for use as growth media on top of the backfill. This surface then would be suitable for completion of reclamation procedures including rough and final grading, testing of selectively handled overburden for suitability, seeding and planting, and other final reclamation tasks. The sequence of activities would be implemented to achieve post-mining land uses and long-term reclamation goals as approved by permitting agencies prior to site construction.

The proposed Rusk Permit Area is located north of the community of Tatum. Existing public roads (CR, FM, and SH) and utilities cross the proposed disturbance areas. These roads and utilities are shown in **Figures 2-3** and **2-4**, respectively. The mine year during which each road would be closed is identified in **Table 2-6**. Roads would be closed by the jurisdictional agency in advance of mine operations. The roads would be returned to their original alignment as sequential operations and reclamation activities advance. In general, the affected roads would be reopened approximately 7 to 10 years after being mined through and following approval of the appropriate jurisdictional agency. Alternate access routes would be provided prior to road closures.

Utilities (e.g., natural gas pipelines and transmission lines) located within the area of proposed mining would be rerouted and removed in advance of mining (**Figure 2-4**). Utilities would be permanently rerouted at the discretion of the owner in advance of mine operations. Pipelines located within 100 feet of the permit area would be maintained in accordance with RCT regulations.

The land surface within the proposed mining area includes lands currently owned by SWEPCO and private lands that would be leased or purchased by SWEPCO.

An estimated 200 natural gas and oil wells and an estimated 125 groundwater wells exist within the Rusk Permit Area proposed life-of-mine disturbance boundary. All wells within the area of proposed mining would be sealed in accordance with RCT regulations. Oil and gas wells that would be mined through would be plugged in accordance with 16 TAC 3.14.

Table 2-4 Estimated Incremental Surface Disturbance Acreages

Year	Dragline Walkway/Haul Roads/Utility Corridor	Ancillary Facilities	Mine Pits	Relocated Roads and Utilities	Total
Within Permit Area					
1	115	800	150	10	1,075
2	70	0	281	20	371
3	70	10	161	20	261
4	70	10	170	20	270
5	115	15	176	20	326
6 to 10	70	15	1,229	30	1,344
11 to 15	90	500	1,840	30	2,460
16 to 20	110	500	2,067	30	2,707
21 to 25	110	50	2,251	30	2,441
26 to 30	110	50	2,181	30	2,371
Totals	**930**	**1,950**	**10,506**	**240**	**13,626**[1]

[1] The total acreage reflects the disturbance footprints associated with the proposed mine areas and associated facilities. Approximately 766 additional acres exist within the proposed life-of-mine disturbance boundary (see **Figure 2-2**), which encompasses at total of 14,392 acres (inclusive of proposed mine areas and facilities). Portions of the 766 additional acres may be used during operations for temporary non-coal facilities (e.g., temporary stockpiles for oxidized overburden), if needed. Therefore, the life-of-mine disturbance boundary reflects the maximum disturbance acreage that would occur under the Proposed Action.

Source: Sabine 2010a.

Table 2-5 Production Schedule

Mine Year/Period	Overburden/Interburden (million cubic yards)	Lignite (million tons)
1	0	0
2	25.3	2.4
3	23.9	2.0
4	24.9	2.1
5	28.0	2.2
6 to 10	204.6	14.7
11 to 15	296.6	22.8
16 to 20	359.1	26.1
21 to 25	405.9	31.6
26 to 30	446.6	34.2
Total[1]	**1,815.0**	**138.2**

[1] Slight differences are due to rounding.

Source: Sabine 2009b.

Table 2-6 Public Roads Within and/or Adjacent to the Proposed Rusk Permit Area

Road Name	Mine Years Closed/ Relocated or Removed[1,2]	Activity[2]
Rusk County Roads		
CR 2210	3 to 17	Mining/Closed
CR 2211	NA	None – adjacent to project boundary
CR 2212	23 to 27	Mining/Closed
CR 2213D	18 to 22	Mining/Closed
CR 2214	13 to 32	Mining/Closed
CR 2215	28 to 32	Mining/Closed
CR 2216[3]	23 to 27	Mining/Closed
CR 2217	15 to 17	Mining/Closed
CR 2218	15 to 17	Mining/Closed
CR 2219D (Hendricks Lake Road)	2 to 17	Mining/Closed
CR 2221D[3]	7 to 11	Mining/Closed
CR 2222D[3]	NA	Mining/Closed
CR 2174	18 to 22	Mining/Closed
CR 2175D[3]	NA	Bridge for haul road crossing

Table 2-6 Public Roads Within and/or Adjacent to the Proposed Rusk Permit Area

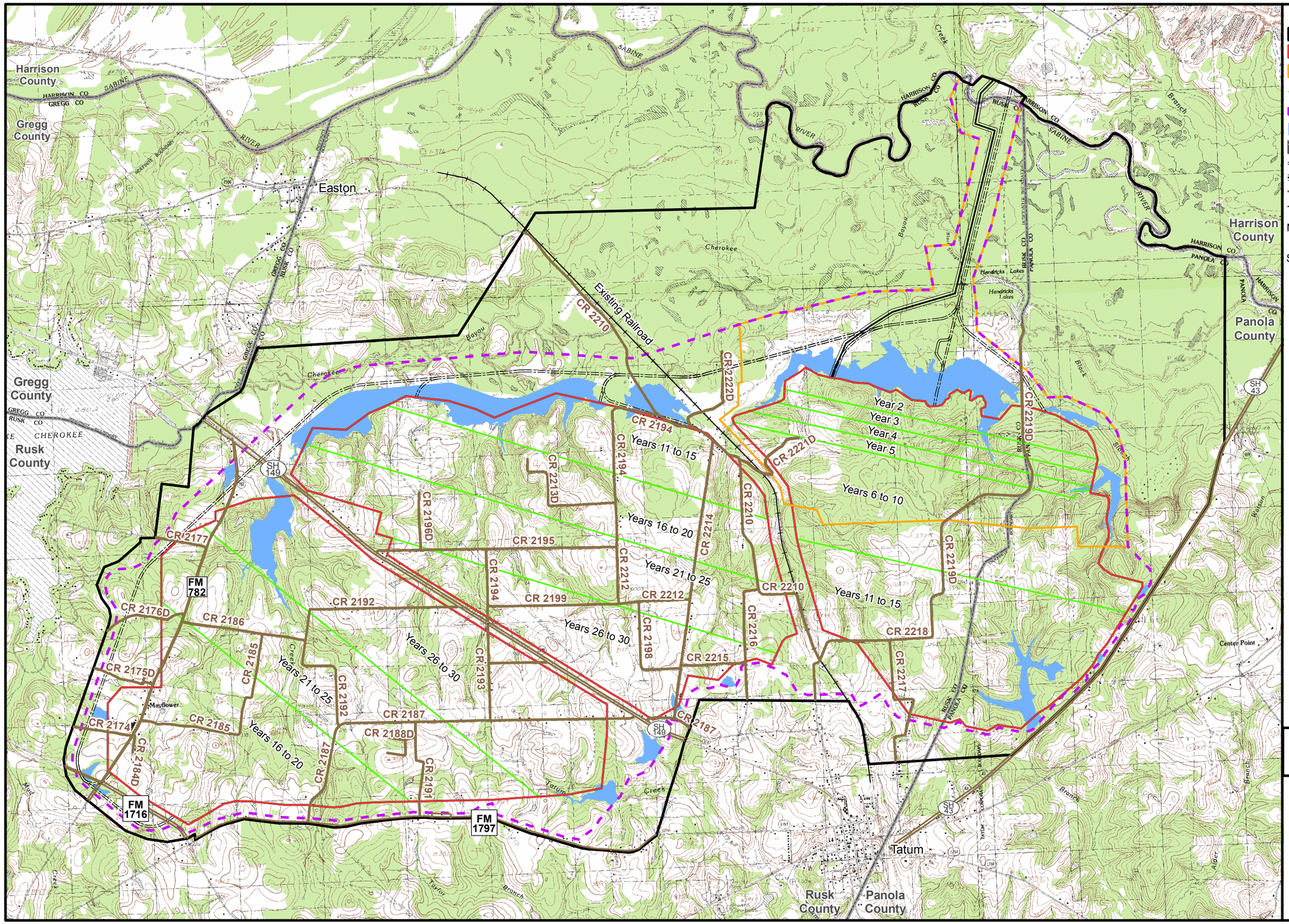
Road Name	Mine Years Closed/ Relocated or Removed[1,2]	Activity[2]
CR 2176D	21 to 25	Mining/Closed
CR 2177	21 to 25	Mining/Closed
CR 2184D	20 to 22	Mining/Closed
CR 2185	20 to 25	Mining/Closed
CR 2186	23 to 27	Mining/Closed
CR 2187	20 to 32	Mining/Closed
CR 2188D	23 to 27	Mining/Closed
CR 2191	23 to 27	Mining/Closed
CR 2192	23 to 32	Mining/Closed
CR 2193	28 to 32	Mining/Closed
CR 2194[3]	13 to 20	Mining/Closed
CR 2195[3]	13 to 27	Mining/Closed
CR 2196D[3]	23 to 27	Mining/Closed
CR 2198	28 to 32	Mining/Closed
CR 2199	28 to 32	Mining/Closed
Panola County Roads		
CR 2219D (Hendricks Lake Road)	2 to 17	Mining/Closed
State Highways		
SH 43	NA	None – on project boundary
SH 149	NA	New overpass construction with associated temporary closures (24 to 48 hours) to allow mining operations to reach mine area X; temporary closure (24 to 48 hours) for dragline crossing
Farm-to-Market		
FM 782	18 to 32	Mining/Closed
FM 1716	NA	Potential bridge for haul road crossing
FM 1797	NA	None – on project boundary

[1] Roads would be closed and re-opened incrementally as mining and reclamation advance.

[2] NA = not applicable.

[3] Access for through traffic would extend beyond the indicated closure period, until connection to the county road network is re-established.

Source: Sabine 2010a,c, 2009b.



Legend

- Proposed Rusk Permit Area Boundary
- Proposed Mine Areas
- Proposed First 5-year RCT Permit Term Disturbance Boundary
- End of Period Mining Extent
- Proposed Life-of-mine Disturbance Boundary
- Sediment Control Pond
- County Boundary
- Main Haul Roads
- Dragline Walkway
- Existing Road
- Existing Railroad

Note: See **Table 2-6** relative to timing of road closures.

Source: Sabine 2009a,b, 2010c.

N

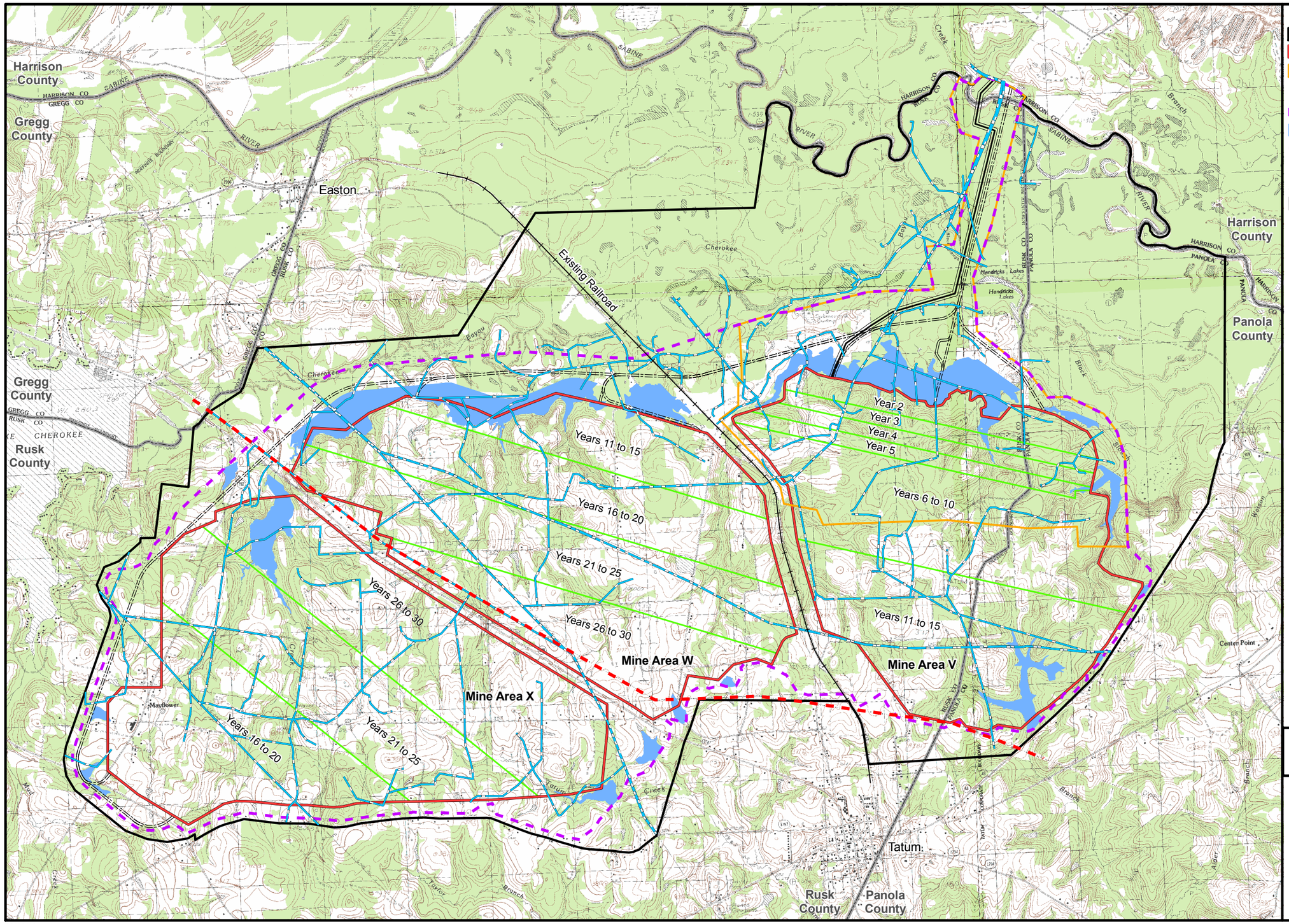
0 0.5 1 Miles

Rusk Permit Area EIS

Figure 2-3

Existing Public Roads

09/21/10



Legend

- Proposed Rusk Permit Area Boundary
- Proposed Mine Areas
- Proposed First 5-year RCT Permit Term Disturbance Boundary
- End of Period Mining Extent
- Proposed Life-of-mine Disturbance Boundary
- Sediment Control Pond
- Existing Powerlines
- Existing Pipelines
- Main Haul Roads
- Dragline Walkway
- County Boundary
- Existing Railroad

Source: Sabine 2009a,b, 2010c.

N

0 0.5 1 Miles

Rusk Permit Area EIS

Figure 2-4

Existing Utilities

08/10/10

The proposed project area is shown in **Figure 2-2**. The area of new surface disturbance associated with the Proposed Action during individual years or groups of years is shown in **Table 2-4**. As a result of sequential backfilling of the mine pits and concurrent reclamation, the acreage of lignite mining disturbance at any given time during mine operations would be approximately 500 acres (Sabine 2010a). For purposes of this discussion, the activities associated with the proposed Rusk Permit Area are addressed in three general phases:

- Construction or development activities (primarily in mine year 1);
- Operations or steady-state mining activities (mine years 1 to 30); and
- Closure and final reclamation activities (primarily in mine years 30 to 35).

An ongoing exploration program would be conducted within the proposed permit area, but outside of the initial 5-year mine plan area, to further define the lignite deposit as mining plans are developed. Cement plugs would be installed in the exploration drill holes within 2 days of completion. If flowing water, oil and/or gas, or zones of alternating or unusable water quality are encountered, cement plugs would be installed to prevent flow from, or mixing within, the drill hole.

2.5.1 Construction Phase

Following receipt of all required local, state, and federal permits, Sabine would commence construction of the proposed mine. Construction activities and mine components developed during this phase are described below.

2.5.1.1 Surface Water Control Facilities

Surface water control facilities would be constructed in appropriate locations prior to initiation of mining in each drainage area in order to control runoff from disturbance areas, including the initial mining area and infrastructure areas. These facilities would include a combination of ditches, sediment control ponds, and other control structures or best management practices (BMPs) (e.g., installation of riprap, check dams, temporary vegetation, managed discharges, etc.) designed to minimize erosion and control surface water quality discharged from the site. All surface water runoff from disturbance areas (except roads) would pass through a sediment control pond or series of sediment control structures prior to discharge through TPDES-regulated outfalls (see **Figure 2-5**). Each structure would be planned and constructed in accordance with RCT requirements.

Temporary sediment control measures (e.g., drop structures, terraces, silt fences, check dams) would be installed, as needed, prior to construction and during operations to minimize erosion from disturbance areas. These controls would decrease overland flow velocities, reduce runoff volumes, trap sediment, and stabilize reconstructed soils.

Temporary and permanent fresh water ditches would be constructed to divert fresh water runoff from undisturbed areas around the proposed disturbance area. All diversions would be designed, constructed, and maintained in accordance with RCT requirements. A typical diversion would have a bottom width of 3 feet, side slopes of 3 horizontal (H):1 vertical (V), a bottom slope of 1 percent, and a minimum depth of 3 feet to convey runoff from a 2-year/6-hour storm event. Fresh water ditches would not be used to divert intermittent or perennial streams, and the watershed area reporting to ditches would be less than 640 acres. Fresh water ditches would be constructed during the life of the mine, including the construction phase.

Temporary and permanent storm water ditches would be constructed, as needed, to direct runoff from the proposed disturbance areas to the sediment control ponds to prevent disturbed area runoff from leaving the permit area prior to treatment.

Sediment control ponds would be designed and constructed to: 1) contain runoff from a 10-year/24-hour storm event; 2) provide adequate detention time to allow the collected runoff to meet TPDES discharge limits; and 3) provide adequate storage capacity equal to 3 years accumulated sediment from the drainage area or 0.1 acre-foot of sediment storage per acre disturbed, whichever is greater. Baffles or sediment curtains may be installed in the ponds to facilitate cleaning operations, decrease in-flow velocities, and prevent short-circuiting. Both on-stream and off-stream sediment control ponds would be used, as applicable. Each pond would be constructed prior to disturbance of the area that would drain to the pond. Sediment control ponds that would be constructed during the construction phase would include V1 and V5. These ponds and their associated TPDES outfalls (discharge locations) to downstream drainages are shown in **Figure 2-2**. The mine year in which each pond would be constructed is identified in **Table 2-7**.

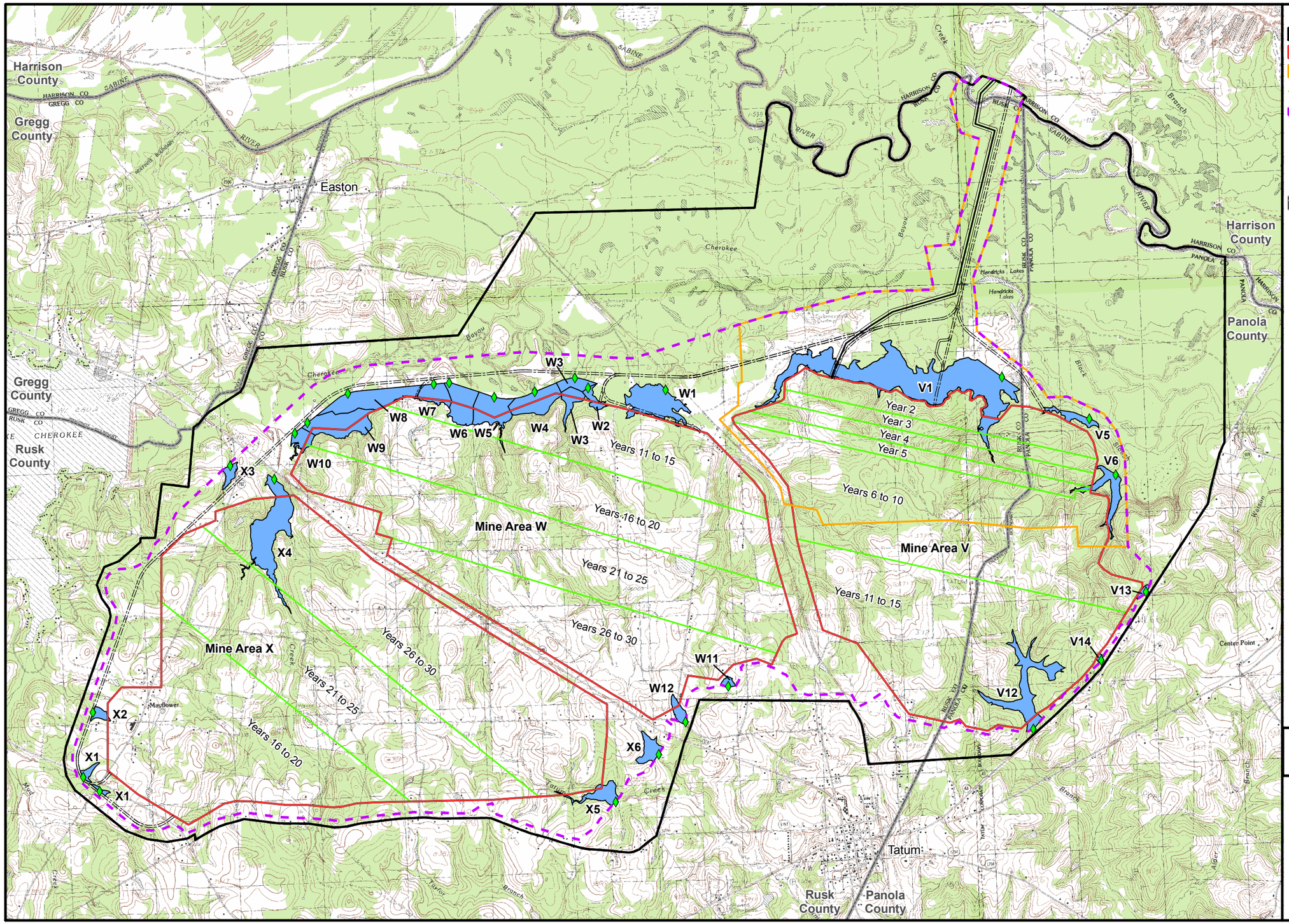
Table 2-7 Sediment Control Ponds

Pond ID	Mine Year	Mine Phase
V1 Pond	1	Construction
V5 Pond	1	Construction
V6 Pond	2	Operations
V13	8	Operations
V12	9	Operations
V14, W1-4	11	Operations
W5-8	14	Operations
W9, X1, X4	16	Operations
X2	17	Operations
W10	19	Operations
X5	20	Operations
X3	26	Operations
X6, W11	27	Operations
W12	29	Operations

Source: Sabine 2009b.

Following construction, pond embankments and the surrounding area disturbed during construction would be revegetated or otherwise stabilized. A stable vegetative cover would be maintained on all embankments. Each pond would be routinely monitored until the structure is removed.

Discharges (water quality) from the surface water control system would be monitored by Sabine as required by TPDES permit conditions to control the quality of water released to local drainages. Water quality and parameters to be monitored at the outfalls for precipitation-related discharges would include total suspended solids (TSS), pH, total iron, and total manganese. For discharges not related to precipitation events, settleable solids, pH, and total iron would be monitored. Flow measurements also would be recorded during discharges. Treatment measures would include the addition of flocculants, if needed, to control total suspended and total settleable solids.



Rusk Permit Area EIS

Figure 2-5

Surface Water Control Features

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2.5.1.2 Dewatering System

Sabine proposes to commence dewatering operations approximately 9 to 12 months prior to mining. Dewatering of overburden would be necessary where saturated portions of the Carrizo and Upper Wilcox sands exist in the proposed mining area. Dewatering would reduce the amount of groundwater entering the pits and would stabilize the highwall and spoil both for safety reasons and to allow efficient operations. Based on modeling conducted by Pastor, Behling & Wheeler, LLC (2009), approximately 129 dewatering wells, with a pumping rate of approximately 15 gallons per minute (gpm), would be required incrementally for the initial (5-year) mine area. Underburden dewatering is not proposed due to lack of substantial underburden sands below the lowest mineable lignite seam, and it is anticipated that seepage into the pit would be sufficient to relieve underburden pressure.

Dewatering well water (approximately 340 to 1,065 acre-feet per year) would be disposed of in accordance with TCEQ requirements either via sediment control ponds or, if the dewatering well water meets TPDES discharge standards without treatment, directly to the closest surface water channel. Discharge of dewatering well water through the sediment control ponds also would be conducted in accordance with TPDES permit criteria.

2.5.1.3 Clearing and Grubbing

Once surface water controls are in place, removal of trees and vegetation would be completed by clearing and grubbing equipment. To maximize wildlife use and aesthetics, and to minimize soil erosion, timber and brush clearing would be conducted at the minimum critical distance in front of mining and avoided where practical. Also, clearing operations would be conducted outside of the peak migratory bird breeding season, to the extent possible. In addition, brush piles and/or windrows would be constructed for wildlife cover, where possible. Merchantable timber would be removed by the landowner or local contractors. Most of the noncommercial timber, brush, and tree stumps would be buried in the pit or burned in accordance with air quality permits.

2.5.1.4 Prime Farmland and Other Topsoil Salvage and Stockpiling

Topsoil would be selectively handled for reclamation together with oxidized overburden material. Sabine has requested a negative prime farmland determination from the RCT. Should Sabine be granted a negative prime farmland determination, all material to be used for reclamation would be handled together, as described in Section 2.5.3.2.

2.5.1.5 Mine Utilities Construction

<u>Electrical Power Supply</u>

Electrical power for mine operations would be provided by SWEPCO via a 138-kV transmission line that would be installed in the proposed transportation and utility corridor between the existing South Hallsville No. 1 Mine and the proposed Rusk Permit Area (**Figure 2-6**). Distribution lines would be installed within the proposed mine plan area between the 138-kV transmission line and portable substations. The substations would be relocated, as needed, as mining operations advance. Trailing cables would be used to convey power from the portable substations to the mine pit to feed the draglines and support the dewatering system.

All power lines and transmission lines would be designed and constructed in accordance with guidelines presented in the Environmental Criteria for Electric Transmission System (U.S. Department of the Interior, U.S. Department of Agriculture [USDI, USDA] 1970) and/or Rural Electrification Administration (REA) Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds.

<u>Water Supply</u>

The sources of water for dust suppression would include Brandy Branch Reservoir (SWEPCO's existing cooling reservoir for the Pirkey Power Plant), the existing Q4 and C8 ponds at the South Marshall No. 1

Mine, and the proposed V1 pond. The estimated annual volume of water required is approximately 80.0 million gallons, or 250 acre-feet. Potable water would be obtained from privately owned groundwater wells located at the existing South Hallsville No. 1 Mine office complex.

2.5.1.6 Transportation and Utility Corridor

The proposed transportation and utility corridor would connect the existing South Hallsville No. 1 Mine with the proposed Rusk Permit Area (**Figure 2-2**). The corridor would encompass the proposed dragline walkway, the main haul road, and the 138-kV transmission line discussed in Section 2.5.1.5 (**Figure 2-6**). The proposed corridor alignment and associated crossing of the Sabine River were located in consultation and review with the USACE, TPWD, and RCT through a site visit on May 6, 2008, and subsequent coordination.

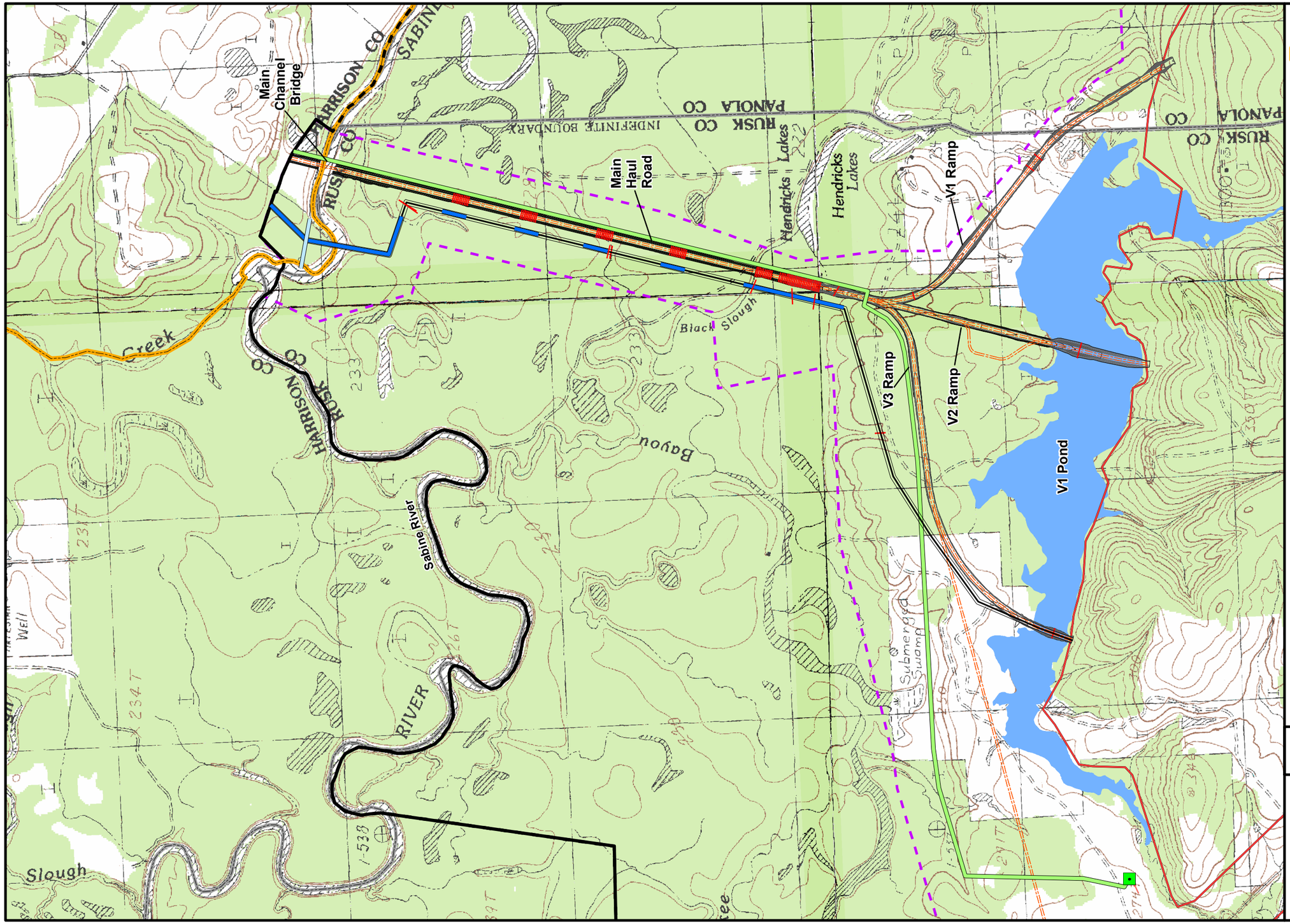
Dragline Walkway

Overburden removal primarily would be accomplished using one of the draglines that currently is operating at the existing South Marshall Permit Area of the South Hallsville No. 1 Mine. It is anticipated that the first two draglines would be moved to the proposed Rusk Permit Area during the summer of 2012. Two additional draglines would be moved in approximately 2018 and 2027.

To provide a route to move the draglines, a 150-foot-wide dragline walkway would be constructed between the existing South Marshall Permit Area on the north side of the Sabine River to the proposed Rusk Permit Area on the south side of the river (**Figure 2-6**). Approximately 685,000 cubic yards of fill material obtained from mine area V (**Figure 2-2**) would be used to construct the walkway base, with culverts installed where needed. A typical cross-section of the walkway is shown in **Figure 2-7**.

The draglines would be walked across the Sabine River during the driest part of the year while flow in the river is low. To facilitate the crossing of the main Sabine River channel, two 10-foot-diameter culverts would be installed in a new by-pass channel that would be constructed to connect the main river channel upstream and downstream of the walkway crossing (**Figure 2-6**). Following culvert installation, the by-pass channel would be opened to main river flow. The draglines then would be walked across the by-pass channel culvert installation, fill would be placed in the main river channel to reroute the main channel flow behind the draglines into the by-pass channel, and the draglines walked across the main channel to the south bank. The fill in the main river channel subsequently would be excavated to allow natural flow to resume while concurrently plugging the inlet of the by-pass channel. It is estimated the main channel would be diverted into the bypass channel for approximately 3 to 7 days (Sabine 2010a).The by-pass channel would be left in place and the excavated fill temporarily stockpiled and stabilized for future use in walking additional draglines from the South Marshall Permit Area to the proposed Rusk Permit Area.

To facilitate crossing of drainage channels in the Sabine River floodplain, 5-foot-diameter culverts would be installed in select locations (**Figure 2-6**) as was determined by a hydrologic analysis of the Sabine River and its floodplain (Sabine 2009a). Culvert inlets and outlets would be lined with riprap for erosion protection. Once a dragline crosses the floodplain and reaches the upland area, approximately 60 percent of the fill used to construct the walkway (approximately 411,000 cubic yards) would be removed from the 100-year floodplain to avoid impacting flood flows until the next dragline crossing is required (**Figure 2-6**). Re-excavated fill temporarily would be placed on top of a portion of the walkway to minimize surface disturbance, graded to 3H:1V side slopes, and reseeded to prevent erosion until needed for the next dragline crossing. Approximately 2 to 3 months would be required to recomplete the walkway, move the next dragline, and re-excavate, stockpile, and stabilize the fill (Sabine 2010a).



Legend

- Proposed Rusk Permit Area Boundary
- Existing South Hallsville Permit Boundary
- Proposed Mine Areas
- Proposed Life-of-mine Disturbance Boundary
- Sediment Control Pond
- Main Haul Roads
- Dragline Walkway
- Dragline Walkway to be Temporarily Removed
- Sabine River Bypass Channel
- Culverts
- 138-kV Transmission Line
- 138-kV Substation
- County Boundary

Source: Sabine 2009a, 2010c.

N

0 0.25 0.5 Miles

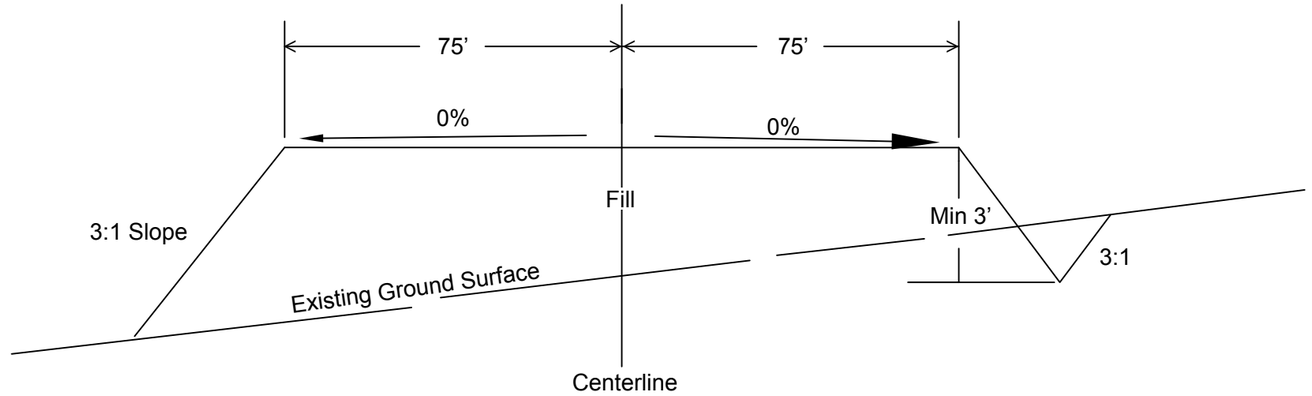
Rusk Permit Area EIS

Figure 2-6

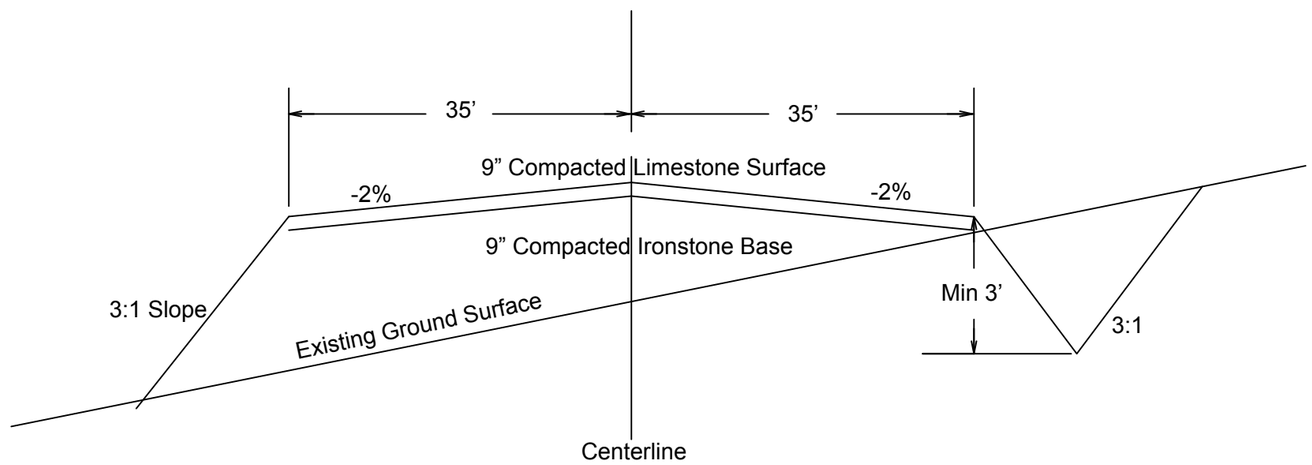
Transportation/Utility Corridor

08/10/10

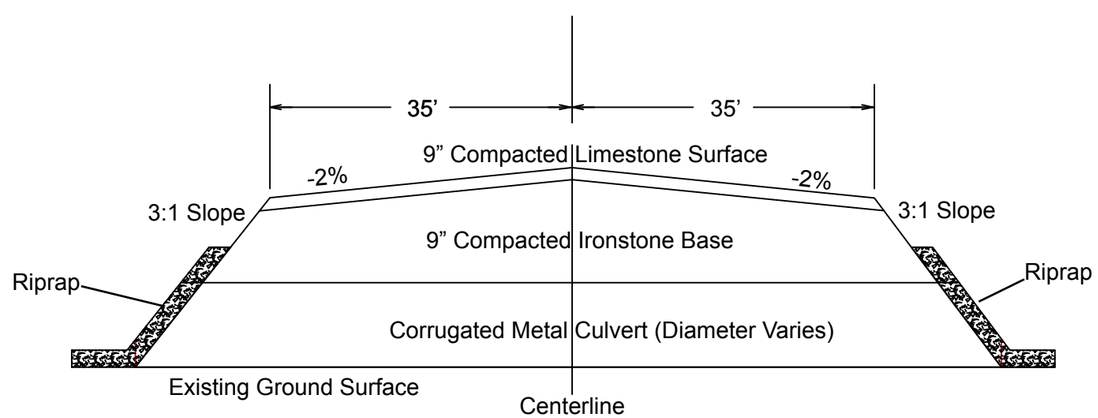
Dragline Walkway -
Typical Cross-section



Main Haul Road -
Typical Cut/Fill Cross-section



Main Haul Road -
Typical Culvert Cross-section



Source: Sabine 2009a.

Rusk Permit Area EIS

Figure 2-7

Typical Cross-sections of Dragline Walkway and Main Haul Road

It is anticipated that the proposed thickness of the fill material used to construct the dragline walkway would be sufficient to bridge any potentially poor foundation areas. However, if needed, unsuitable foundation material would be removed and placed in one of the oxidized overburden stockpiles in or adjacent to mine area V (**Figure 2-2**) or geotextile material would be installed, prior to placement of fill. If geotextiles are required in an area of the dragline walkway that temporarily would be removed between dragline crossing, the geotextile material would be properly disposed of at the time of fill removal, and new geotextile material would be installed at the time the fill material is replaced (just prior to the next dragline crossing) (Sabine 2010a).

Main Haul Road

The proposed 70-foot-wide main haul road would be constructed to provide access and a haulage route between the existing South Hallsville No. 1 Mine on the north side of the Sabine River and the Rusk Permit Area on the south side of the river (**Figure 2-6**). Compacted ironstone would be used to construct the haul road base, with compacted limestone used for the running surface (**Figure 2-7**). A bridge and six groupings of culverts would be installed to facilitate crossing of the Sabine River and its floodplain (**Figure 2-6**).

The main channel crossing of the Sabine River would consist of an approximately 1,080-foot-long bridge (Sabine 2010a), with a deck width of 75 feet, designed to provide passage of stream flow during a 100-year storm event with a maximum allowable 1 foot of rise in the base flood. The peak flow at the proposed crossing location is estimated to be 120,000 cfs. To minimize scour at the bridge ends, abutment slope angles would be reduced to 3H:1V and protected with concrete or rock riprap (Sabine 2010a). To facilitate crossing of the associated floodplain, approximately 500,000 cubic yards of fill material from proposed mine area V would be used to construct the haul road sub-base. Prior to placement of fill, unsuitable foundation materials would be removed and placed in the oxidized overburden stockpiles at the Rusk Permit Area for use in reclamation (Sabine 2010a) (see **Figure 2-2**). In addition, a total of 75, 10-foot-diameter corrugated metal pipe culverts would be installed in six locations in the floodplain. Together, the bridge and culverts are designed to pass the 100-year design storm event. Riprap would be installed at the inlet and outlet of each culvert to provide erosion protection. In addition to clearing required for culvert installation, additional clearing upstream and downstream (approximately 48 acres) would be required to provide unobstructed conveyance of water. Natural streams would not be altered or relocated without prior approval from the USACE and RCT.

At the southern end of the floodplain, the haul road would diverge into three ramps (V1, V2, and V3) to provide access to and from the various open-pit mine areas (**Figure 2-6**). Drainage control (e.g., culverts and ditches) for the three ramps has been designed to accommodate runoff from a 10-year/6-hour storm event. Culvert installations and a compacted stone base of sufficient height would be installed to facilitate ramp crossing of the northernmost sediment control pond (V1 Pond) while providing for flow between the various portions of the pond. The ramps as well as the main haul road would be constructed in accordance with MSHA and RCT regulations.

Prior to construction of those portions of the ramps that would be outside of established drainage control, a temporary drainage ditch, silt fence, and/or hay bale barrier would be installed at the down-slope perimeter to direct runoff to a temporary sump. A silt fence and/or riprap would be placed at the sump outlet to minimize erosion. As soon as practical, the temporary disturbance areas would be revegetated. Following revegetation and the completion of construction, the temporary erosion controls would be removed.

2.5.1.7 Ancillary Support Facilities

Ancillary Facilities

No new office, maintenance, or truck wash facilities are proposed for the Rusk Permit Area. Mine personnel would use the existing permanent mine facilities located at the currently authorized South Hallsville No. 1 Mine.

A water truck fill station and non-coal storage area would be constructed adjacent to the V2 Ramp, just south of the main haul road/utility corridor (**Figure 2-2**). In addition, a dragline workover\non-coal storage area and an equipment fueling station/parking area would be constructed adjacent to the V3 Ramp (**Figure 2-2**). All of these facilities would be located within drainage control.

Access Roads

Access roads would be constructed at the mine site to facilitate construction and maintenance of sediment control ponds and other surface water control facilities (e.g., freshwater diversions), to provide access to groundwater pump sites, and to provide access for clearing and grubbing equipment. These roads typically would be 24 feet in width, surfaced with compacted limestone, and would remain in place as needed following construction to provide access for monitoring and maintenance purposes.

Drainage channels and culverts, as needed, would be incorporated into all access road construction. Erosion controls (e.g., rock sediment traps, silt fences, earth berms) would be installed in the roadway ditches to minimize erosion and retain sediment.

Fuel and Lubricant Storage

Flammable fluids (e.g., gasoline or diesel fuel) or other materials (e.g., oil, grease, anti-freeze, solvents) classified as toxic or hazardous by TCEQ and other applicable regulatory authorities would be registered, transported, stored, labeled, and handled in accordance with applicable regulatory requirements. These materials would continue to be stored at the existing facilities at the South Hallsville No. 1 Mine, with the following exceptions. At the proposed equipment fueling station in the Rusk Permit Area, diesel fuel would be stored in two 75,000-gallon aboveground tanks, and gasoline would be stored in one 6,000-gallon aboveground tank. These tanks would be installed within concrete spill containment structures to allow for identification and containment of accidental spills. Diesel and gasoline deliveries to the proposed fueling station would be via FM 968 to the main gate at the South Hallsville No. 1 Mine, then southward via existing mine roads and the proposed transportation/utility corridor. There would be no increase in use or consumption of any of these materials as a result of the proposed project. However, the project would extend the period over which these materials would be transported to, and used and stored at, the site by approximately 15 years.

Refuse and Solid Waste Disposal

There would be no processing of run-of-mine lignite at the mine; therefore, no lignite processing wastes would be generated. During construction and operation, areas for limited short-term storage of non-coal wastes (e.g., combustible refuse, non-combustible refuse, flammable liquids, and chemicals) would be registered with the TCEQ and other applicable agencies as required under federal regulations. Disposal of non-coal wastes would be in accordance with TCEQ's regulations in order to meet all local, state, and federal requirements. Waste materials would be reclaimed and reused or salvaged whenever practical. Unsalvageable combustible wastes would be disposed of by controlled burning under TCEQ regulations, when possible. Temporary placement and storage of non-coal wastes, if needed, would be in a controlled manner within the mine plan area to ensure that leachate and surface runoff would not degrade surface water or groundwater, fires would be prevented, and the area would remain stable and suitable for reclamation and revegetation compatible with adjacent undisturbed areas. As applicable, some non-coal wastes (e.g., crushed galvanized culverts) would be removed from the mine site in accordance with TCEQ regulations.

During construction and operation, some non-coal wastes (i.e., trees, tree by-products, and rocks) would be disposed of in the mine backfill. Wastes would be compacted and covered. A minimum of 4 feet of suitable growth media would be placed over the site, slopes stabilized, and the area revegetated. Operation of the disposal sites would be in accordance with all local, state, and federal requirements.

Fencing, Site Security, and Fire Management

During the construction phase, perimeter fencing, gates, earthen berms, and appropriate signage would be installed to restrict public access to the proposed Rusk Permit Area. These would be maintained throughout the life of the project to restrict public access.

During construction and operation, prescribed fires may be used for fire management within the project boundary, as well as for burning of cleared vegetation in advance of mining. Mobile equipment capable of excavating, burying, or extinguishing fires would be available on site. Prescribed fires would be conducted in accordance with air permit requirements and coordinated with local fire control authorities.

Lighting

During construction and operation, mobile light plants would be used in the pit areas as required by MSHA to provide for night mining activity. Mobile equipment would provide lighting for the transportation and utility corridor.

2.5.1.8 Initial Mining Area

The proposed Rusk Permit Area is divided into three main mine areas: V, W, and X (**Figure 2-2**). Three separate mine areas are required to avoid mining through local highways and an existing rail line. Each mine area is laid out to begin operation in low ratio overburden-to-lignite areas. This approach minimizes box cut spoils and the associated affected area. The cost to rehandle this material for construction of the post-mining topography also is reduced because of the lower volume. In addition, with multiple draglines mining in different areas, sequencing beginning at the lowest ratio is done so that overburden removal is at approximately the field average stripping ratio. This minimizes the overburden removal equipment and maximizes recovery of the lignite resource. Mining within each area then would advance until it reaches a highway, the rail line, or proximity to Tatum.

In preparation for mining, overburden would be removed from the initial mining area by dragline or mobile equipment and placed adjacent to the excavated area to expose the upper lignite seam. Some areas would need to be pre-stripped to provide for safe dragline operations. Due to timing, oxidized material from the pre-stripped areas may be stockpiled prior to replacement in the boxcut area after backfilling and grading have been completed. No permanent stockpiles are proposed.

The initial mining area would be located in the northeastern portion of the proposed mine area, as shown in **Figure 2-2**. Mine pits would be up to 13,500 feet in length. Selective handling of overburden is proposed for all areas to provide at least 4 feet of suitable plant growth media. Only the volume needed for growth media would be selectively handled; the remainder would be mined through and spoiled by normal operations. Specific engineering designs would be followed to ensure that the graded spoil from the initial pits would be sequenced so the upper 4 feet would meet the criteria for plant growth media. Overburden and interburden from subsequent pits would be graded to tie into the topography and drainage patterns established by the graded spoils from the initial pit.

Haul roads within the mine area would be constructed in accordance with MSHA regulations. Grades on these roads would range from 0 to 15 percent, with in-pit ramp sections also ranging from 5 to 15 percent. Long-term haul road sections would be surfaced with crushed limestone. BMPs (e.g., water, chemical dust suppressants, periodic road maintenance) would be used to control fugitive dust emissions from haul road surfaces.

2.5.1.9 Utility Relocations and Road Closures

Existing public roads and utilities located within the initial mine development area would be closed or relocated, respectively, prior to mining, as needed and approved. The roads are identified in **Table 2-6** and shown in **Figure 2-3**; utilities are shown in **Figure 2-4**.

Utilities

An estimated 110 miles of pipeline exist in the proposed life-of-mine disturbance area. Ground-truthing of all utility locations would occur prior to mining. During construction and operations, removal and relocation of pipelines, transmission lines, and other utilities would be negotiated with the respective owners of the utilities prior to disturbance. This work would be completed by, or under the direction of, the utility owners.

For pipelines transmitting crude oil, liquefied petroleum, natural gas, or other toxic and flammable substances, Sabine has requested a variance from the RCT that would allow pipeline markers to be field located within the active mine blocks and in the vicinity of other surface mining activities. Markers would be set at varying intervals and at public road crossings in a manner such that one marker would be visible from the next. This variance would apply to all live pipelines within an active mine area.

Public Roads

Portions of 24 CRs and 1 FM road would be closed at various times during the life of the project, and 1 CR and 1 SH would be temporarily affected by bridge or overpass construction (**Table 2-6** and **Figure 2-3**). Prior to closure of any public road segment, Sabine would obtain all required approvals from the jurisdictional agencies, and alternate public and landowner access would be provided. Sabine would not conduct mining activities within 100 feet of a public road ROW until the road has been closed by the jurisdictional agency. It is anticipated that roads would be re-opened from 7 to 10 years after the road has been mined through.

2.5.2 Operations Phase

The operations phase of the proposed project would include activities associated with the normal, steady-state mining operations through full production and up to commencement of planned closure and reclamation. The following sections describe the routine mining activities, maintenance activities, and concurrent reclamation activities required at the mine.

2.5.2.1 Surface Water Control Facilities

BMPs (e.g., silt fences, straw bales, riprap) would be used throughout operations to limit erosion and reduce sediment transport as a result of storm water runoff from the proposed disturbance areas. Storm water ditches and sediment control ponds would be installed during the construction phase and incrementally over the life of the mine to divert and route storm water and control sediment in surface water runoff from newly disturbed lands during mine pit advancement (see **Table 2-7**). The sediment control ponds that would have TPDES-regulated outfalls (discharge locations) are shown in **Figure 2-5**. The design, construction, and operation of these facilities would be as described in Section 2.5.1.1, Surface Water Control Facilities (Construction Phase). Ditches also would be constructed to divert storm water runoff from undisturbed areas around disturbance areas, where needed.

To facilitate mining, a series of berms, ditches, or sumps would be constructed in and around the mine pits to control surface water and groundwater inflow. These water control features incrementally would be installed in appropriate locations throughout the life of the mine as operations advance. Collected water would be pumped to a sediment control pond prior to discharge.

Berms and ditches would be used in rough graded areas to maintain dry pit conditions, to provide a safety feature along the highwall edge, and to retain sediment within the disturbance areas. These sediment and water control measures would be used in conjunction with sediment control ponds, and installed incrementally where needed as operations advance. No berm or ditch that would increase a pond watershed area would be constructed without prior approval of the RCT.

Following storm events, the water quality of the contained storm water runoff would be monitored on a continuous basis. As discussed in Section 2.5.1.1, Surface Water Control Facilities (Construction Phase), when the water quality meets TPDES permit criteria, the water would be discharged down to the sediment

storage level of the pond. Between storm events, the sediment control ponds would be dewatered to an elevation that would provide sufficient storage capacity to retain runoff from a 10-year/24-hour storm event.

During operations, the ponds would be routinely inspected, and sediment periodically would be removed from the ponds to maintain an adequate containment volume for the 10-year/24-hour storm event.

2.5.2.2 Dewatering

During operations, additional dewatering wells would be installed, where required, in advance of the pit excavation to partially dewater overburden and interburden zones. Water pumped from these wells would be used or discharged in accordance with procedures described in Section 2.5.1.2, Dewatering (Construction Phase).

Dewatering wells would be decommissioned immediately prior to being mined through. Decommissioning would include removal of electrical cables, pipelines, pumps, and ancillary equipment. Dewatering wells would be shallower than the final depth of mining. Therefore, they would not be plugged, as they would be completely mined through.

Seepage and surface runoff collected in the active mine pit would be pumped to nearby sediment control ponds for treatment, as needed, to meet the water quality requirements of the project's TPDES permit prior to discharge to local drainages.

2.5.2.3 Clearing and Grubbing

Clearing and grubbing to remove trees and vegetation would be conducted incrementally in advance of pit excavation. Clearing practices, including minimizing clearing to the extent needed at any given time, timing clearing to avoid the peak migratory bird breeding season, and disposing or burning of cleared vegetation, would be conducted as discussed in Section 2.5.1.3, Clearing and Grubbing (Construction Phase).

2.5.2.4 Prime Farmland and Other Topsoil Salvage and Stockpiling

As described in Section 2.5.1.4, Prime Farmland and Other Topsoil Salvage and Stockpiling (Construction Phase), it is anticipated that all soils and oxidized overburden material to be used in reclamation would be handled together.

2.5.2.5 Haul and Access Road Construction

Haul roads in the active mine area incrementally would be extended as mining operations advance, and access roads would be constructed or extended, as needed, to provide access for ongoing maintenance and monitoring purposes.

Access and haul roads would be constructed and maintained to have adequate drainage control (e.g., ditches, culverts) designed to safely pass peak runoff from a 10-year/6-hour precipitation event. Erosion control measures (e.g., rock sediment traps, silt fences, earth berms) would be installed in the roadway ditches to minimize erosion and retain sediment and would be used in conjunction with sediment control ponds.

Structures for road crossings of perennial or intermittent streams would include bridges and culverts. Bridges and culverts would be designed and constructed to accommodate runoff from a 10-year/6-hour precipitation event. Low-water crossings would be designed, constructed, and maintained to prevent erosion of the structure or streambed and additional contributions of suspended solids to stream flow.

Road surfaces would be maintained on a regular basis by grading, ditch cleaning, and adding additional surfacing material. Primary roads would be surfaced with material approved by the RCT as being

sufficiently durable for the anticipated volume of traffic and the weight and speed of vehicles using the road.

If haul road or access road crossings of active pipelines should be necessary, a minimum of 6 feet of compacted material would be placed between the pipeline and the road that crosses over it. No excavation would be allowed within 100 feet of an active gas pipeline without prior approval by the RCT.

Fugitive dust generation from haul roads would be controlled by water sprays, chemical dust suppressants, or slow-curing liquid asphalt as allowed by TCEQ. Other fugitive dust emission controls would include prompt removal of coal, rock, or soil from roads; compaction of unpaved roads, as needed; and restriction of travel of unauthorized vehicles on other than established roads.

Haul roads and primary roads incrementally would be removed when no longer needed. Road surfacing material either would be salvaged for reuse or covered with a minimum of 4 feet of suitable growth media. The disturbed areas would be regraded, scarified, and revegetated.

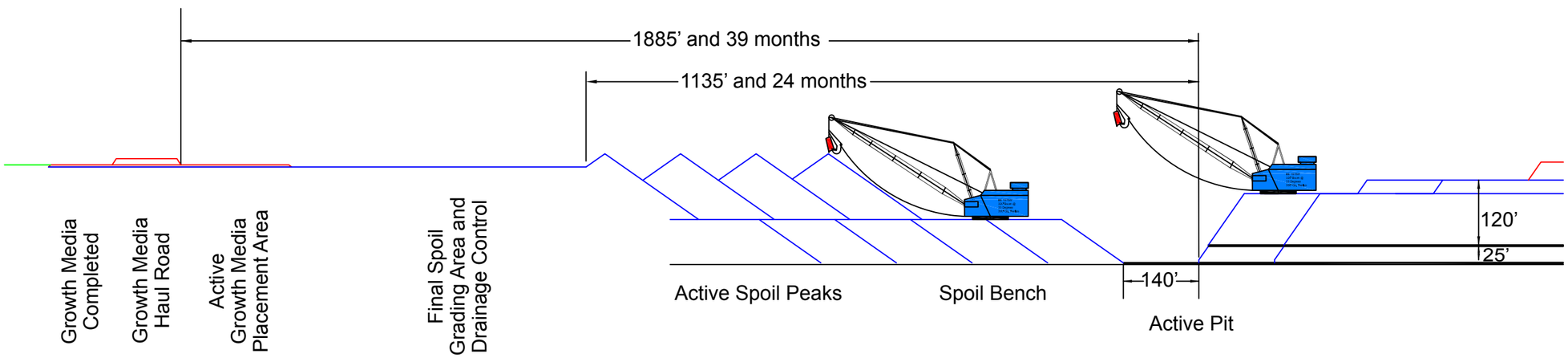
2.5.2.6 Overburden and Interburden Removal

The active mine pits would be approximately 9,000 to 15,000 feet in length, approximately 100 to 200 feet in width, and up to approximately 180 feet in depth. Based on slope stability studies completed by Calder & Workman, Inc. (2008), typical highwall angles would vary from approximately 50 to 55 degrees. Benches of varying height would be used.

Overburden and interburden removal primarily would be accomplished using dragline(s), assisted by auxiliary equipment (e.g., hydraulic excavators, loaders, trucks, scrapers, and bulldozers). During operations, draglines would operate from one end of the pit area to the other, using the side cast method to place the spoil (excavated overburden and interburden) in a previously mined-out pit as part of the reclamation process (**Figure 2-8**). Both highwall side and spoil side locations would be used by the draglines to remove overburden and interburden. In select areas, a truck and shovel fleet or dozers may be used for overburden and interburden removal, with the trucks transporting the overburden and interburden to a previously mined-out pit. This equipment also would follow behind dragline operations to remove remaining overburden and interburden on exposed lignite seams. Sequential overburden and interburden removal and pit backfilling would continue throughout the life of the mine. The approximate volume of overburden and interburden produced by year or time period is presented in **Table 2-5**.

Sabine's selective handling plans for overburden are designed to provide for segregation of sufficiently oxidized material to provide a minimum 4-foot cover over all acid-forming, toxic, or combustible materials naturally occurring within the geologic materials. Based on the analysis of core samples, a spatial model of the physical and chemical characteristics (i.e., acid-base accounting, pH, and sand and clay content) of the overburden would be created to determine the quality of the material to be removed. The areal and vertical extent of suitable and unsuitable growth media materials would be staked in the field and sampled for verification prior to removal. Unsuitable materials would be placed lower in the post-mine pit backfill profile, and a sufficient quantity of suitable growth media would be salvaged for placement in the top 4 feet of the post-mine pit backfill profile. As needed, the salvaged growth media may be placed in temporary stockpiles. Temporary stockpiles for the initial 5 years are shown in **Figure 2-2**, with additional temporary stockpiles to be incrementally developed over the life of the mine. No permanent stockpiles would be developed. To ensure long-term spoil stability, the unoxidized material also would be selectively placed, with the clay portion of the unoxidized material placed in the bottom-most portion of the pit backfill.

After excavation, overburden and interburden material is expected to swell to a loose volume of approximately 10 percent greater than its in-place volume. With removal of the lignite seams, sufficient space would be available within the mined-out pits to accommodate all of the overburden and interburden as backfill, while meeting regulatory requirements for the post-mining topography to approximate original contour.



Distance from the active pit to growth media placement will vary due to ongoing spoil grading and growth media placement operations. Distances shown illustrate maximums.

Source: Sabine 2009a.

Rusk Permit Area EIS

Figure 2-8

Mine Operational Sequence

2.5.2.7 Lignite Mining and Transport

Sabine proposes to develop three mine areas (V, W, and X) in a phased manner (see **Figure 2-2**). Lignite mining in Area V, located on the eastern side of the proposed permit area, would be completed during the first 15 years of operation, with the northernmost portion of Area V mined during the initial 5 years. Mining in Area W would be initiated in mine year 11 and would extend pit development to the west. Mining in Area X would be initiated in year 16 and would extend pit development to the southwest.

Nine separate coal seams would be mined, with the depth to the lowest minable seam varying from 40 to 180 feet below the surface. Recovery of in-place lignite tonnage is expected to be approximately 90 percent. The proposed lignite production rate by year or time period is presented in **Table 2-5**.

An Easi-miner or other mobile loading equipment would be used to mine the lignite seams and load the lignite into bottom or end-dump trucks. The diesel-powered Easi-miner includes a 7-foot-diameter cutting head with carbide steel teeth and a conveyor. As the cutting head and teeth fracture the lignite, the lignite is fed to the conveyor and loaded onto the bottom or end-dump trucks. While continuously mining, the Easi-miner can extract up to 2,800 tons of lignite per hour. After loading, bottom or end-dump trucks would haul the lignite via the proposed transportation/utility corridor to the existing truck dump area located within the existing South Hallsville No. 1 Mine (**Figure 2-1**) or alternately to one of the temporary lignite stockpiles that would be developed in the Rusk Permit Area (**Figure 2-2**). Lignite of suitable quality also may be unloaded at the coal barn, the existing Norit Americas' highway hauler loading location that also is located at the existing South Hallsville No. 1 Mine (**Figure 2-1**). No new truck dump or lignite handling facilities are proposed for the project.

Lignite placed in the proposed temporary coal storage area, uncovered in the active pits, or located beyond the margins of the active pits would be monitored regularly for burning material. If any burning lignite is identified, mining equipment would be available to bury the material, or diesel and electric pumps would be available to flood the area, as appropriate. Unmined lignite beyond the pit margins would be inspected prior to backfilling and covered with a minimum of 4 feet of oxidized overburden.

2.5.2.8 Equipment and Site Maintenance

Routine maintenance and repair of Rusk Permit Area mine production and support equipment would be conducted at the existing truck shop located at the South Hallsville No. 1 Mine. As discussed in Section 2.5.1.7, Ancillary Support Facilities (Construction Phase), there would be no increase in the current use or consumption of any toxic or hazardous materials (including lubricants, hydraulic fluids, engine coolants) as a result of the proposed project. However, it would extend the period over which these materials would be transported and used or consumed by approximately 15 years.

Site maintenance would be conducted on a routine basis and would include inspection and repair of drainage and sediment control facilities and installed erosion controls, grading to maintain site drainage patterns, cleanout and disposal of sediment from sediment control ponds and ditches, and resurfacing of roads, as needed.

2.5.2.9 Ancillary Support Facilities

Ancillary support facilities that would be used throughout the life of the mine are described in Section 2.5.1.7, Ancillary Support Facilities (Construction Phase).

2.5.2.10 Existing Utilities, Roads, and Rail Line

<u>Utilities</u>

Several utilities incrementally would be relocated in advance of operations (see **Figure 2-4**). Relocations would be completed in coordination with the controlling company.

Roads

During operations, Sabine would not conduct general mining or reclamation activities within the 100-foot buffer zone of public roads until the roads have been closed by the jurisdictional authority or a buffer zone waiver has been obtained from the RCT. Public roads that would be closed sequentially over the life of the mine in advance of pit development are identified in **Table 2-6** and shown in **Figure 2-3**.

Highway and Rail Line Crossing

For haul road crossings of state highways, Sabine would construct a bridge over the haul road to convey state highway traffic over the haul road. For haul road crossings of the rail line, and as an alternative for road crossings, Sabine would construct a high arch superspan culvert to accommodate passage of the haul road either beneath or over the rail line or road (see **Figure 2-9**). For dragline crossings of state highways or the rail line, Sabine would build a temporary fill crossing with a minimum of 10 feet of fill and approaches of 8 percent on either side. These crossings would require temporary closure of the road or rail line for a period of 24 to 48 hours (Sabine 2010a).

2.5.3 Closure and Reclamation

Reclamation would be initiated following excavation of the initial mining area and would continue concurrently with mining operations throughout the life of the mine and through final closure. The acreage of lignite mining disturbance at any given time during mining operations would be approximately 500 acres (Sabine 2010a). The short-term reclamation goal for the proposed Rusk Permit Area includes the establishment of a vegetative cover to provide for soil stabilization and erosion control. The long-term reclamation goals include establishing a sustainable vegetative cover that would promote the identified post-mining land uses, returning the disturbed areas to productive post-mining land uses equal to or better than pre-mining conditions, and maintaining drainage and water quality and quantity.

After the lignite has been removed from a mine pit and the pit backfilled with overburden and interburden by the draglines or truck and shovel fleet excavating the subsequent pit, the peaks of the backfilled material (spoil) would be leveled and graded to approximate original contour in compliance with RCT coal mining regulations. Selective handling and placement of overburden and interburden materials during backfilling, as discussed in Section 2.5.2.6, Overburden and Interburden Removal (Operations Phase), would provide for redistribution of a minimum of 4 feet of suitable growth media over the regraded surface. The general sequence of mining and reclamation activities is shown in **Figure 2-8**. The lag that would occur between the time mining commences for a given pit and the rough leveling to approximate original contour of the spoil placed in the same pit would be approximately 24 months. Subsequent placement of suitable growth media would be completed in approximately 15 months, with seeding and planting conducted within 60 days. Overall reclamation activities in a given area, including normal husbandry, would continue for approximately 12 years (Sabine 2010a). The ability of reclaimed land to support the approved post-mining land uses would be evaluated in accordance with the RCT's revegetation success criteria and USACE's permit criteria.

RCT-designated post-mining land uses for the proposed Rusk Permit Area may include pastureland, forest land, fish and wildlife habitat, developed water resources, grazing land, industrial/commercial uses, residential, undeveloped land, and cropland, depending on landowner agreements. Waters of the U.S., including wetlands, would be reclaimed in accordance with final USACE permit criteria; they would be incorporated per landowner agreements as features or fish and wildlife enhancement areas within the RCT-designated post-mining land uses. Section 12.147 of the RCT regulations requires the identification of RCT-designated post-mining land uses for lands that would be disturbed during the initial RCT permit term. Of the 2,840 acres of proposed disturbance within the initial 5-year RCT permit area, approximately 1,602 acres would be reclaimed as pastureland, approximately 1,092 acres reclaimed to forest land, approximately 9 acres reclaimed as developed water sources, and approximately 137 acres reclaimed to fish and wildlife habitat (Sabine 2010d). The conceptual post-mining land uses for the life-of-mine disturbance area are shown in **Figure 2-10**. The final post-mining land uses for the proposed disturbance area outside of the initial 5-year RCT permit area would be determined based on landowner agreements.

2.5.3.1 Rough and Final Grading

Following selective placement of overburden and interburden in each pit, rough grading would be completed using dozers or scrapers. Rough grading is designed to create a land surface with elevations and drainage patterns that would approximate, to the extent practical, the pre-mine topography. The conceptual post-mining topography is shown in **Figure 2-11**. The regraded surface would be checked to identify areas requiring additional grading to meet surface water control, land form, and elevation requirements. Final grading operations would be conducted along the contour using graders. Grading operations would be monitored and controlled to ensure that a minimum of 4 feet of approved materials are maintained over all exposed coal seams, and acid-forming, toxic-forming, and combustible backfill materials. Regraded areas would be scarified or otherwise treated to minimize erosion, eliminate surface slippage, and promote root penetration.

Once final grading has been completed, the upper 4 feet of soil would be tested for suitability as a growth media, and the material inspected to ensure proper placement (minimum of 4 feet). Any area containing thin or unacceptable growth media would be staked and additional suitable growth media added to ensure a 4-foot coverage. Areas staked for additional material would be rechecked once the material has been placed. Ultimate verification and control of the proper placement of suitable materials in the top 4 feet for the mine plan area would be provided by implementation of the Mine Soil Monitoring Program.

2.5.3.2 Growth Media Replacement

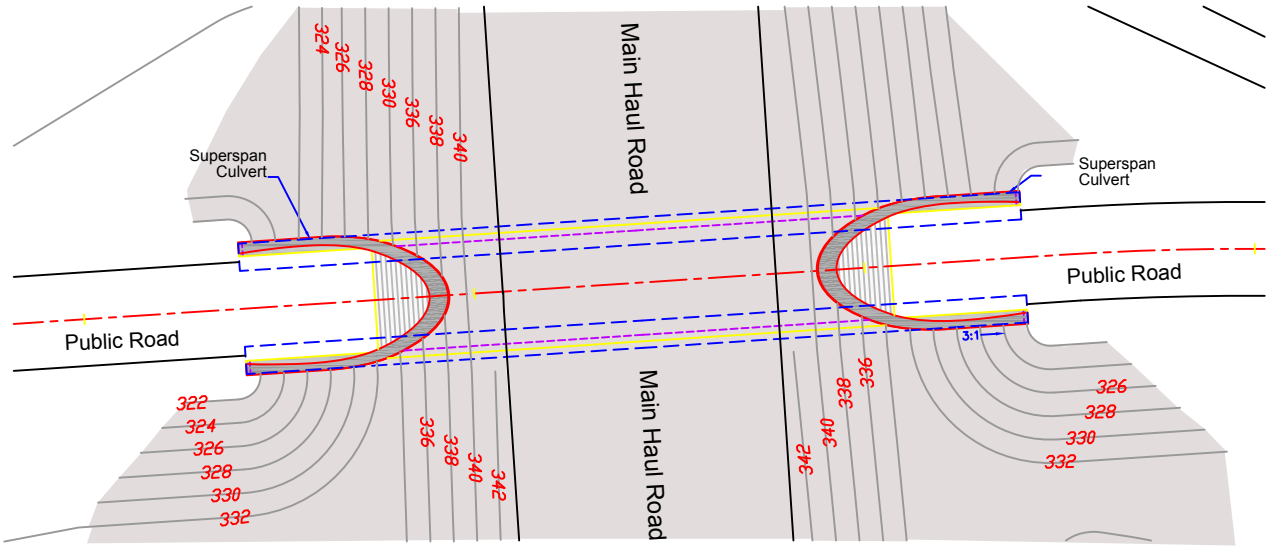
For reclamation purposes, topsoil would be selectively handled along with oxidized overburden to ensure adequate growth media is available to provide 4 feet of cover. Based on a review of the drill hole data from locations within and directly adjacent to the initial 5-year mine plan area, the combined thickness of the topsoil and oxidized overburden materials that would be suitable for use as growth media ranges from approximately 15 to 50 feet and averages approximately 30 feet. As discussed in Section 2.5.2.6, Overburden and Interburden Removal (Operations Phase), selective handling of these materials would ensure a sufficient volume would be available for reclamation purposes. Based on drilling information and Sabine's geologic model, it is projected that approximately 352.2 million cubic yards of suitable overburden is available within the area proposed to be mined during the life of the project, of which approximately 61.7 million cubic yards (approximately 17.5 percent) would be needed for reclamation purposes (Sabine 2010a).

Suitable growth media would be respread over regraded disturbance areas to a minimum depth of 4 feet as discussed in Section 2.5.3.1, Rough and Final Grading. When impractical to promptly redistribute growth media on rough graded areas, the material would be stockpiled for future use. Growth media stockpiles would range in size from 1 to 50 acres. The stockpiled materials would be stabilized by mulching and/or interim seeding with a rapid-growing annual or perennial cover during the first normal period of favorable planting conditions.

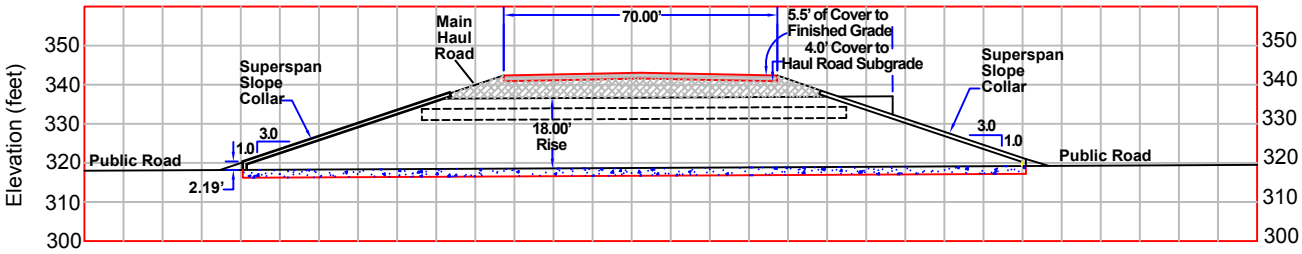
2.5.3.3 Drainage Reconstruction and Sediment Control

Drainage patterns would be re-established in the reconstructed landscape prior to placement of suitable growth media. To the extent possible, drainage channels would be constructed to approximate pre-mining conditions and configured to ensure that ephemeral drainages upgradient of the mined area connect with and flow freely into the new drainage system.

Contour furrows would be installed to provide surface stabilization and erosion control in the post-mining landscape, until vegetation has been re-established. Long-term erosion control measures would include rock check dams, concrete block drop structures, and semi-permanent erosion control fabrics.



Plan View



Cross-section

Superspan

Rusk Permit Area EIS

Figure 2-9

Typical Haul Road Crossing for Public Roads and Rail Line

Source: Sabine 2010a.

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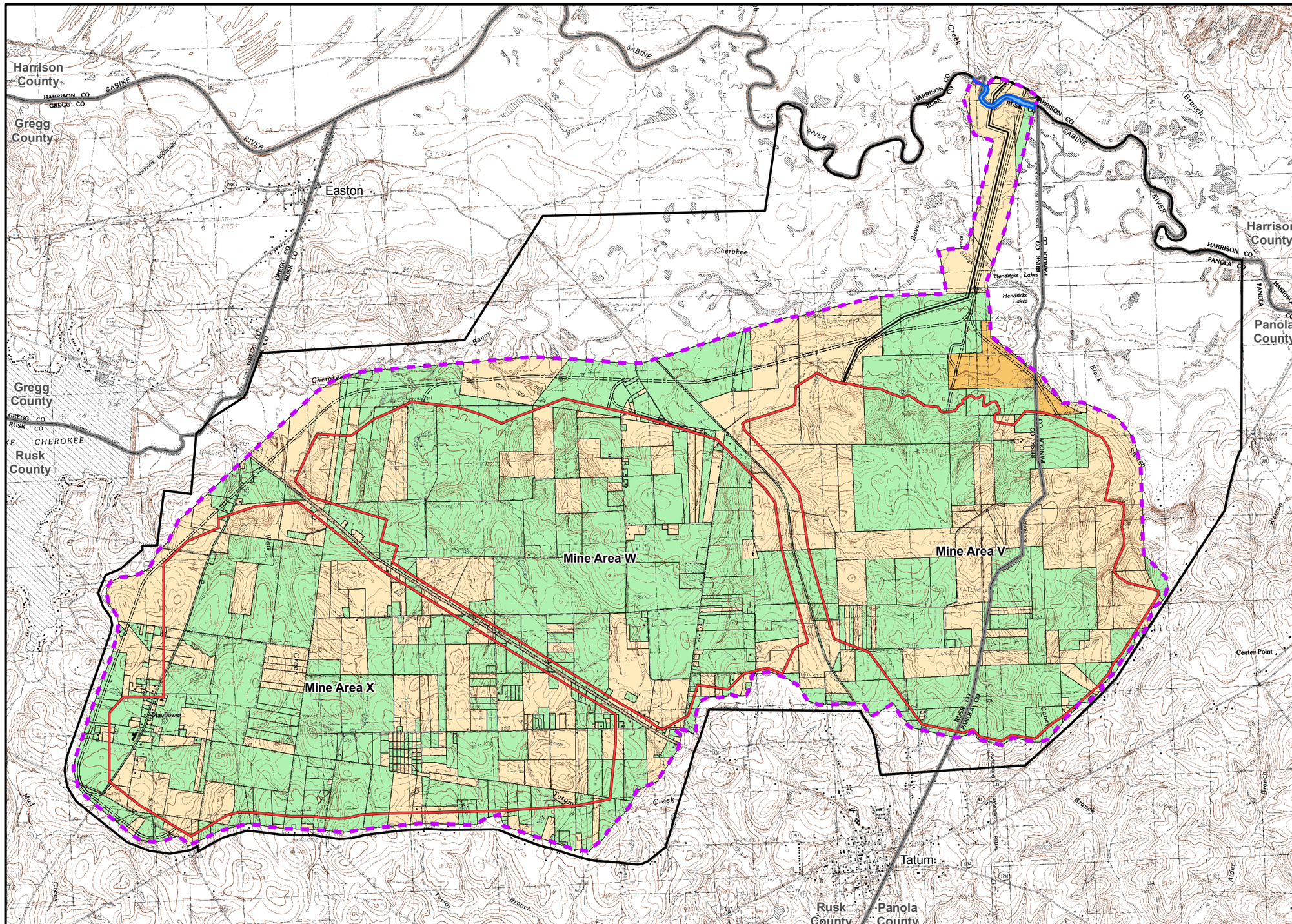


Legend

- Proposed Rusk Permit Area Boundary
- Proposed Mine Areas
- Proposed Life-of-mine Disturbance Boundary

Conceptual Land Uses

- Forestry
- Pasture
- Wildlife
- Developed Water Resources (see note below)
- Main Haul Roads
- Dragline Walkway
- County Boundary

Source: Sabine 2009b, 2010c.

Note: Other developed water resources and fish and wildlife habitat post-mining land uses will be incorporated within forestry and pastureland land uses (see section 2.5.3). Other post-mining land uses will be incorporated per landowner agreements.

N

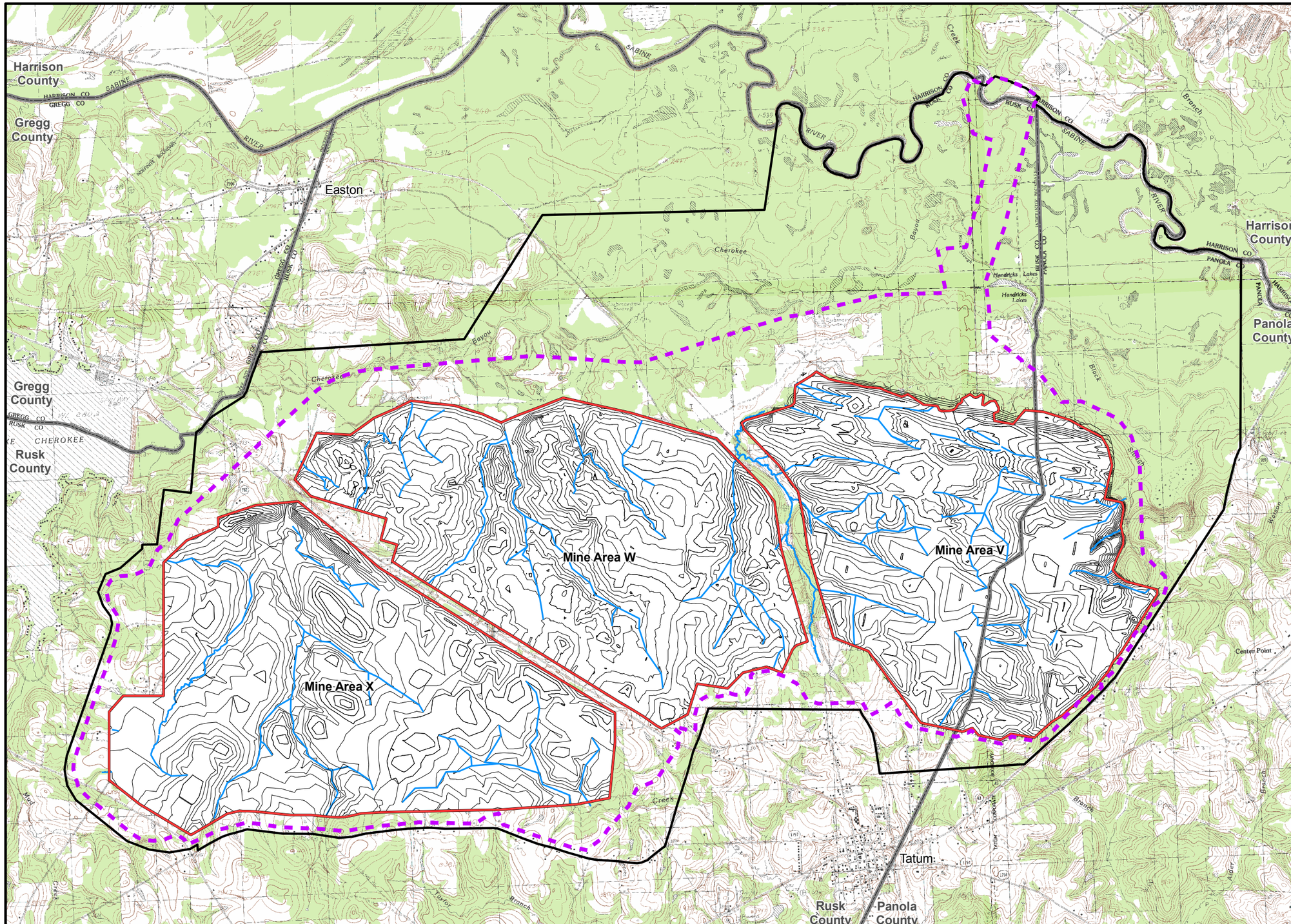
0 0.5 1 Miles

Rusk Permit Area EIS

Figure 2-10

Post-mining Land Uses (Conceptual)

08/18/10



Legend

- Proposed Rusk Permit Area Boundary
- Post-mining Topography
- Post-mining Stream
- Proposed Mine Areas
- Proposed Life-of-mine Disturbance Boundary
- County Boundary

Source: Sabine 2010a.

Note: The sediment control ponds shown in **Figure 2-5** would be retained to the extent possible, pending final agreements with landowners and final RCT approval.

Contour intervals are 10 feet.

N

0 0.5 1 Miles

Rusk Permit Area EIS

Figure 2-11

Post-mining Topograpy (Conceptual)

05/16/10

Some of the constructed sediment control ponds would be retained following the completion of mining to achieve post-mining land uses. Sediment control ponds not required to achieve post-mining land uses would be removed once their respective watershed areas have been revegetated, the vegetation requirements have been met, and the surface water drainage meets applicable state and federal water quality criteria. Following removal of an impoundment, the area would be recontoured to blend with the surrounding topography and revegetated. Surface water diversion ditches also would be regraded and revegetated when no longer needed.

Approximately 10 to 20 permanent ponds would be constructed on the reclaimed surface. The ponds would be constructed incrementally throughout the life of the mine as mining and reclamation operations advance. It is currently anticipated that the new ponds, including retained sediment control ponds, would total approximately 100 acres (Sabine 2010a). These ponds would provide reliable water sources for wildlife and livestock in the post-mine setting.

Storm water runoff from the reclaimed area would be routed through sediment control ponds and ultimately discharged through final discharge ponds that drain directly to the Sabine River. Post-mining discharges through these outfalls would be monitored in accordance with the operation's TPDES permit requirements.

2.5.3.4 Post-mining Topography

The post-mining topography for the proposed Rusk Permit Area is shown in **Figure 2-11**. Post-mining topography would be consistent with the project's reclamation goals, and post-mining land uses and would be similar in appearance to the surrounding topography.

2.5.3.5 Revegetation

Seed Mixes

Plant species proposed for use in locations designated for fish and wildlife habitat and undeveloped land in the post-mine setting are presented in **Table 2-8**. These species were selected in coordination with the Natural Resources Conservation Service (NRCS), USACE, USFWS, TPWD, and RCT. **Table 2-9**, presents by post-mining land use category, the species proposed for use on grazing, pasture, and forest lands, as well as commercial/industrial areas. Species selection for use in revegetation would be based on the reclamation stage, site-specific conditions, and proven success capabilities of the plant species selected, as well as contractual agreements with landowners. Where compatible with approved post-mining land uses, woody plantings designed to enhance fish and wildlife habitat and related environmental values would be established along reconstructed drainageways, ponds, roads, and fence lines. In such cases, plant species from both **Table 2-8** and **Table 2-9** would be used in combination. Additional native plant species for possible use in reclamation are presented in **Table B-1** in **Appendix B**.

The establishment of a temporary vegetative cover and/or mulching would be used, as needed, for stabilization of disturbance areas when conditions for establishment of permanent vegetation are not favorable or practical. Annual species (e.g., millet, oats, sorghum) primarily would be used for this purpose, with a variety of grass and forb species planted in some locations for temporary wildlife enhancement. Selection and establishment of a temporary cover would be coordinated with the planned establishment of a permanent cover to ensure compatibility.

Seeding and Planting Techniques

Broadcast seeding, seed drilling, and hydro-mulching would be used for application of seed mixes, depending on season and site conditions. Tree and shrub seedlings would be planted mechanically or by hand. Trees, shrubs, or clumps of woody plants that would be disturbed by mining operations may be transplanted in regraded areas with a tree spade or front-end loader.

Table 2-8 Reclamation Species for Fish and Wildlife Habitat and Undeveloped Land Use Categories

Scientific Name	Common Name	Food Value Rating[1]	Cover Value Rating[1]
Woody Species			
Betula nigra	River birch	3	2
Callicarpa americana	American beautyberry	1	2
Carya spp.	Hickory	1	2
C. illnoensis	Pecan	1	2
Celtis laevigata	Texas sugarberry	1	2
Cephalanthus spp.	Buttonbush	1	1
Cercis canadensis	Redbud	2	2
Cornus spp.	Dogwood	1	1
Crataegus spp.	Hawthorn	1	1
Diospyrus spp.	Persimmon	1	2
Ilex decidua	Possumhaw	1	1
I. opaca	American holly	1	1
I. vomitoria	Yaupon	1	1
Juglans nigra	Black walnut	1	2
Liquidambar styraciflua	Sweetgum	2	2
Maclura pomifera	Osage orange	3	1
Morus rubra	Red mulberry	1	2
Prunus spp.	Wild Plum	1	1
Prunus spp.	Wild cherry	1	1
Quercus falcata	Southern red oak	1	1
Q. lyrata	Overcup oak	1	1
Q. macrocarpa	Bur oak	1	1
Q. marilandica	Blackjack oak	1	1
Q. nigra	Water oak	1	1
Q. phellos	Willow oak	1	1
Q. shumardii	Shumard oak	1	1
Q. stellata	Post oak	1	1
Rhus spp.	Sumac	1	1
Sambucus spp.	Elderberry	1	1
Sassafras albidum	Sassafras	1	1
Ulmus americana	American elm	2	2
U. crassifolia	Cedar elm	2	1
Viburnum dentatum	Arrow-wood	1	2
Vines			
Ampelopsis arborea	Peppervine	1	3
Campsis radicans	Trumpet creeper	2	1
Parthenocissus quinquefolia	Virginia creeper	1	1

Table 2-8 Reclamation Species for Fish and Wildlife Habitat and Undeveloped Land Use Categories

Scientific Name	Common Name	Food Value Rating[1]	Cover Value Rating[1]
Rubus spp.	Dewberry	1	1
Symphoricarpos orbiculatus	Coralberry	1	1
Vitis spp.	Grape	1	1
Grasses			
Triticum spp.	Winter wheat[2]	1	3
Andropogon gerardii	Big bluestem	3	2
Bouteloa curtipendula	Sideoats grama	2	3
Bouteloua dactyloides	Buffalo grass	3	4
Chasmanthium spp.	Oats[2]	1	2
Leptochloa dubia	Green sprangletop	3	3
Panicum virgatum	Switchgrass	1	2
Schizachyrium scoparium	Little bluestem	3	2
Sorghastrum nutans	Indiangrass	2	3
Sporobolus spp.	Dropseed	2	3
Tripsacum dactyloides	Eastern gamagrass	3	3
Forbs			
Desmanthus illinoensis	Illinois bundleflower	2	2
Helianthus annus	Common sunflower	1	1
Helianthus maximiliani	Maximiliam sunflower	1	1
Indigofera miniata	Western indigo	2	2
Aquatic Species			
Juncus spp.	Rush	3	1
Echinochloa crusgalli var *frumentacea*	Japanese millet[2]	1	2
Panicum spp.	Millet[2]	1	2
Phragmites australis	Common reed	4	1
Polygonum spp.	Smartweed	1	1
Potamogeton spp.	Pondweed	1	4
Sesbania spp.	Sesbania	2	3
Spartina spp.	Cordgrass	4	1
Typha spp.	Cattail	4	1

[1] Food and cover values taken from Dickson and Vance (1981): 1 = Excellent; 2 = Good; 3 = Fair; 4 = Limited.

[2] Species used only for temporary reclamation.

Table 2-9 Reclamation Plant Species for Grazing Land, Pastureland, and Forest Land Categories[1]

Planting List or Approved Invaders/Volunteers	Scientific Name	Common Name	Planting Rate (pounds/acre of PLS or stocking rate)[2,3,4]
Grazing Land Category			
Planting List	*Andropogon gerardii*	Big bluestem	10
	Bothriochloa laguroides	Silver bluestem	10
	Bouteloua curtipendula	Side oats grama	10
	Buchloe dactyloides	Buffalo grass	10
	Chamaecrista fasciculata	Partridge pea	10
	Castilleja spp.	Indian paintbrush	10
	Desmanthus illinoensis	Illinois bundleflower	10
	Helianthus annuus	Sunflower – black peredovik	10
	Leptochloa dubia	Green sprangletop	10
	Mimosa strigillosa	Herbaceous mimosa	10
	Pancium dichotomiflorum	Fall panicum	10
	Pancium virgatum	Switchgrass	10
	Schizachyrium scoparium	Little bluestem	10
	Sorghastrum nutans	Indiangrass – Cheyenne	10
	Vigna unguiculata	Iron clay cowpea	10
Approved Invaders/ Volunteers	*Baccharis halimifolia*	Eastern baccharis	10
	Lespedeza cuneata	Sericea lespedeza	10
	Trifolium incarnatum	Crimson clover	10
	Vicia villosa	Hairy Vetch	10
Pastureland Category			
Planting List Species (May include approved grass species from the grazing planting list.)	*Cynodon dactylon*	Coastal bermudagrass	40-60 bushels/acre
	C. dactylon	Common bermudagrass	40-60 bushels/acre
	Trifolium incarnatum	Crimson clover	10
Approved Invaders/ Volunteers (May include grass species from grazing approved invader list.)	*Paspalum notatum*	Bahiagrass	0
	Trifolium vesiculosum	Arrowleaf clover	0
	Vicia villosa	Hairy vetch	0
Forest Land Category			
Planting List – Herbaceous and Grass Species	*Andropogon gerardii*	Big bluestem	10
	Bothriochloa laguroides	Silver bluestem	10
	Bouteloua curtipendula	Side oats grama	10
	Buchloe dactyloides	Buffalo grass	10
	Cassic fasciculata	Partridge pea	10
	Castilleja spp.	Indian paintbrush	10
	Dalea purpurea	Purple prairie clover	10

Table 2-9 Reclamation Plant Species for Grazing Land, Pastureland, and Forest Land Categories[1]

Planting List or Approved Invaders/Volunteers	Scientific Name	Common Name	Planting Rate (pounds/acre of PLS or stocking rate)[2,3,4]
	Desmanthus illinoensis	Illinois bundleflower	10
	Heflianthus annuus	Sunflower – black peredovik	10
	H. maximilianii	Sunflower – maximillian prairie gold	10
	Leptochloa dubia	Green sprangletop	10
	Mimosa strigillosas	Herbaceous mimosa	10
	Panicum dichotomiflorum	Fall panicum	10
	P. virgatum	Switchgrass	10
	Schizachyrium scoparium	Little bluestem	10
	Sorghastrum nutans	Indiangrass – Cheyenne	10
	Vigna unguiculata	Iron clay cowpea	10
Planting List – Woody Species	*Acer rubrum*	Red maple	100-200 trees/acre
	Carya aquatica	Water hickory (bitter pecan)	100-200 trees/acre
	C. cordiformis	Bitternut hickory	100-200 trees/acre
	C. illnoensis	Pecan	100-200 trees/acre
	C. ovata	Shagbark hickory	100-200 trees/acre
	C. texana	Black hickory	100-200 trees/acre
	C. tomentosa	Mockernut hickory	100-200 trees/acre
	Juglans nigra	Black walnut	100-200 trees/acre
	Pinus echinata	Shortleaf pine	100-200 trees/acre
	P. palustris	Longleaf pine	100-200 trees/acre
	P. taeda	Loblolly pine	100-200 trees/acre
	Quercus alba	White oak	100-200 trees/acre
	Q. falcata	Southern red oak	100-200 trees/acre
	Q. laurifolia	Laurel oak	100-200 trees/acre
	Q. lyrata	Overcup oak	100-200 trees/acre
	Q. macrocarpa	Bur oak	100-200 trees/acre
	Q. marilandica	Blackjack oak	100-200 trees/acre
	Q. michauxii	Swamp chestnut oak	100-200 trees/acre
	Q. nigra	Water oak	100-200 trees/acre
	Q. phellos	Willow oak	100-200 trees/acre
	Q. schumardii	Schumard oak	100-200 trees/acre
	Q. stellata	Post oak	100-200 trees/acre
	Q. velutina	Black oak	100-200 trees/acre

Table 2-9 Reclamation Plant Species for Grazing Land, Pastureland, and Forest Land Categories[1]

Planting List or Approved Invaders/Volunteers	Scientific Name	Common Name	Planting Rate (pounds/acre of PLS or stocking rate)[2,3,4]
Approved Invaders/ Volunteers – Woody Species (Grass species from the grazing and pastureland approved invader lists also may be used.)	*Acer negundo*	Boxelder	100-200 trees/acre
	Betula nigra	River birch	100-200 trees/acre
	Bumelias lanuginosa	Coma (Chittamwood bumelia)	100-200 trees/acre
	Carpinus caroliniana	American hornbeam (blue beech)	100-200 trees/acre
	Celtis spp.	Hackberry	100-200 trees/acre
	Cercis canadensis	Eastern redbud	100-200 trees/acre
	Cornus drummondii	Roughleaf dogwood	100-200 trees/acre
	C. florida	Flowering dogwood	100-200 trees/acre
	Diospyrus virginana	Common persimmon	100-200 trees/acre
	Fagus grandifolia	American beech	100-200 trees/acre
	Ilex opaca	American holly	100-200 trees/acre
	Juniperus virginiana	Eastern red cedar	100-200 trees/acre
	Liquidambar styraciflua	Sweetgum	100-200 trees/acre
	Magnolia grandiflora	Southern magnolia	100-200 trees/acre
	Maclura pomifera	Osage orange (horse-apple, bois d'arc)	100-200 trees/acre
	Morus rubra	Red mulberry	100-200 trees/acre
	Nyssa aquatica	Water tupelo	100-200 trees/acre
	N. slyvatica	Black-gum (black tupelo)	100-200 trees/acre
	Ostrya virginiana	Eastern hop hornbean	100-200 trees/acre
	Planera aquatica	Water elm (planetree)	100-200 trees/acre
	Prunus serotina	Black cherry	100-200 trees/acre
	Sassafras albidum	Sassafras	100-200 trees/acre
	Taxodium distichum	Bald cypress	100-200 trees/acre
	Tillia caroliniana	Carolina basswood (linden)	100-200 trees/acre
	Ulmus alata	Winged elm	100-200 trees/acre
	U. crassifolia	Cedar elm	100-200 trees/acre
	U. rubra	Slippery elm	100-200 trees/acre

[1] Plant species may be selected from any of the above planting lists for controlling erosion in designated industrial/commercial land use areas.

[2] Planting rates are presented for drill seeding methods. Broadcast seeding method rates would be double the drill seeding rates. Permanent vegetation typically is seeded at 50 to 70 pounds per acre.

[3] PLS = Pure Live Seed.

[4] Those species with seeding rates of 0 pounds per acre are not allowed to be planted; however, they are allowed to occur within a management unit.

On slopes of 5 percent or less, contour plowing and contemporaneous planting would be used. Where slopes exceed 5 percent and previously have not been stabilized with a temporary cover, mulch (straw or hay) would be blown onto the site and secured either by a mechanical crimper or chemical tackifier, as need.

Where a temporary cover has been established to minimize the exposure of disturbance areas to erosion, perennial species would be directly planted into the area. Conditions that would interfere with the planting or establishment of permanent vegetation would be evaluated and corrected, as needed. Where perennial species are planted into a temporary cover, the remaining stubble would serve as mulch and erosion control until the permanent vegetation becomes established.

Temporary vegetation would be seeded within 60 days of placement of suitable growth media and typically would be seeded from July through February, as climatic conditions permit. Permanent grass and forb species would be planted from March through June. Trees and shrubs would be planted December through February into areas with re-established herbaceous vegetation.

Irrigation

Based on rainfall records for the project area, it is not anticipated that irrigation would be necessary. However, irrigation may be used in areas requiring enhanced stabilization. If drought conditions affect revegetation success, the area would be reseeded with a temporary crop cover and replanted at the next appropriate planting season.

Seedbed Amendments

The preparation of a suitable seedbed for temporary or permanent revegetation would include, as needed, the application of agricultural grade limestone, the application of fertilizer, or incorporation of lime and fertilizer into the growth media to a depth of 1 to 4 feet. Core samples of the oxidized overburden selected for use as growth media, standard soil testing procedures, and experience gained at the existing South Hallsville No. 1 Mine would be used to determine fertilizer and lime requirements needed to support the post-mining land uses and attain the required productivity levels.

Areas where lime and fertilizer are incorporated into the growth media would be selectively graded following incorporation.

Pesticide Applications

Pesticides (inclusive of herbicides) would be used, as required, to control insect damage and invasion of noxious weed or invasive plant species. All pesticides would be applied under the supervision of a certified applicator. Due to the rapidly advancing technology, the selection of appropriate pesticides would be determined prior to use based on the target species and site-specific conditions. The use, application, and disposal of pesticides would be conducted in accordance with all applicable federal and state regulations.

Prescribed Burning

Prescribed burning may be used to reduce accumulations of biomass in areas reclaimed to pasture and forest land uses. All prescribed burning would be conducted in accordance with applicable specifications and would be coordinated with local fire control authorities. Fire lanes would be established throughout the reclaimed areas, as needed, to prevent fire and to provide access in case of fire.

2.5.3.6 Restoration of Waters of the U.S., Including Wetlands

If the project is approved, the USACE would require Sabine to commit to successful implementation of mitigation measures for waters of the U.S., including wetlands. Sabine's mitigation is described in the proposed Conceptual Mitigation Plan (HDR 2010b) (**Appendix C**) submitted to the USACE in support of the 404 IP application (HDR 2010a). These measures include on site aquatic resource creation and/or restoration at the ratios identified in **Table 2-10**, while enhancement and preservation of existing on or off

site resources would require higher ratios and would be approved by the USACE on a site-specific basis. Mitigation typically would be in-kind for each resource type, since historical lignite mine reclamation and mitigation efforts in the region generally have been successful. Out-of-kind mitigation would be considered a last resort for replacement of aquatic resources (USACE 2010). For purposes of this analysis, the USACE has assumed that through successful implementation of the proposed Conceptual Mitigation Plan (HDR 2010b), the streams, open water, and wetland resources reconstructed, restored, and/or enhanced subsequently would meet the USACE's criteria for waters of the U.S. and constitute acceptable mitigation for the anticipated disturbances (USACE 2010).

Table 2-10 Proposed Mitigation Ratios

Waters of the U.S., Including Wetlands	Direct Mitigation Ratios[1]	Compensatory Mitigation Ratios[1]	Total Mitigation Ratios[1,2]
Forested wetlands	1.0 to 1.0	1.0 to 1.0	2.0 to 1.0
Non-forested wetlands	1.0 to 1.0	0.5 to 1.0	1.5 to 1.0
Ponds	1.0 to 1.0	---	1.0 to 1.0
Streams	1.0 to 1.0	---	1.0 to 1.0

[1] Ratios reflect acres of mitigation to acres of impact. For example, a 1.5 to 1.0 ratio is expressed as 1.5 acres of mitigation required for 1.0 acre of impact.

[2] Total ratios include both direct and compensatory mitigation.

Source: HDR 2010b.

2.5.3.7 Final Pit Reclamation

As described in Section 2.5.2.6, Overburden and Interburden Removal, sequential backfilling and reclamation would be conducted throughout the life of the mine as the pit advances. The backfilled pit areas would be revegetated in accordance with the requirements of the specified post-mining land uses. No end lakes are proposed (Sabine 2010a).

2.5.3.8 Transportation Utility Corridor Reclamation

After the final dragline is moved from the South Hallsville No. 1 Mine to the proposed Rusk Permit Area in approximately 2027, the dragline walkway would be removed and the disturbance area reclaimed. All culverts would be removed and reused on site or properly disposed of off site. All fill used to construct the walkway would be removed and hauled to other parts of the proposed project for use in reclamation activities. The disturbance area subsequently would be reseeded and/or replanted in accordance with the requirements for the specified post-mining land use (see **Figure 2-10**) and per Sabine's reclamation plan and/or proposed Conceptual Mitigation Plan, as applicable.

Following the completion of mining, the main haul road and V1, V2, and V3 ramps would be reclaimed. All culverts would be removed and either reused or disposed of off-site. The bridge structure across the Sabine River also would be removed and either sold, reused by Sabine at another site, or properly disposed of off-site. Fill material used to construct the haul road and riprap used for reinforcement to control erosion would be removed and either used in reclamation or sold (Sabine 2010a). The disturbance area subsequently would be reseeded and/or replanted in accordance with the requirements of the specified post-mining land use and per Sabine's reclamation plan and/or proposed Conceptual Mitigation Plan, as applicable.

It is likely that the 138-kV transmission line and substation would be retained or rerouted, as would be determined by the power company.

2.5.3.9 Reclamation of Ancillary Facilities and Disposition of Equipment

Closure of ancillary facilities and disposition of equipment would be conducted in accordance with applicable federal, state, and local regulations. Revegetation would be completed as described in Section 2.5.3.5, Revegetation, in accordance with the post-mining land use. All equipment would be transported off site. The transmission line would be dismantled and removed from the site.

Temporary Coal Storage Areas

Following the completion of mining, any remaining lignite in the temporary coal storage areas would be loaded and transported to either the existing truck dump area or existing coal barn located at the South Hallsville No. 1 Mine. The disturbance area subsequently would be ripped to relieve compaction and reclaimed in accordance with Sabine's reclamation plan.

Roads

Haul roads and access roads not required for long-term monitoring and management purposes would be recontoured to blend with the surrounding topography and the natural drainage patterns. Prior to recontouring, road surfacing material would be removed for reuse or buried under a minimum of 4 feet of suitable growth media. These areas would be reclaimed in accordance with the post-mining land use.

Fuels and Lubricants

Following the completion of mining and reclamation, materials not consumed on site would be returned to the supplier or shipped to a licensed recycler, as appropriate. In addition, all storage tanks for these materials would be removed and disposed of in accordance with all applicable federal, state, and local laws and regulations.

Following the completion of mining and reclamation, any remaining solid waste would be transported to and disposed of at a licensed Class III disposal facility.

Fencing and Site Security

Mining areas undergoing reclamation would be fenced, as necessary, to control public access and/or to facilitate revegetation.

Monitoring Wells

Groundwater wells used for monitoring purposes would be plugged in accordance with TAC 1001, 1002, and 1009 when no longer in use. Wells completed above the mine floor elevation within a mining block would be removed during pit excavation. Wells completed below the mine floor elevation would be plugged with a cement-bentonite grout.

Sediment Control Ponds

Sediment control ponds would be retained to the extent possible, pending final agreements with landowners and final RCT approval. Alternately, sediment control ponds that would not be retained would be backfilled, recontoured to approximate original contour, and revegetated.

2.5.3.10 Monitoring of the Reclaimed Site

A site-specific reclamation success program would be established and conducted in coordination with appropriate jurisdictional agencies throughout the life of the project. Revegetation success would be determined in accordance with RCT's 2006 *Procedures and Standards for Determining Revegetation Success on Surface-Mined Lands in Texas* and Sections 12.395 and 12.399 of the Texas Coal Mining Regulations. Revegetation success would be monitored through evaluation of percent ground cover, tree densities, and productivity, as applicable, in relation to the site-specific post-mining land use. The program then would examine, review, and determine the effectiveness of the reclamation efforts to achieve

proposed standards of reclamation success. Based on the results of the evaluation, reclamation techniques would be refined, as needed, to ensure reclamation objectives would be achieved. Criteria for determination of reclamation success by post-mining land use are presented below. Mitigation success criteria specific to the Section 404 permit that would be issued by the USACE prior to start-up also are included.

Pastureland and Grazing Land

Under the RCT regulations for pastureland and grazing land, ground cover must achieve at least 90 percent of the ground cover technical standards established by the NRCS, which require 95 percent cover for sod-forming grasses and 90 percent cover for bunchgrasses. Productivity is required to reach or exceed 90 percent of a reference area or 90 percent of site-specific technical standards developed by the NRCS at the request of the applicant. Ground cover and productivity need to meet or exceed the approved standards any 2 of the first 5 years, with the exception of the first year. Production is to be measured through a combination of hay harvest methods, field clipping of standing forage, and/or grazing use records. Current plans would restore this land use on a maximum of 41 percent of the total disturbance area.

Cropland

Under the RCT regulations for non-prime farmland soils, sufficient ground cover is to be maintained to control erosion until crop production begins. Productivity is required to reach or exceed 90 percent of a reference area or 90 percent of site-specific technical standards developed by the NRCS at the request of the applicant. Ground cover and productivity need to meet or exceed the approved standards any 2 of the first 5 years, with the exception of the first year. Production is to be measured through a combination of mechanical whole-field harvest or field clipping, and the Revised Universal Soil Loss Equation is used to estimate erosion potential. This land use would be restored per landowner agreements and, therefore, interspersed with the other post-mining land uses in the proposed disturbance area.

Forestry

Under the RCT regulations for the forestry land use type, performance standards for both vegetative ground cover and tree stocking rates must be achieved. Ground cover is required to meet or exceed 90 percent of a reference area or 90 percent of the technical standard of 78 percent. Tree species are required to meet or exceed 90 percent of a site-specific technical standard developed by the applicant in coordination with the Texas Forest Service. A stem count of 450 per acre for pine species and 250 per acre for hardwood species is proposed by Sabine for the site-specific technical standard (Sabine 2009a). Ground cover and tree composition measurements also are required, with a minimum of 75 percent of the ground cover to comprise permit-approved species that support the post-mining land use and up to 25 percent of the ground cover to comprise desirable invader species. Ground cover must meet or exceed the success standards during the growing season of the last year of reclamation responsibility. At the end of reclamation responsibility, at least 80 percent of the healthy tree stems are to have been in place for 60 percent of the reclamation period. Current plans would restore this land use on a maximum of 59 percent of the total disturbance area.

Fish and Wildlife Habitat

Under the RCT regulations for fish and wildlife habitat, ground cover (i.e., herbaceous species) in general wildlife habitat is required to meet or exceed 90 percent of the technical standard of 78 percent. For bobwhite quail and grassland bird species habitat, the ground cover is to fall within the lower and upper acceptable values of 57 and 77 percent, respectively. In areas where the wildlife habitat type is planned for tree and shrub species restoration, the RCT requires the applicant to develop a site-specific technical standard in consultation with the TPWD. The site-specific technical standard proposed by Sabine is a stem count of 100 per acre (Sabine 2009a). For general wildlife habitat, woody species stocking rates are required to meet or exceed 90 percent of the identified technical standard. For bobwhite quail and grassland bird species mottes, woody species stocking rates are required to meet the identified technical standard. The RCT regulations relative to herbaceous and woody species composition measurements and

end of reclamation responsibility goals are the same as described above for the forestry land use type. This land use would be interspersed to the extent possible with the other post-mining land uses in the proposed disturbance area, particularly with forest land, pastureland, and developed water resources.

Fish and wildlife habitat also would be provided through mitigation of waters of the U.S., including wetlands, which would be reclaimed in accordance with Sabine's proposed Conceptual Mitigation Plan (HDR 2010b). Forested wetland habitat would be deemed successful with a minimum tree density after 5 years of 100 trees per acre, with no one tree species exceeding 30 percent. Non-forested wetland habitat would be deemed successful with 80 percent ground cover after 3 years, with no non-native, noxious, or invasive species comprising any of the three most dominate species. Riparian zone planting would be deemed successful with establishment of riparian habitats measuring 25 to 50 feet on either side of streams. In addition, permanent ponds would be designed to ensure successful formation and propagation of wetland and riparian habitats. See the Developed Water Resources subsection below relative to aquatic habitat.

Undeveloped Land

The undeveloped land category includes those areas for which long-term management goals and uses have not been identified. These areas would be planted with native grasses, shrubs, and trees. Per the RCT regulations, ground cover must meet or exceed 90 percent of the ground cover technical standards, which require 95 percent cover for sod-forming grasses and 90 percent cover for bunchgrasses. As per the RCT regulations for the fish and wildlife habitat type, woody species stocking rates are required to meet or exceed 90 percent of the identified technical standard developed by the applicant in coordination with the TPWD (a stem count of 100 per acre [Sabine 2009a]). The RCT regulations relative to herbaceous and woody species composition measurements and end of reclamation responsibility goals are the same as described above for the forestry land use type. This land use would be restored per landowner agreements and, therefore, interspersed with other post-mining land uses in the proposed disturbance area.

Industrial/Commercial

Under the RCT regulations for the industrial/commercial land use type, sufficient ground cover is to be maintained to control erosion. If woody species stocking is to be implemented, these plantings would be required to meet or exceed 90 percent of a site-specific technical standard developed by the applicant in coordination with the Texas Forest Service. Woody species composition monitoring, where applicable, and end of reclamation responsibility goals are the same as described above for the forestry land use type. This land use would be restored per landowner agreements and, therefore, interspersed with other post-mining land uses in the proposed disturbance area.

Residential Land

Under the RCT regulations for the residential land use type, sufficient ground cover is to be maintained to control erosion. If woody species stocking is to be implemented, these plantings would be required to meet or exceed 90 percent of a site-specific technical standard developed by the applicant in coordination with the TPWD. Woody species composition monitoring, where applicable, and end of reclamation responsibility goals are the same as described above for the forestry land use type. This land use would be restored per landowner agreements and, therefore, interspersed with other post-mining land uses in the proposed disturbance area.

Developed Water Resources

Sabine, in coordination with the USACE, would identify and inventory appropriate waters of the U.S. (including wetlands) reference sites for use in evaluating reclamation success for developed water resources in the proposed Rusk Permit Area. The reference sites would be specific to the project's Section 404 permit requirements. Based on Sabine's proposed total mitigation ratios (inclusive of direct and compensatory mitigation) as discussed in Section 2.5.3.6, Restoration of Waters of the U.S. Including Wetlands, the acreage or linear extent, as applicable, of ponds and streams in the proposed disturbance

area would approximate pre-mining conditions; the acreage of non-forested wetlands would increase by approximately 50 percent; and the acreage of forested wetlands would increase by approximately 100 percent.

2.5.4 Summary of Committed Environmental Protection Measures

Table 2-11 summarizes Sabine's committed environmental protection measures that would be implemented under the Proposed Action to minimize environmental impacts associated with development of the proposed Rusk Permit Area. Potential monitoring and mitigation measures currently being considered by the USACE based on the environmental impacts identified in this EIS also are identified in **Table 2-11**.

2.6 No Action Alternative

Under the No Action Alternative, the USACE would deny Sabine's application for an individual Section 404 permit. As a result, the proposed Rusk Permit Area would not be developed, and the potential impacts to the natural or human environment identified for the Proposed Action would not occur. However, existing operations at the South Marshall Permit Area of the South Hallsville No. 1 Mine would continue under existing authorizations until the lignite reserves are depleted (in approximately 2027). Potential impacts associated with the No Action Alternative are described in the resource-specific sections of Chapter 3.0.

Implementation of the No Action Alternative would not meet the purpose and need for the project. However, the No Action Alternative must be addressed, because a permit cannot be issued by the USACE if such issuance would be contrary to the public interest and would not comply with the Section 404(b)(1) guidelines. Also, its inclusion in this analysis is required under provisions of NEPA and serves as a basis for comparison of environmental impacts among alternatives. Under this alternative, the identified lignite reserves at the proposed Rusk Permit Area would not be mined.

The No Action Alternative does not mean, however, that there would be no impacts to the lands in and near the proposed Rusk Permit Area. The potential exists that the lignite reserves in the Rusk Permit Area would be leased at a later date, or that some portion of the land would be sold for purposes of development. The USACE has chosen not to speculate on the nature of the future land use, and has not predicted these associated possible future impacts from the No Action Alternative. Also note that with No Action Alternative, there still would be regional impacts, as identified in the analyses of cumulative impacts that are caused by activities other than development of the proposed Rusk Permit Area.

It is assumed the No Action Alternative would not affect the continued operation of the existing Pirkey Power Plant. If the USACE selects the No Action Alternative, there are other potential fuel sources for the power plant; however, as these fuel sources do not meet the purpose and need of the proposed project and are outside of Sabine's control, they are not considered as alternatives in this EIS. If other fuel sources are proposed by SWEPCO at a future time, the development of those fuel sources would be subject to compliance with applicable environmental laws and regulations.

2.7 Past, Present, and Reasonably Foreseeable Future Actions (for Cumulative Impact Assessment)

The evaluation of cumulative impacts associated with the proposed Rusk Permit Area is dependent on identification of those past, present, and RFFAs in the vicinity that may affect the same resources and overlap in a geographic and temporal manner with the anticipated impacts of the Proposed Action. The geographic areas considered for these actions vary among resources (see Chapter 3.0), since a remote activity may contribute to cumulative impacts for one resource (e.g., air quality) while not contributing to cumulative impacts for other resources that primarily are affected by site-specific activities (e.g., soils). The period of potential cumulative impact is defined as the 30-year life of the project plus approximately 5 years for reclamation. The list below includes past and present actions and RFFAs with the potential to contribute to cumulative impacts to one or more of the resources analyzed in this EIS.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Geology and Mineral Resources	• As required by RCT regulations, mine spoils would be regraded to approximate original contour prior to being revegetated.	• No additional monitoring or mitigation is being considered.
Water Resources *Groundwater*	• To minimize impacts to surface water and groundwater quality, as applicable, Sabine would minimize disturbance areas at any given time, install temporary and permanent erosion controls (e.g., check dams, riprap, mulch), selectively place spoils in backfill areas to ensure that naturally occurring acid- or toxic-forming materials are 4 feet or greater below the final grade, and conduct concurrent reclamation throughout the life of the project. • During mining and following completion of reclamation, Sabine would replace water supply wells impacted by mining operations with new wells constructed and completed in the sand units of the Wilcox Formation underlying the proposed pit floor.	• **GW-1**: Sabine would coordinate with the Chalk Hill and Crystal Farms water districts to identify the location of existing customers and water supply wells and distribution facilities that may be impacted by the Proposed Action. Specific measures would be developed, as applicable, to mitigate identified impacts.
Surface Water	• Surface water control features (ditches, sediment control ponds, BMPs) would be constructed or installed in advance of ground-disturbing activities. • During mining and following completion of reclamation, Sabine would replace water supply wells impacted by mining operations with new wells constructed and completed in the sand units of the Wilcox Formation underlying the proposed pit floor. • Discharge water from sediment control ponds would be monitored in accordance with TPDES permit requirements to control the quality of water discharge. Portable water treatment systems would be used, as needed, and maintained to ensure discharges meet applicable effluent limitations. These treatment systems may consist of chemical additives for iron removal, pH adjustment, or flocculent addition for small particle sediment removal.	• **SW-1**: BMPs to reduce erosion and sedimentation within the Sabine River floodplain and along transitional haul road ramps would be specifically defined and located on design plans along the proposed haul road and the proposed dragline walkway. Practices and features would ensure shoreline and stockpile protection, as well as scour protection at and near bridge abutments and piers for the 100-year design event. Additional scour or channel migration investigations would be conducted to define the potential locations, depth, and extent of such processes, and findings would be integrated into protective measures for final designs. Culvert diameters, configurations of culvert transitions (inlets, outlets), and flow

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Water Resources *Surface Water* (Cont.)	• During periods between dragline moves, approximately 60 percent of the fill material used to construct the walkway would be removed and stockpiled on top of the remaining portion of the walkway, thus allowing openings to maintain the function of the floodplain. Stockpiled fill would be seeded with a temporary seed mix to minimize erosion and sediment transport. • To the extent possible, pre-mine stream drainage configurations would be retained, and slopes similar to pre-mine conditions would be achieved when practical during reclamation, to facilitate stream-flow regimes consistent with pre-mining rates. • Jurisdictional waters of the U.S. impacted by mining and mining-related activities would be reconstructed within the reclaimed mine area in their approximate pre-mine locations through the use of creation, restoration, enhancement, or preservation techniques in accordance with Sabine's proposed Conceptual Mitigation Plan developed per the requirements of the USACE's Section 404 permitting process. (See **Table 2-10** for proposed mitigation ratios.)	velocities through culverts would be further investigated to reasonably ensure the stability of flow paths and the embankment at and near culverts. Final designs and construction of the haul road and walkway would incorporate reasonable estimates of the hydraulic effects of woody debris on bridge and culvert conveyance, local scour, and backwater conditions. Since mean daily flow observations were used in preliminary designs, ongoing design efforts would distribute the mean daily peak flow into an hourly flow hydrograph based on existing representative data or accepted practice. Bridge and roadway freeboard values would accommodate the hourly peak flow in final design. • **SW-2**: Work in the Sabine River floodplain would cease during severe storms or out-of-bank flows. If after a storm event, construction traffic on the river floodplain causes soil ruts deeper than 3 inches, equipment mats would be used or construction delayed until drier conditions occur.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Water Resources *Surface Water* (Cont.)		• **SW-3**: Channel conditions upstream and downstream of embankments, the haul road bridge, and culverts would be monitored using scheduled periodic field observations and a sequence of historical aerial photos (such as from the Texas Natural Resources Information System). A professionally qualified fluvial geomorphologist would be retained to provide input regarding monitoring methods and protection for channels and streambanks during project design and the development and implementation of a river monitoring program. As needed and if notable changes in the trends of planform (plan view) banks/bars are observed from the existing and historical conditions, upstream and downstream stabilization would be implemented according to accepted engineering/geomorphic practices. In addition, water quality conditions in the Sabine River downstream of any project-related disturbance in the river or floodplain would be monitored for sedimentation impacts or other reductions in background water quality. In cooperation with TPWD and USACE, Sabine would develop and satisfactorily implement a water quality monitoring plan to inform the agencies of project activity schedules and to characterize turbidity and suspended sediment concentrations in the Sabine River flow both upstream and downstream of project-related disturbance. Monitoring activities would extend sufficiently far downstream to ascertain and quantify any sedimentation

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Water Resources *Surface Water* (Cont.)		impacts to the mussel sanctuary 4 miles downstream, as well as other zones that may support aquatic special status species and aquatic species of special concern within a distance to be prescribed by TPWD. The timing of these water quality monitoring activities would include pre-, during, and post-activity monitoring at timeframes prescribed by TPWD. A written summary report and data compilation would be submitted to TPWD and USACE by Sabine within 1 month of any monitoring sequence. Thresholds that would trigger mitigation activities would be developed in cooperation with TPWD. Criteria could include, for example, increases in turbidity and/or TSS concentrations above upstream sample values (or normal values for the flow and season), an incremental depth of burial from sedimentation in occupied downstream habitat, or some other measurable stressor. • **SW-4**: Scheduled periodic monitoring would be conducted to evaluate potential impacts to vegetation or flow paths from restricted surface/subsurface drainage around the main haul road and dragline walkway crossing embankments. Revisions to an approved mitigation plan would be made in coordination with USACE if monitoring over time indicates impacts greater than local and minor.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Water Resources *Surface Water* (Cont.)		• **SW-5**: The Spill Prevention, Control, and Countermeasures (SPCC) Plan would include a separate section for the Sabine River floodplain. The section would emphasize response protocols, training and communication; the location and availability of cleanup kits and other control equipment or materials at the north end of the haul road for spills involving haul trucks, fuel trucks, or other supply vehicles. No movable equipment would be parked or staged overnight within the floodplain boundaries; refueling within the floodplain boundary would be conducted on a limited basis; and no fuels, solvents, or other potentially hazardous materials would be stored within the floodplain boundaries during haul road and dragline walkway construction or operations. • **SW-6**: Storm water controls and, if needed, sediment control ponds would be installed on drainage pathways along the haul road and dragline walkway. These facilities would be designed, constructed, and monitored to control runoff and water quality to within state standards before road and embankment drainage empties into the Sabine River. • **SW-7**: The locations and characteristics of permanent sediment control ponds would be defined on final project plans and narratives, and incorporated into mitigation and monitoring plans for the Section 404 permit. Embankment heights, typical retention volumes, and design-event storm water retention volumes would be defined and

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Water Resources *Surface Water* (Cont.)		incorporated into designs for state and federal agency review. Typical normal outlet and emergency spillway configurations would be defined to meet state dam safety requirements, and outlet controls to minimize downstream channel adjustments would be defined and incorporated into designs for state and federal agency review. Long-term post-reclamation ownership responsibilities would be detailed in mitigation and reclamation plans.
Soils	• Potential impacts to soils would be minimized by limiting the acreage of mining disturbance at any given time and prompt revegetation of disturbance areas in accordance with the proposed Reclamation Plan and proposed Conceptual Mitigation Plan for waters of the U.S. • Selective materials handling and testing would be implemented to ensure placement of suitable growth media in the upper 4 feet of the reclaimed spoil material. • Temporary oxidized overburden (growth media) stockpiles would be graded to 3H:1V slopes, seeded with a temporary crop cover, and mulched to prevent erosion. • Replaced growth media would be tested to ensure no acid- or toxic-forming materials are present in the upper 4 feet of the regraded spoils. • To minimize erosion, rills and gullies deeper than 9 inches in final graded areas would be filled, graded, or otherwise stabilized as soon as field conditions allow. The area subsequently would be reseeded or replanted during the first favorable planting period. • Fertilizer and other soil amendments would be used, as needed, to ensure successful re-establishment of vegetation.	• **S-1**: Rough and final grading only would occur when the soils are dry, below the plastic limit to reduce soil compaction during reclamation. • **S-2**: Compacted surface or subsurface soil would be decompacted by deep ripping or subsoiling, prior to revegetation efforts.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Vegetation	• Potential impacts to vegetation would be minimized by limiting the acreage of mining disturbance at any given time and prompt revegetation of disturbance areas in accordance with the proposed Reclamation Plan and proposed Conceptual Mitigation Plan for waters of the U.S. • Permanent revegetation would be initiated during the first favorable planting period following placement, testing, amendment, and final regrading of suitable growth media. • In temporary disturbance areas, or during periods unfavorable for re-establishment of permanent vegetation on prepared backfill areas, a temporary crop cover would be established. • Permanent ponds would be designed with graded slopes and shallow shelves to promote propagation of aquatic and wetland vegetation.	• **V-1**: Prior to ground-disturbing activities, surveys would be conducted by a qualified biologist for the Neches River rose-mallow and the Texas trillium in areas of potentially suitable habitat within the Rusk Permit Area. If either species is identified during the surveys, Sabine, in coordination with the USFWS and TPWD, as appropriate, would develop appropriate mitigation to minimize impacts and a management plan for monitoring and reporting.
Fish and Wildlife Resources	• Potential impacts to fish and wildlife species would be minimized by limiting the acreage of mining disturbance at any given time, limiting disturbance (to the extent possible) within high-value habitat, and prompt revegetation of disturbance areas in accordance with the proposed Reclamation Plan and proposed Conceptual Mitigation Plan for waters of the U.S. • Sabine's proposed Fish and Wildlife Plan would be implemented to minimize impacts to fish and wildlife species and aquatic communities, including special status species. This plan includes the restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. • Permanent ponds would be designed with graded slopes and shallow shelves to promote propagation of aquatic and wetland habitats.	• **FW-1**: If vegetation clearing activities should be required during the migratory bird breeding season (March through July), pre-construction breeding bird surveys would be conducted prior to these activities. A qualified biologist would survey potentially suitable habitat for nesting activity and other evidence of nesting. If active nests are located, or other evidence of nesting is observed, appropriate protection measures, including establishment of buffer areas and constraint periods, would be implemented until the young have fledged and dispersed from the nest area.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Fish and Wildlife Resources (Cont.)	• Wildlife habitat enhancement projects, including removal of cattle from the mine area and prohibiting hunting of indigenous non-migratory species, would be implemented by Sabine. Enhancement measures related to development of aquatic and riparian habitats would be implemented in accordance with the proposed Conceptual Mitigation Plan for waters of the U.S. (See **Table 2-10** for proposed mitigation ratios.) • To minimize potential power line- or transmission line-related impacts to raptor species, these facilities would be designed and constructed in accordance with guidelines presented in the Environmental Criteria for Electric Transmission System (USDI, USDA 1970) and/or REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds. • To maximize wildlife use and aesthetics and to minimize soil erosion, timber and brush clearing would be conducted at the minimum critical distance in front of mining and avoided where practical. Brush piles and/or windrows would be constructed for wildlife cover, where possible. • The proposed alignments and river crossings for the main haul road and dragline walkway were located in consultation and review with the USACE, TPWD, and RCT.	• **FW-2**: Prior to construction of the proposed haul road bridge and dragline walkway crossing of the Sabine River, mussel surveys would be conducted by a qualified biologist within the proposed disturbance areas and immediately downstream of the crossings. Mussels found during the survey would be relocated to appropriate habitat in coordination with TPWD.

Table 2-11 Committed Environm ion Measures Und

Environmental Resource		
Fish and Wildlife Resources (Cont.)	• Potential impacts to breeding and nesting migratory bird species would be minimized through the avoidance of rookeries and raptor nest sites during the breeding season, to the extent possible, and by increasing the availability of water sources away from active mining areas. Also, to the extent possible, clearing operations would be conducted during non-breeding periods to avoid the peak migratory bird breeding season. • Should a Louisiana black bear be observed on site, TPWD and the RCT would be notified. If needed, Sabine in coordination with TPWD would develop a strategy for avoidance or relocation of the bear, as applicable. • Should Bachman's sparrow nesting activity be observed on site, the area would be marked for avoidance and the young allowed to fledge before additional activity is allowed in the area. • Sabine environmental staff would monitor the mine area for the interior least tern each year from April 1 through July 31. Monitoring would be conducted in accordance with the USFWS's published profile for the interior least tern, dated May 1989. If nesting birds are found, the USFWS would be contacted and Sabine would develop a management strategy for the species in coordination with the USFWS. Outside of nesting season, any confirmed observations would be noted. • Any bald eagle or wood stork sighting in the mine area would be reported to the RCT and TPWD, and the area avoided, if possible, or activity minimized to the extent possible.	

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Fish and Wildlife Resources (Cont.)	• During the spring, areas along the proposed transportation/utility corridor and near sediment control ponds would be monitored for nesting female alligator snapping turtles. If an alligator snapping turtle or its nest is observed, it would be marked for avoidance and the RCT would be notified. If the nest is located in an area where disturbance potential exists, TPWD would be contacted for assistance in relocating the nest to a protected area. During Sabine River flow bypass operations for the dragline walkway, the construction area would be surveyed and any stranded turtles would be monitored or relocated to the river bed where water flow is available. The survey and potential relocation would be performed by a biologist and/or Sabine staff permitted by TPWD to handle this species. A report would be filed with the RCT of any occurrences or relocations by the end of the calendar year when such activity occurred. • The RCT would be notified if a canebrake rattlesnake is observed on site. If observed in an area proposed for disturbance, a biologist and/or Sabine staff permitted by TPWD to handle this species would conduct surveys of the area and relocate individuals to potential habitat well away from active mine areas. • During river flow bypass operations for the dragline walkway crossing of the Sabine River, any paddlefish observed stranded in the riverbed would be relocated to the river flow above or below the bypass. This activity would be performed by a biologist and/or Sabine staff permitted by TPWD to handle this species.	

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Fish and Wildlife Resources (Cont.)	• Surveys of construction footprints in the river bed would be conducted prior to commencing construction, and all individuals of the targeted threatened species located and identified would be collected and moved to areas of the river bed not impacted by construction activities. Results of these relocation surveys would be reported to RCT. Observations of any other threatened or endangered species identified within the permit area would be reported to the RCT.	
Paleontological Resources	• No environmental protection measures are proposed.	• No monitoring or mitigation is being considered.
Cultural Resources	• Cultural resource surveys would be completed on any remaining areas to be disturbed by mining activities, prior to surface disturbance in the area. These surveys would be phased in coordination with Sabine's proposed mining schedule. Field surveys, report preparation, and review of reports by regulatory agencies (including Texas Historical Commission [THC]) would be completed 5 years in advance of disturbance in each 5-year mine block, thus providing time for implementation of THC-approved mitigation or avoidance measures for any identified National Register of Historic Places (NRHP)-eligible sites prior to surface disturbance. • No cultural resource sites would be disturbed until written authorization to proceed has been obtained from the THC, USACE, and RCT. • In the event that previously unknown archaeological deposits are discovered during construction, all construction activities would cease within the vicinity of the discovery, and the THC would be notified of the find. Steps would be taken to protect the site from vandalism and further damage until the THC could evaluate the nature of the discovery. Construction would not resume in the area of the discovery until the THC has issued a notice to proceed.	• **CR-1**: To minimize the potential for indirect effects to cultural resources as a result of illegal collection or vandalism, Sabine would educate project-related personnel as to the sensitive and confidential nature of the resources and implement a strict policy against illegal collection and against revealing the location of any cultural resources located in the Rusk Permit Area.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Cultural Resources (Cont.)	• If construction or other project personnel discover what might be human remains, construction would cease within the vicinity of the discovery, and the THC would be notified of the find. Construction would not resume in the area of the discovery until the THC has issued a notice to proceed.	
Air Quality	• Fugitive dust emissions from haul roads would be controlled by the application of water sprays, chemical dust suppressants, or slow-curing liquid asphalt as allowed by TCEQ. Other controls would include prompt removal of lignite, rock, or soil from roads; compaction of unpaved roads, as needed; and restriction of travel of unauthorized vehicles on other than established roads. • Fugitive dust emissions from disturbance areas would be controlled by minimizing the acreage of lignite mining disturbance at any given time, prompt revegetation of regraded lands, and restricting fugitive dust causing activities during periods of air stagnation. • Particulate emissions related to potential coal combustion would be minimized by promptly extinguishing areas of burning or smoldering coal and conducting periodic inspections for burning areas whenever the potential for spontaneous combustion is high.	• No additional monitoring or mitigation is being considered.
Land Use and Recreation	• Sabine would not conduct mining activities within 100 feet of cemeteries within the permit area and would continue to provide access to the cemeteries during operations.	• No additional monitoring or mitigation is being considered.
Social and Economic Values	• No environmental protection measures are proposed.	• No monitoring or mitigation is being considered.
Transportation	• Sabine would provide alternate public and landowner access prior to closure of a road.	• No additional monitoring or mitigation is being considered.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Noise and Visual Resources *Noise*	• No environmental protection measures are proposed.	• **N-1**: Noise Mitigation. Noise effects at sensitive receptors would be reduced somewhat by minimizing the simultaneous operation of major noise sources in proximity to each other when operating near occupied residences. Care should be taken to ensure that all motorized equipment is operating in good condition with effective mufflers intact. • **N-2**: Noise Barriers. To the degree possible, mine planning should use temporary spoil piles and topsoil stockpiles as berm-type noise barriers between mine activities and nearby residences. This would be particularly effective when equipment would be operating at or near the surface rather than deeper in pits, and whenever mining activity would be occurring near residential areas identified as being subject to project-related noise in excess of the applied criteria.

Table 2-11 Committed Environmental Protection Measures and Additional Mitigation Measures Under Consideration

Environmental Resource	Sabine's Committed Environmental Protection Measures[1]	Additional Mitigation Measures Under Consideration
Noise and Visual Resources *Visual Resources*	• No environmental protection measures are proposed.	• **VR-1**: Visual Screening. In addition to the proposed reclamation procedures included in plans for the proposed project, visual screening should be employed where the edges of active mining would be near the permit boundary and there are potentially sensitive public viewpoints nearby. In particular, existing vegetation should be preserved and augmented, as necessary, to maximize visual screening near Tatum and Easton and along SH 149. Planting should mimic natural vegetative patterns and plant materials to the degree possible to provide the most natural appearing screening effects. Existing groves of trees should be retained where possible to provide visual buffers.
Hazardous Materials	• In accordance with TCEQ regulations, fuel storage tanks would be installed within a concrete containment structure to provide for secondary containment of accidental spills.	• **HM-1**: To minimize the potential for worker exposure or environmental impacts in the event of an unanticipated discovery of a contaminated site during project construction or operation, Sabine would develop a protocol for the handling of contaminated sites to ensure protection of workers and to minimize potential environmental impacts.
Public Health	• See environmental protection measures for air quality and hazardous materials.	• No additional monitoring or mitigation is being considered.
Environmental Justice	• No environmental protection measures are proposed.	• No monitoring or mitigation is being considered.

[1] Includes BMPs that would be implemented in compliance with regulations and permit requirements to minimize environmental impacts, as well as additional measures identified by Sabine that would be implemented as standard procedures during the life of the mine to further minimize environmental impacts.

2.7.1 Past and Present Actions

The predominant land uses surrounding the proposed Rusk Permit Area include lignite mining, lignite- and coal-fired power plants, forestry, and oil and gas operations. The area is known for an abundance of lignite, which occurs from the Texas-Louisiana border to the Mexico border near Laredo, Texas. Forestry and pasture land reinforce the rural, undeveloped nature of much of the study area. Residential parcels and oil and gas wells and the associated pipelines also are prevalent in the cumulative effects area.

The past and present actions with the potential to contribute to cumulative impacts to those resources affected by the proposed Rusk Permit Area are described below (see **Figure 2-12**).

2.7.1.1 South Hallsville No. 1 Mine

The existing South Hallsville No. 1 Mine (**Figures 2-1** and **2-12**) was opened in 1984 to provide a source of lignite to the Pirkey Power Plant, with operations in the South Marshall Permit Area initiated in 1995. Ongoing mining and concurrent reclamation is projected to continue through 2027, with final reclamation and closure through 2035. The South Hallsville No. 1 Mine is described in detail in Section 2.4, Existing Operations. Associated disturbance acreages are presented in **Table 2-12**.

2.7.1.2 Henry W. Pirkey Unit No. 1 Power Plant

The existing Pirkey Power Plant is located in Harrison County adjacent to the existing South Hallsville No. 1 Mine (**Figure 2-12**). It is owned and operated by SWEPCO. The power plant, currently provides base load electric generation capacity for the local electric grid (675-megawatt [MW]). Construction of the power plant began in 1982, and the plant began operation in 1985. Associated disturbance acreages are presented in **Table 2-12**. A 1,388-acre cooling reservoir, Brandy Branch Reservoir (**Figure 2-12**), is located adjacent to and southeast of the power plant; a dam was constructed across Brandy Branch Creek to form Brandy Branch Reservoir. Makeup water for the cooling reservoir is pumped approximately 20 miles from Big Cypress Bayou, located approximately 1 mile south of Ferrell's Bridge Dam, via a 36-inch concrete pipeline. Approximately 18,000 acre-feet of water is diverted annually from Brandy Branch Creek (USEPA 1982); permitted water consumption is approximately 670 acre-feet per year.

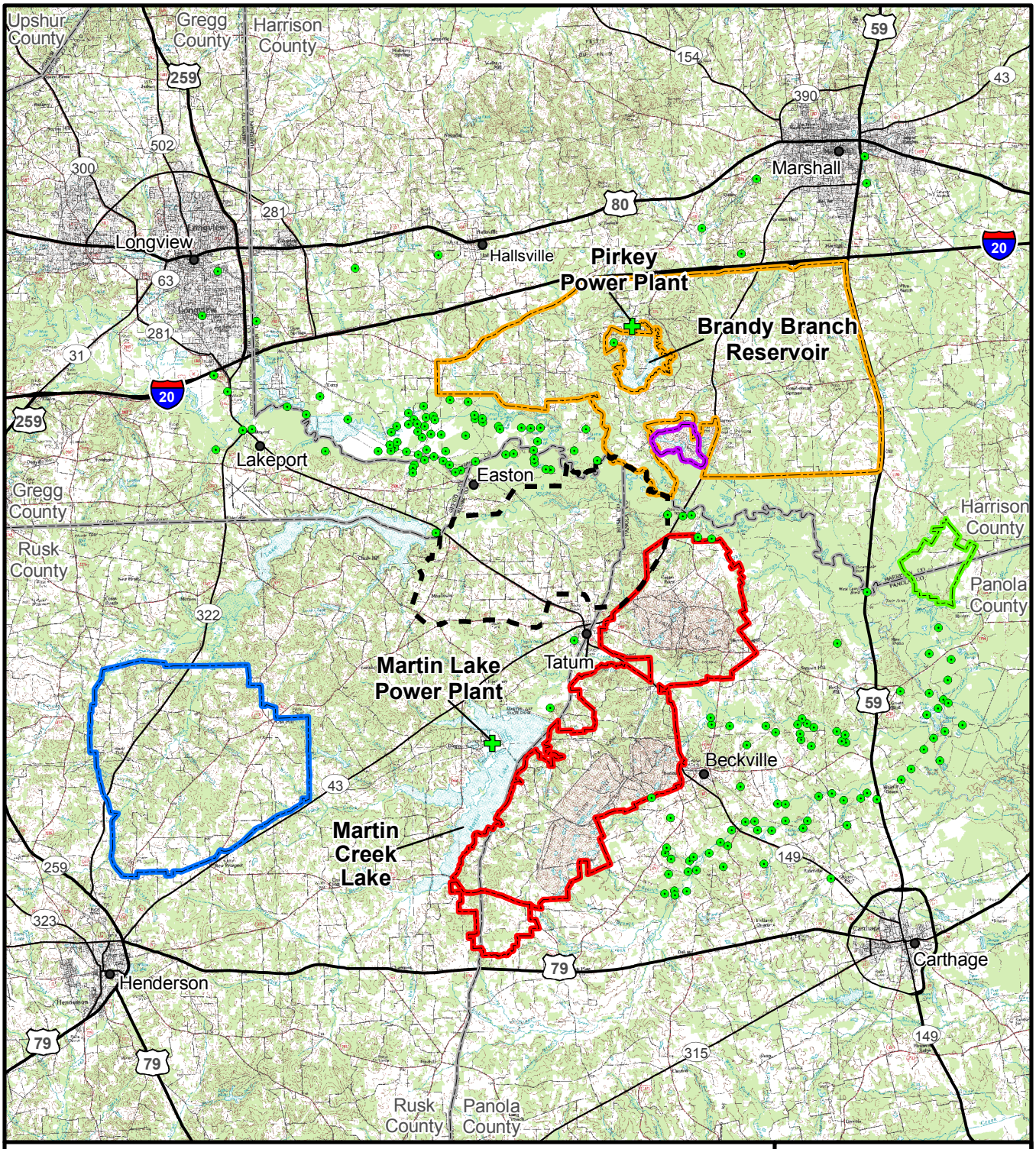
Lignite from the existing South Hallsville No. 1 Mine is delivered to the power plant site by bottom-dump trucks; conveyors transport the lignite to the power plant facilities. Currently, there are approximately 110 workers at the Pirkey Power Plant. The plant is anticipated to continue operation until approximately 2045.

Bottom ash produced by the steam generator is sluiced to either of two bottom ash basins on the site; the bottom ash is removed from the power plant property and disposed of in approved, registered landfills. Fly ash and flue gas desulfurization (FGD) material are disposed of in an authorized valley-fill landfill within the plant site. A portion of the fly ash is sold for beneficial reuse and transported off site.

Flue gas exits the power plant through a 525-foot chimney. Nitrogen oxide (NO_X) emissions are controlled by burner design and arrangement and furnace design. Particulate emissions are removed by electric precipitators. Sulfur dioxide (SO_2) is removed from the flue gas stream using a two-stage wet scrubber system and a limestone reagent (finely ground limestone slurried with water). The FGD wet scrubber system contains two separate absorption loops in series within a single tower structure.

2.7.1.3 Martin Lake Mine

The Martin Lake Mine (**Figure 2-12**), a lignite mine owned and operated by Luminant Mining Company, LLC, is located in Rusk and Panola counties. The mine began operation in 1976, with ongoing mining and concurrent reclamation projected. until approximately 2017. Associated disturbance acreages are presented in **Table 2-12**. Annual lignite production (2007) is approximately 7.7 million tons. Permitted water consumption is approximately 1,500 acre-feet per year. Approximately 500 to 600 workers are employed at the mine.



Legend

- Proposed Rusk Permit Area Boundary
- Existing Oak Hill Permit Boundary
- Existing South Hallsville Mine Permit Boundary
- Existing Martin Lake Permit Boundary
- Existing Darco Mine Permit Boundary
- Marshall Lignite Mine
- Other Existing Projects with USACE Authorized 404 Permits
- County Boundary

N

0 2.5 5 Miles

Rusk Permit Area EIS

Figure 2-12

Past, Present, and Reasonably Foreseeable Future Actions

05/12/10

Table 2-12 Disturbance and 404 Permit Compensatory Mitigation Acreages for Past, Present, and Reasonably Foreseeable Future Actions

Action	RCT Permit Boundary (approximate acres)	Authorized Disturbance (approximate acres)	Reasonably Foreseeable Future Action Projected Disturbance (acres)	Waters of the U.S. Disturbance as Subset of Total Disturbance (acres)	Waters of the U.S. Compensatory Mitigation (acres)
Past and Present Lignite Mines					
South Hallsville No. 1 Mine (inclusive of South Marshall Permit Area)	44,400	17,600	--	671.9	1,314.5
Martin Lake Mine	33,308	26,057	--	552.2	964.0
Oak Hill Mine	26,014	18,814	--	403.0	597.0
Darco Mine	6,000	2,926	--	22.1	82.7
Subtotal	**109,722**	**65,397**	**0**	**1,649.2**	**2,958.2**
Reasonably Foreseeable Future Lignite Mining Actions					
Marshall Lignite Mine	--	--	2,300	--	--
Rusk Conveyor	--	--	Minimal	--	--
Subtotal	**0**	**0**	**2,300**	**0**	**0**
Power Plants and Associated Cooling Reservoirs					
Pirkey Power Plant	--	4,588	--	--	--
Martin Lake Power Plant	--	5,770	--	--	--
Subtotal	**0**	**10,358**	**0**	**0**	**0**
Other					
Other 404 Authorizations	--	261	--	261.0	506.0
Total	**109,722**	**76,016**	**2,300**	**1,910.2**	**3,464.2**

Sources: HDR 2010h; RCT 2010; Sabine 2010c; USACE 2010b.

2.7.1.4 Martin Lake Power Plant

The Martin Lake Power Plant (**Figure 2-12**), owned and operated by Luminant Mining Company, LLC, is located in Rusk County. The lignite-fired power plant began operation in 1977 and is anticipated to continue operation well into the future. Associated disturbance acreages are presented in **Table 2-12**. The Martin Creek Lake Reservoir (**Figure 2-12**), located adjacent to the Martin Lake Power Plant, encompasses approximately 5,000 acres (Sabine 2010a). Based on a comparison to other operating power plants, it is assumed for purposes of this analysis that the permitted water consumption is approximately 1,800 acre-feet per year, and the number of workers at the plant is approximately 200.

2.7.1.5 Oak Hill Mine

The Oak Hill Mine (**Figure 2-12**), a lignite mine owned by Luminant Mining Company, LLC, is located in Rusk County. The mine began operation in 1986, with mining and concurrent reclamation ongoing; closure is estimated in approximately 2018. Associated disturbance acreages are presented in **Table 2-12**. The mine produced approximately 3.8 million tons of lignite in 2007. Permitted water consumption is approximately 1,500 acre-feet per year. Approximately 220 workers are employed at the mine.

2.7.1.6 Darco Mine

The Darco Mine (**Figure 2-12**) a lignite mine currently owned by Norit Americas, Inc., began operation in the 1930s in Harrison County. The mine is currently in reclamation with closure anticipated in 2015. Associated disturbance acreages are presented in **Table 2-12**.

2.7.1.7 Other Actions for Which USACE Section 404 Permits Have Been Issued

The USACE has conducted an internal database and records search to identify other past and present actions within the cumulative effects area for the proposed Rusk Permit Area and the associated effects on waters of the U.S., including wetlands. This search identified actions located within the cumulative effects study area external to and within a 15-mile radius of the proposed area of disturbance associated with the Rusk Permit Area (**Figure 2-12**). The USACE has issued a total of 173 Section 404 permits for non-mining-related projects within this area from January 1990 through December 2009. The permits were issued for a variety of projects, including oil and gas exploration and development, pipeline construction, sewer line construction, highway and road construction, railroad maintenance, dam construction for lake development, and miscellaneous other construction projects. Based on available information, these actions have resulted in a total disturbance of approximately 261 acres of waters of the U.S. Of this total, approximately 32 acres were associated with riparian vegetation, approximately 17 acres were associated with wetland and/or riparian vegetation, and approximately 212 acres were associated with wetland vegetation, portions of which are assumed to have been reclaimed. Approximately 506 acres of waters of the U.S., including wetlands, have been required for compensatory mitigation for these authorized impacts.

2.7.2 Reasonably Foreseeable Future Actions

Future actions considered in this analysis include those considered to be reasonably foreseeable, rather than speculative. This categorization is based on the best available information from the agencies and proponents involved or from credible published sources. The CEQ guidelines (CEQ 1997) related to identification of RFFAs state that, “In general, future actions can be excluded from the analysis of cumulative effects if:

- The action is outside the geographic boundaries or timeframes established for the cumulative effects analysis;
- The action will not affect resources that are the subject of the cumulative effects analysis; or
- Including of [sic] the action would be arbitrary.”

Based on this approach, the following actions have been identified as RFFAs to be addressed in the cumulative impact assessment for this EIS.

2.7.2.1 Marshall Lignite Mine

North American Coal has proposed the Marshall Lignite Mine (**Figure 2-12**) that would be located in Harrison County. Construction is estimated to begin in 2011, following Caddo Resources' receipt of all required permits and approvals. Operation is projected to begin in 2013 and continue until approximately 2030. Associated disturbance acreages are presented in **Table 2-12**. This proposed mine would have an annual production of approximately 630,000 tons of lignite. Annual mine water consumption is estimated to be 500 acre-feet per year. The mine would employ approximately 10 workers during construction and approximately 50 workers during operation. The lignite would be trucked to Marshall, Texas, by Norit Americas, Inc. Truck traffic between the proposed mine and the existing activated carbon plant in Marshall is estimated to be approximately 70 round trips per day. The lignite from the Marshall Lignite Mine would replace the existing lignite supply for the activated carbon plant, extending the life of the plant an additional 17 years.

2.7.2.2 Conveyor for Rusk Permit Area

Depending on future economics, an overland conveyor may be constructed between the proposed Rusk Permit Area (if permitted) and the existing truck dump at the South Hallsville No. 1 Mine. The conveyor would be constructed within the transportation/utility corridor currently proposed for the Rusk Permit Area and within the currently authorized South Hallsville No. 1 Mine permit boundary. A conveyor maintenance facility, as well as new coal handling facilities to prepare the run-of-mine lignite for transport by conveyor (including a truck dump and crushing and transfer equipment), also would be constructed in the currently proposed Rusk Permit Area disturbance boundary. It is assumed that any additional new surface disturbance would be minimal.

2.8 Comparative Analysis of Alternatives

Table 2-13 summarizes and compares the projected environmental impacts of the Proposed Action, and the No Action Alternative. Detailed descriptions of projected impacts are presented in Chapter 3.0, Affected Environment and Environmental Consequences. The summarized impacts assume the implementation of the applicant-committed environmental protection measures discussed in Section 2.5.4 but the absence of potential monitoring and mitigation measures currently being considered by the USACE as discussed in the resource-specific sections of Chapter 3.0. Implementation of the monitoring and mitigation measures under consideration potentially would reduce the projected impacts. Impacts are referred to as "short-term" through the life of the mine and reclamation or "long-term" if they persist beyond mine closure and reclamation.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Geology		
Modification of topography in the permit area	Topography would be altered by the removal of overburden and lignite. Effects minimized through regrading to approximate original contour.	Same as the Proposed Action.
Removal of the lignite resources making it unavailable in the future	Approximately 138.2 million total tons of lignite would be extracted.	Lignite extraction will continue until the currently permitted resource has been depleted.
Access to oil and gas resources	Access to oil and gas resources precluded during active mining and reclamation.	Access to oil and gas, sand, and ironstone resources precluded during active mining (through 2027) and reclamation (through 2035).
Water Resources		
Groundwater		
Groundwater level decline in Carrizo-Wilcox aquifer	Maximum extent of projected 5-foot groundwater drawdown area primarily limited to within permit boundary.	Similar to the Proposed Action.
Effects to private wells	Wells within mine pits would be removed. Wells outside of mine pits but within the projected 5-foot groundwater drawdown area would experience reduced water availability; some wells may go dry. Sabine would replace lost water sources or reduced water availability for all owners of impacted water wells within the affected area.	Similar to the Proposed Action.
Groundwater level decline effects to seeps and springs	Groundwater contribution to seep and spring baseflows would be reduced for those features that are not directly disturbed by mining but are located within the projected 5-foot groundwater drawdown area and are hydraulically connected to the Carrizo-Wilcox aquifer. Groundwater levels anticipated to return to pre-mine levels within 7 to 8 years after mining.	Similar to the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Surface Water		
Removal of surface water features	Direct removal of approximately 5.4 acres of perennial streams, 13.5 acres of intermittent streams, 22.1 acres of ephemeral streams, and 48.3 acres of impoundments. Successful implementation of Sabine's proposed Conceptual Mitigation Plan would result in no net loss of surface water features.	Direct removal of streams and impoundments within authorized disturbance area. Implementation of the mine's 404 compensatory mitigation plan would reduce these impacts.
Flow effects from watershed modifications	Increased flows during operations would be attenuated by the sediment control ponds, with minimal flow and sedimentation effects to the Sabine River and its tributaries. Local short-term to long-term increases in runoff resulting in channel migration, bank erosion, and scour following reclamation.	Similar to the Proposed Action.
Surface water quality	No impacts from mine disturbance with implementation of erosion controls, reclamation plan, TPDES permit provisions, and water treatment prior to discharge, if needed. Potential adverse impacts to the Sabine River and/or water bodies on its floodplain if a hazardous materials spill should occur along the transportation corridor, depending on nature of a spill, location, and associated response.	No impacts from authorized mine disturbance with implementation of erosion controls, reclamation plan, TPDES permit provisions, and water treatment prior to discharge, if needed.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action Reflects development of proposed Rusk Permit Area.	No Action Alternative Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Erosion and sedimentation effects	Short-term, temporary increases in suspended sediment concentrations, turbidity, and sediment deposition in the Sabine River during construction of the transportation corridor crossing. Local short-term increases in sediment transport/deposition in the Sabine River and/or water bodies on its floodplain from road runoff along the transportation corridor. Potential increased scouring at bridge piers and floodplain channel installations during high flows with resulting sediment transport/deposition and turbidity and related long-term impacts on channel geometry. No impacts from mine disturbance areas with implementation of erosion controls, reclamation plan, and TPDES permit provisions.	No impacts from mine disturbance areas with implementation of erosion controls, reclamation plan, and TPDES permit provisions.
Waters of the U.S., including Wetlands		
Loss of waters of the U.S., including wetlands	Direct loss of 303.1 acres of waters of the U.S. including 151.2 acres of forested wetlands, 62.6 acres of non-forested wetlands, 22.1 acres of ephemeral streams, 13.5 acres of intermittent streams, 5.4 acres of perennial streams, and 48.3 acres of ponds. Impacts would be mitigated per Sabine's proposed Conceptual Mitigation Plan resulting in no loss of waters of the U.S. and a net increase of 182.5 acres of wetlands.	Direct loss of approximately 671.9 acres of waters of the U.S., including wetlands. Effects will be mitigated per the mine's 404 compensatory mitigation with approximately 1,314.5 acres of reclaimed as streams, open water, and wetlands, a net increase of 642.6 acres.
Soils		
Impacts to soil resources	Direct incremental disturbance of up to 14,392 acres of soil resources, with associated increased erosion, alteration of soil structure, and reduction in soil productivity. Implementation of erosion control measures, soil and suitable growth media salvage, and reclamation plan would minimize the impacts.	Same as the Proposed Action with the following exception. Ongoing direct disturbance of soil resources on approximately 17,600 acres of approved disturbance.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Vegetation		
Impacts to vegetation	Direct incremental removal of up to 14,392 acres of vegetation, resulting in a long-term loss of woody species, and short-term loss of herbaceous species. Impacts would be minimized with implementation of reclamation plan and proposed Conceptual Mitigation Plan. Implementation of Sabine's proposed Conceptual Mitigation Plan would result in the conversion of approximately 182.5 acres of upland vegetation to wetland vegetation.	Same as the Proposed Action with the following exceptions. Ongoing direct incremental removal of vegetation on approximately 17,600 acres of approved disturbance. Implementation of the mine's 404 compensatory mitigation plan will result in the conversion of approximately 642.6 acres of upland vegetation to aquatic, wetland, and riparian vegetation.
Establishment of noxious weeds or invasive plant species	Potential increase in noxious weeds and invasive plant species establishment in disturbed area. Implementation of the reclamation plan, including use of pesticides (inclusive of herbicides), would minimize impacts.	Same as the Proposed Action.
Impacts to vegetation from mine-related water level changes	No impact to upland vegetation within the 5-foot mine-related groundwater drawdown area are anticipated. Wetland vegetation associated with potentially affected seeps and springs may experience a decline until groundwater levels recover (approximately 7 to 8 years after mining).	Same as the Proposed Action.
Potential effects to vegetation from mine water discharge	Minimal flow and sedimentation effects to the Sabine River and its tributaries with associated minimal effect on vegetation.	Similar to the Proposed Action.
Impacts to economically harvestable vegetation and associated use	Short-term loss of harvestable herbaceous vegetation; long-term loss of commercially harvestable trees. Implementation of reclamation in accordance with post-mining land uses would minimize these impacts.	Similar to the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Impacts to special status plants	Potential direct impact to two state-designated rare plant species (Neches River rose-mallow and Texas trillium), if present in proposed disturbance areas. No impact to any other special status plant species or potentially suitable habitat.	No impact to special status plant species or potentially suitable habitat.
Fish and Wildlife		
Loss of aquatic habitat from mining	Direct incremental loss of approximately 48.3 acres of open water habitat (ponds) and 18.9 acres of perennial and intermittent stream habitat. Impacts would be minimized with implementation of reclamation and Sabine's proposed Conceptual Mitigation Plan, resulting in no net loss of aquatic habitat.	Direct incremental loss of stream and pond habitats within the authorized approximately 17,600-acre disturbance area. Impacts will be mitigated with implementation of reclamation and the mine's 404 mitigation requirements.
Direct terrestrial habitat loss or alteration	Direct incremental loss of up to 14,316 acres of terrestrial habitat resulting in a short-term impact to herbaceous species dominated habitats and long-term impact to woody species dominated habitats. Impacts would be minimized with implementation of reclamation and Sabine's Fish and Wildlife Plan. Implementation of Sabine's proposed Conceptual Mitigation Plan would result in the conversion of approximately 182.5 acres of upland habitat to wetland habitat.	Ongoing direct incremental loss of terrestrial habitats within the approximately 17,600-acre authorized disturbance area. Impacts will be minimized with implementation of reclamation. Implementation of the mine's 404 conceptual mitigation will result in the conversion of approximately 642.6 acres of upland habitat to aquatic, wetland, and riparian habitat.
Potential habitat reduction due to mine-related water level changes	No impact to upland habitats within the 5-foot mine-related groundwater drawdown area are anticipated. Wetland habitats and available water associated with potentially affected seeps and springs may experience a decline until groundwater levels recover (approximately 7 to 8 years after mining).	Same as the Proposed Action.
Potential habitat effects from to mine water discharges	Minimal flow and sedimentation effects to the Sabine River and its tributaries with associated minimal effect on associated habitat or water availability.	Similar to the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Disturbance to nesting raptors and other migratory birds	Possible loss of raptors or other migratory birds, nests, or young if clearing operations occur during the breeding season (March through July). Avoidance of rookeries and raptor nests during the breeding season and conduct of clearing operations outside of the breeding season, to the extent possible, would reduce impacts to breeding birds.	Similar to the Proposed Action.
Utility line impacts on raptors and other migratory birds	Transmission line collision potential for raptors and other migratory birds. Sabine's implementation of USDI, USDA (1970) design and construction guidelines for these facilities would minimize collision potential for bird species. No bird electrocution hazard identified for the 138-kV transmission line.	Similar to the Proposed Action.
Impacts to special status wildlife species	Minimal impacts to 2 federally listed species and 1 federal candidate species based on occurrence potential. Low to minimal impacts to 12 state-listed species and 8 species of special concern. Moderate impacts to the state listed bald eagle based on known nest sites within 5 miles of the Risk Permit Area. Moderate to high impacts to 5 mussel species (3 state-listed and 2 species of special concern). Potential types of impacts and measures implemented to reduce or minimize impacts would parallel those described above for general wildlife species.	Potential types of impacts and measures implemented to reduce or minimize impacts parallel those described above for general wildlife species.
Paleontological Resources		
Impacts to unique or high scientific value paleontological resources	No impacts to unique or high scientific value paleontological resources based on the types of fossils associated with the Wilcox Group or Carrizo Formation.	Similar to the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Cultural Resources		
Direct impacts to cultural resources	Direct disturbance to 126 archeological sites and historic resources, including 18 NRHP-eligible or potentially eligible sites in the initial 6,925-acre cultural resource survey area. Surveys would be completed on the remaining 7,467 acres prior to disturbance. NRHP-eligible or potentially eligible sites would be avoided or mitigated as determined by the USACE and THC.	Impacts to NRHP-eligible or potentially eligible sites in authorized disturbance areas will be avoided or mitigated as determined by the USACE and THC.
Potential impacts to previously undiscovered significant sites	Previously unidentified sites could be discovered during construction and operation. Implementation of committed measures to protect a site until it can be evaluated by the THC potentially would minimize impacts.	Similar to the Proposed Action.
Potential indirect impacts to cultural resources	Potential minor indirect impacts to NRHP-eligible sites within and outside the area of potential effect (APE) as a result of runoff or water discharge with implementation of proposed surface water control system and erosion control measures. Potential indirect impacts include illegal collection, inadvertent damage, and vandalism associated with increased access and human presence.	Similar to the Proposed Action.
Air Quality		
Potential exceedence of ambient air quality standards	Concentrations of criteria pollutants would not exceed National Ambient Air Quality Standards (NAAQS).	Same as the Proposed Action.
Greenhouse gas emissions	Potential contribution to manmade global climate effects would be immeasurably small.	Same as the Proposed Action.
Land Use and Recreation		
Compliance with local plans and policies.	No applicable plans or policies.	No applicable plans or policies.
Impacts to public lands	No public lands disturbed except road ROWs.	Same as the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Relocation of utility lines	Utility lines would be relocated in advance of mining.	Utility lines would continue to be relocated in advance of mining.
Loss of forest lands	Direct impacts to forest lands; see vegetation above.	Continued direct impacts to forest lands in authorized disturbance area.
Growth of Tatum	No appreciable restriction in the growth of Tatum.	No restriction in growth of Tatum.
Change in recreation demand or availability	Minimal impact on recreation resources.	Reduced recreation demand due to job-related population decline at completion of mining (2027).
Social and Economic Values		
Population change	No measureable effects to population.	Same as the Proposed Action with the following exception. Potential for job-related population decline at completion of mining (2027).
Employment and income change	Continued direct employment and income for existing workforce for approximately 15 additional years. Temporary (1- to 1.5-year) increase of 150 contract construction workers and related income.	Direct loss of employment and income for most of the approximately 300-person workforce in 2027 and the remainder in 2035; unquantifiable indirect and induced economic losses.
Changes to local public finances	Increased income to Panola and Rusk counties and Tatum Independent School District (ISD).	Diminished revenues to Harrison County and Marshall and Hallsville ISDs in approximately 2027. Effects to ISDs offset by changes in state financial support.
Impacts on public schools	No impacts to public schools.	No impacts to public schools.
Impacts on public services	Minimal change in demand for public services.	Same as the Proposed Action.
Impacts on residences	Incremental displacement of residences in approximately 256 dwellings for the duration of disturbance and reclamation in their areas.	Similar to the Proposed Action.
Decline in property values	Short-term decline in values for properties in close proximity to active mining due to noise and visual impacts; rebound of property values as mining moves further away and successful reclamation is completed.	Same as the Proposed Action.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Transportation		
Road closures and effects to travel distance/time	Short-term incremental closure of local roads (25 CRs and 1 FM road). Short-term rerouting of traffic to SH 149 during closure of FM 782 with incrementally increased travel distance (3 to 7.5 miles) and time (3 to 8 minutes). Affected roads reopened approximately 7 to 10 years following completion of mining in the affected areas.	Currently authorized road closures would occur through mining (2027) and reclamation (2035).
Compliance with Level of Service (LOS) standards	No change in LOS on area roads during construction or operation.	Existing levels of service on area roads would continue through completion of mining (in 2027)
Highway safety	Minor increase in accident risk on FM 2625 and SH 149 during traffic detours; increase would be offset by reduction in number of intersections with FM 2625 and SH 149.	No change in accident risk.
Heavy truck and commuter traffic	Short-term minimal effects on area roadways during construction (i.e., additional light vehicle and truck trips). Duration of heavy truck traffic on area roads for transport of materials would be extended by approximately 15 years.	No change in existing commuter or heavy truck traffic levels through approximately 2027, followed by reduced traffic levels through closure and final reclamation (approximately 2035).
Effects on railroad	Minimal effects to Burlington Northern Santa Fe (BNSF) rail line from 24- to 48-hour closure of railroad during dragline crossing.	No effect on BNSF rail line.
Noise		
Effects to sensitive receptors	A noise level increase of 10 decibels on the A-weighted scale (dBA) over background levels would be experienced by 54 receptors; 45 of these also would experience noise levels above 65 dBA. Duration of highest noise levels would be a few days to a few months at a particular location.	Operations and final reclamation-related noise levels would continue until approximately 2035.

Table 2-13 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Proposed Action	No Action Alternative
	Reflects development of proposed Rusk Permit Area.	Reflects ongoing operation of the South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area).
Visual		
Effects to visual landscape	Existing landscape character would be lost from the time of initial clearing until reclamation has been successfully completed.	Same as the Proposed Action.
Hazardous Materials and Solid Waste		
Hazardous materials transport and usage	No increase in hazardous materials transport or usage; duration of hazardous materials transport would be extended approximately 15 years.	Hazardous materials transport, use, and storage would continue through mining (2027) and reclamation/closure (2035).
Spill of hazardous materials during transport	Small probability of a transportation-related spill during the life of the project and a smaller probability of a spill at the Sabine River crossing; implementation of SPCC Plan and Emergency Response Plan would minimize potential impacts.	Small probability of a spill during continued operations (through 2027); implementation of SPCC Plan will minimize potential impacts.
Generation of hazardous wastes	Hazardous wastes would be used and disposed of in accordance with current regulations.	Same as the Proposed Action.
Public Health		
Impact to health of local population	No adverse health impacts are anticipated due to water quality, air quality, noise, or lighting effects.	Same as the Proposed Action.
Environmental Justice		
Potential disproportionate effects to low income or minority populations	No disproportionate effects to low income or minority populations.	Same as the Proposed Action.