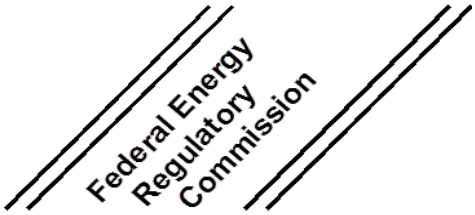

Office of Energy Projects

September 2019

Southern Star Central Gas Pipeline, Inc. **Docket No. CP19-31-000**

Lines DT and DS Replacement Project

Environmental Assessment

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply, Refer To:
OEP/DG2E/Gas 3
Southern Star Central Gas Pipeline, Inc.
Lines DT and DS Replacement Project
Docket No. CP19-31-000

TO THE INTERESTED PARTY:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Lines DT and DS Replacement Project (Project), proposed by Southern Star Central Gas Pipeline, Inc. (Southern Star) in the above-referenced docket. The Project consists of the abandonment of two pipelines and construction of one larger diameter pipeline to replace the pipelines being abandoned in Anderson and Franklin Counties, Kansas.

The EA assesses the potential environmental effects of abandoning, constructing, and operating the Project in accordance with the requirements of the National Environmental Policy Act. The FERC staff concludes that approval of the Project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment.

Southern Star proposes to construct 31.5 miles of new 36-inch-diameter pipeline, designated as Line DPA, and three small-diameter (i.e., 2 to 4 inches) pipeline laterals, totaling about 5.9 miles. The new pipelines would replace Southern Star's existing Lines DS and DT. Line DS is a 31.4-mile-long, 20-inch-diameter pipeline of which 29.4 miles would be removed and 2 miles would be abandoned in place. Line DT is a 31.8-mile-long, 26-inch-diameter pipeline, of which 29 miles would be removed and 2.8 miles would be abandoned in place. Southern Star would also modify two existing compressor stations (Ottawa Compressor Station [CS] and Welda CS), five existing tie-ins, and associated auxiliary and appurtenant facilities. Lastly, Southern Star would construct one new regulator/measuring station (Richmond Regulator Station), two new launchers and receivers, three new mainline valves (MLVs), and four new tie-ins along the new pipeline laterals.

The Commission mailed a copy of the *Notice of Availability* of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners; other interested individuals and groups; and newspapers and libraries in the Project area. The EA is only available in electronic format. It may be viewed and downloaded from the FERC's website (www.ferc.gov), on the Environmental Documents page (https://www.ferc.gov/industries/gas/enviro/eis.asp), under the "EAs" tab. In addition, the EA can be accessed by using the eLibrary link on the FERC's website. Click on the eLibrary link (https://www.ferc.gov/docs-filing/elibrary.asp), click on General Search (https://elibrary.ferc.gov/idmws/search/fercgensearch.asp), and enter the docket number in the "Docket Number" field, excluding the last three digits (i.e. CP19-31). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659.

Any person wishing to comment on the EA may do so. Your comments should focus on the EA's disclosure and discussion of potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they would be. To ensure that the Commission has the opportunity to consider your comments prior to making its decision on this Project, it is important that we receive your comments in Washington, DC on or before 5:00pm Eastern Time on **October 9, 2019.**

For your convenience, there are three methods you can use to file your comments to the Commission. The Commission encourages electronic filing of comments and has staff available to assist you at (866) 208-3676 or FercOnlineSupport@ferc.gov. Please carefully follow these instructions so that your comments are properly recorded.

(1) You can file your comments electronically using the eComment feature on the Commission's website (www.ferc.gov) under the link to Documents and Filings. This is an easy method for submitting brief, text-only comments on a project;

(2) You can also file your comments electronically using the eFiling feature on the Commission's website (www.ferc.gov) under the link to Documents and Filings. With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "eRegister." You must select the type of filing you are making. If you are filing a comment on a particular project, please select "Comment on a Filing"; or

(3) You can file a paper copy of your comments by mailing them to the following address. Be sure to reference the project docket number (CP19-31-000) with your submission: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Room 1A, Washington, DC 20426

Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (18 CFR 385.214). Motions to intervene are more fully described at http://www.ferc.gov/resources/guides/how-to/intervene.asp. Only intervenors have the right to seek rehearing or judicial review of the Commission's decision. The Commission may grant affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website (www.ferc.gov) using the eLibrary link. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

Kimberly D. Bose
Secretary

LINES DT AND DS REPLACEMENT PROJECT
ENVIRONMENTAL ASSESSMENT

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TECHNICAL ABBREVIATIONS AND ACRONYMS

APE	area of potential effect
ATWS	additional temporary workspace
BMPs	best management practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
CS	Compressor Station
dB	decibels
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
EA	environmental assessment
EI	environmental inspector
EFA	ecological focus area
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
fbs	feet below the ground surface
FERC	Federal Energy Regulatory Commission
g	gravity
GHG	greenhouse gases
HAPs	hazardous air pollutants
HCA	high consequence area
HDD	horizontal directional drill
HDD Plan	Plan for Containment of Inadvertent Release of Drilling Mud During Horizontal Directional Drilled Waterbody Crossings
hp	horsepower
IR	inadvertent return of fluids to the ground surface
KDHE	Kansas Department of Health and Environment
KDWPT	Kansas Department of Wildlife, Parks and Tourism
KGS	Kansas Geological Survey
L_{dn}	day-night sound level
L_{eq}	24-hour equivalent sound level
MLV	mainline valve
MOU	Memorandum of Understanding
MP	milepost
NAAs	nonattainment areas
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969 (as amended)
NGA	Natural Gas Act
NOI	*Notice of Intent to Prepare an Environmental Assessment for the Proposed Lines DT and DS Replacement Project and Request for Comments on Environmental Issues*

TECHNICAL ABBREVIATIONS AND ACRONYMS (continued)

NO_2	nitrous dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conversation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NWI	National Wetlands Inventory
O_3	ozone
OEP	Office of Energy Projects
Ottawa CS	Ottawa Compressor Station
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PHMSA	Pipeline and Hazardous Materials Safety Administration
PGA	peak ground acceleration
Plan	FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
Procedures	FERC's *Wetland and Waterbody Construction and Mitigation Procedures*
Project	DT and DS Replacement Project
psig	pounds per square inch gauge
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
Southern Star	Southern Star Central Gas Pipeline Inc.
SPCC	Spill Prevention, Containment, and Countermeasures
tpy	tons per year
USACE	United States Army Corps. of Engineers
FWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound
Welda CS	Welda Compressor Station

SECTION A – PROPOSED ACTION

1.0 Introduction

The staff of the Federal Energy Regulatory Commission (Commission or FERC) prepared this environmental assessment (EA) to assess the environmental impacts of the proposed Lines DT and DS Replacement Project (Project). On December 21, 2018, Southern Star Central Gas Pipeline, Inc. (Southern Star); pursuant to sections 7(b) and 7(c) of the Natural Gas Act, in FERC Docket No. CP19-31-000, filed an application seeking authorization to abandon, construct, and operation certain interstate natural gas transmission facilities.

We[1] prepared this EA in compliance with the requirements of the National Environmental Policy Act (NEPA) (Title 40 of the Code of Federal Regulations, Parts 1500-1508 [40 CFR 1500-1508]) and the Commission's implementing regulations under 18 CFR 380.

The assessment of environmental impacts is an integral part of the Commission's decision making process to determine whether to authorize Southern Star's proposal. Our principal purposes in preparing this EA are to:

- identify and assess potential impacts on the natural and human environment that could result from implementation of the proposed action;
- identify and recommend reasonable alternatives and specific mitigation measures, as necessary, to avoid or minimize project-related environmental impacts;
- identify and recommend mitigation measures, as necessary, to minimize environmental impacts; and
- facilitate public involvement in the environmental review process.

2.0 Purpose and Need

Lines DT and DS were installed in 1952 and 1946, respectively. According to Southern Star, repairs due to corrosion have become more frequent on these lines. Therefore, to maintain the integrity and safety of its pipeline network, and improve the reliability of service, Southern Star proposes to abandon the existing Lines DT and DS and replace them with new Line DPA.

Section 7(b) of the NGA specifies that no natural gas company shall abandon any portion of its facilities subject to the Commission's jurisdiction without the Commission

[1] "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

first finding that the abandonment will not negatively affect the present or future public convenience and necessity.

3.0 Public Review and Comment

On February 8, 2019, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed Lines DT and DS Replacement Project and Request for Comments on Environmental Issues* (NOI). The NOI was sent to affected landowners; federal, state, and local government agencies; elected officials; environmental and public interest groups; Native American tribes; other interested parties; and local libraries and newspapers. The NOI established a 30-day scoping period and requested comments on specific concerns about the Project or issues that should be considered during the preparation of the EA. The scoping period ended on March 11, 2019.

In response to the NOI, the Commission received a comment letter from the Kansas Department of Wildlife, Parks and Tourism (KDWPT) regarding impacts on state-listed wildlife species and designated critical habitats as well as impacts on state-managed lands. This comment is addressed in sections B.2 and B.3.

4.0 Proposed Facilities

The proposed facilities are summarized in table 1 which shows the Project Component, County, Milepost (MP) Location, and the Description. Figure 1 shows the overview general location of the Project facilities. All of these facilities would be located within Anderson and Franklin Counties, Kansas.

Table 1 Summary of Project Facilities

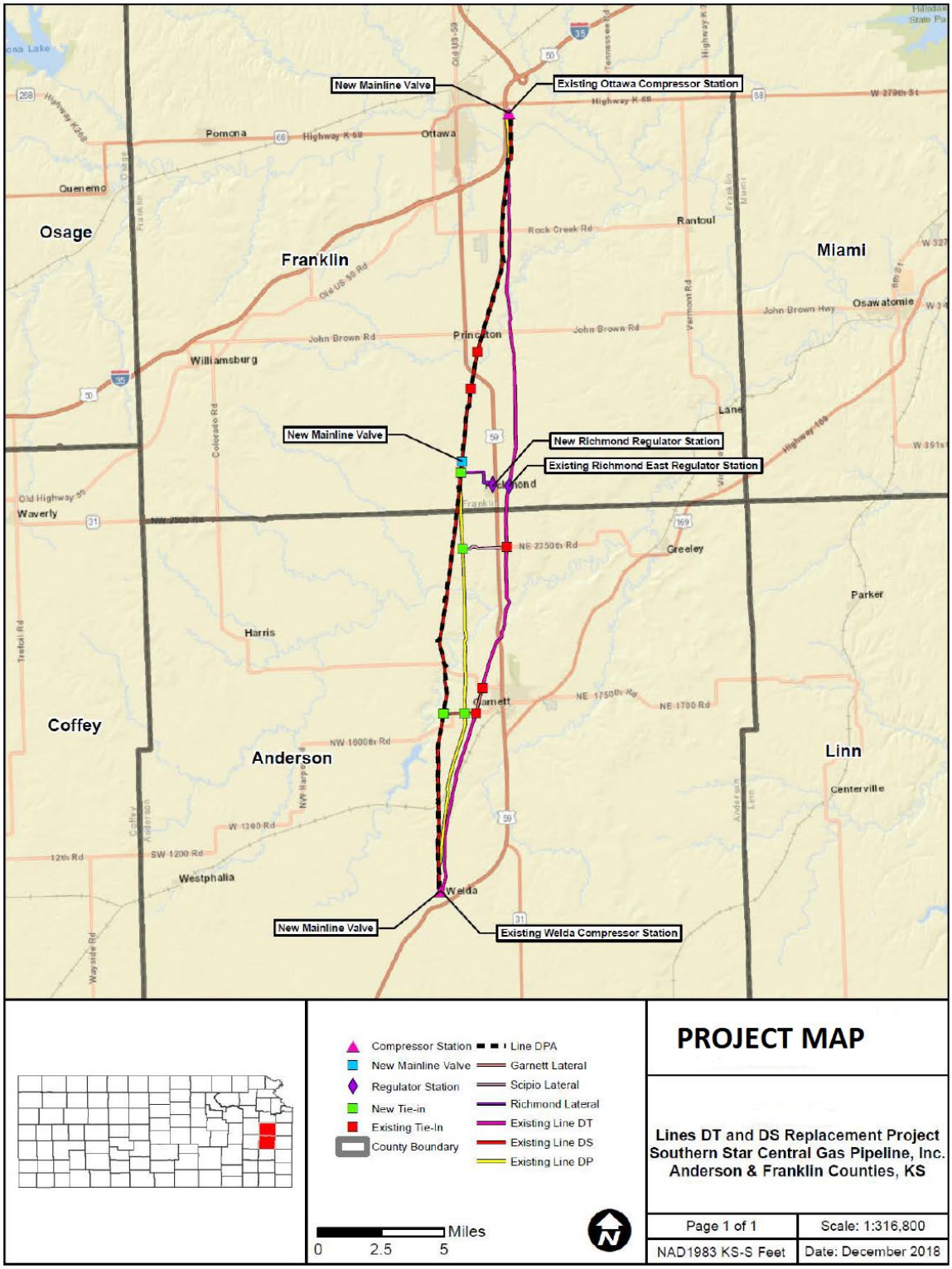
Project Component	County	Milepost Location	Description
Pipeline Facilities			
Line DPA	Anderson	0.00 – 15.34	Install 31.5 miles of new 36-inch-diameter natural gas pipeline primarily paralleling the existing Line DS, where feasible.
	Franklin	15.34 – 31.50	
Garnett Lateral	Anderson	0.00 – 2.35	Install 1.3 miles of new 4-inch-diameter natural gas pipeline and 1.0 miles of new 3-inch-diameter natural gas pipeline.
Scipio Lateral	Anderson	0.00 – 1.81	Install 1.8 miles of new 2-inch-diameter natural gas pipeline.
Richmond Lateral	Franklin	0.00 – 1.78	Install 1.8 miles of new 2-inch-diameter natural gas pipeline.
Line DS Abandonment	Anderson	0.00 – 15.19 [a]	Abandon a total of 31.4 miles of existing 20-inch-diameter natural gas pipeline, of which 29.3 miles would be removed and 2.0 miles would be abandoned in place.
	Franklin	15.19 – 31.36 [a]	

Table 1 Summary of Project Facilities			
Project Component	**County**	**Milepost Location**	**Description**
Line DT Abandonment	Anderson	0.00 – 15.90 [b]	Abandon a total of 31.8 miles of existing 26-inch-diameter natural gas pipeline, of which 29 miles would be removed and 2.8 miles would be abandoned in place.
	Franklin	15.90 – 31.79 [b]	
Aboveground Facilities			
Line DPA			
Welda Compressor Station (Welda CS) [c]	Anderson	0.00	Install new piping and auxiliary facilities to connect the new Line DPA and abandon and remove existing piping and auxiliary facilities associated with Lines DS and DT.
Ottawa Compressor Station (Ottawa CS)[c]	Franklin	31.50	Install new filtration and regulation for Line DPA and modify the existing compressor station to connect Line DPA. Abandon and remove existing piping and auxiliary facilities associated with Lines DS and DT.
Panhandle Tie-in [c]	Franklin	20.34	Disconnect the existing Lateral DS-001 from Line DS and connect it to the new Line DPA. Install gravel, fencing, and a new permanent access road.
Princeton Tie-in [c]	Franklin	21.81	Disconnect the existing Lateral DS-002 from Line DS and connect it to the new Line DPA. Install permanent gravel and fencing.
Launcher and Receiver [c]	Anderson	0.00	Install new launcher/receiver facilities for Line DPA, including a new launcher at the existing Welda CS and a new receiver at the existing Ottawa CS.
	Franklin	31.50	
Mainline Valves	Anderson	0.00 [c]	Install three new mainline valves along Line DPA, including one at the existing Welda CS, one at a new site, and one at the existing Ottawa CS.
	Franklin	17.37; 31.50 [c]	
Existing Auxiliary Facilities [c]	Anderson	Various [d]	Connect existing auxiliary facilities associated with the existing Line DS, including valves, farm taps, meters and regulators, and other minor appurtenances, to the new Line DPA.
	Franklin		
Garnett Lateral			
New Tie-ins	Anderson	0.00; 0.85 [e]	Install two new tie-ins connecting the new pipeline lateral to Line DPA (located at Line DPA MP 6.98) and the existing Line DP (located at Line DP MP 7.16).
Existing Tie-ins [c]	Anderson	1.30; 2.35	Disconnect the existing Lateral DT-005 and the existing Lateral DT-010 from Line DT and connect them to the new Garnett Lateral.
Scipio Lateral			

Table 1 Summary of Project Facilities			
Project Component	**County**	**Milepost Location**	**Description**
New Tie-in	Anderson	0.00 [e]	Install a new tie-in connecting the new pipeline lateral to the existing Line DP (located at Line DP MP 13.71).
Scipio Sales Tie-in [c]	Anderson	1.81	Disconnect the existing Lateral DT-004 from Line DT and connect it to the new Scipio Lateral. Install gravel, fencing, and a new permanent access road.
Richmond Lateral			
New Tie-in	Franklin	0.01 [e]	Install a new tie-in connecting the new pipeline lateral to Line DPA (located near Line DPA MP 16.92) and the existing Line DP (located at Line DP MP 16.75).
New Richmond Regulator Station	Franklin	1.78	Install a new regulator/measuring station at the terminus of the new Richmond Lateral.
Line DT Abandonment			
Existing Richmond East Regulator Station [c]	Franklin	16.92 [b]	Abandon and remove the existing regulator/measuring station connected to Line DT.
Existing Auxiliary Facilities [b, c]	Anderson	10.36 [f]	Abandon and remove existing auxiliary facilities, including valves, farm taps, meters and regulators, and other minor appurtenances, at various locations along the existing Line DT route.
	Franklin	19.21; 22.92; 22.93; 27.03; 29.03 [f]	

[a] Milepost is associated with Southern Star's existing Line DS.
[b] Milepost is associated with Southern Star's existing Line DT.
[c] Project activities would occur at existing aboveground facilities.
[d] Existing auxiliary facilities occur at multiple locations within the existing Line DS permanent right-of-way.
[e] Tie-ins with the existing Line DP would occur at sites which would be constructed in 2019 under Southern Star's blanket certificate as part of the Line DP Hydrostatic Pressure Test Project, while the connection with the new pipeline lateral is proposed as part of the Lines DT and DS Replacement Project.
[f] Existing auxiliary facilities occur at multiple locations within the existing Line DT permanent right-of-way. Mileposts are provided for only those auxiliary facilities which are located outside of Southern Star's proposed or existing permanent right-of-ways.

Figure 1 General Location of the Project Facilities



Approximately 81 percent (30.4 miles) of the new pipelines would be co-located with existing Southern Star right-of-way or would parallel existing utility corridors.

Areas where Southern Star was unable to co-locate the pipelines with existing rights-of-way or parallel existing corridors were primarily due to constructability issues (e.g. crossings of streams, wetlands, or congested areas) or efforts to minimize impacts on residential developments or cultural resources. Approximately 92 percent (58.3 miles) of the existing Lines DT and DS would be abandoned by removal, while the remaining existing pipeline segments (totaling 4.8 miles) would be abandoned in place. Appendix 1 identifies the segments of existing Lines DT and DS that are proposed for abandonment in place to avoid or minimize impacts on wetlands, waterbodies, and public road crossings.

5.0 Land Requirements

Table 2 provides a summary of land requirements for the Project. The new Line DPA would require a typical construction right-of-way of 110 feet in uplands and 85 feet through wetlands. In general, the construction right-of-way would be split into a 65-foot working side and 45-foot spoil side (45 feet and 40 feet in wetlands). Southern Star has determined that a 110-foot-wide construction right-of-way is required for Line DPA to sufficiently accommodate installation of the 36-inch-diameter pipeline while maintaining adequate separation from Southern Star's existing Lines DP, DS, and DT, which would remain in-service during construction of Line DPA. Furthermore, a 110-foot-wide construction right-of-way provides adequate spoil storage for installation of the new Line DPA and for removal of the existing Lines DT and DS (in co-located areas). In addition, a 66-foot-wide construction right-of-way would be required for the new pipeline laterals and would be split into a 33-foot working side and 33-foot spoil side.

Table 2 Summary of Land Requirements

Facility	Land Affected During Construction (acres) [a]	Land Affected During Operation (acres) [b]
Pipeline Facilities		
Line DPA		
Right-of-way	412.3	251.9
Additional Temporary Workspace	20.2	0.0
Contractor/Pipe Yards	300.0	0.0
Access Roads	4.5	0.0
Cathodic Protection	0.06	0.06
Garnett Lateral		
Right-of-way	18.9	18.8
Additional Temporary Workspace	0.3	0.0
Scipio Lateral		
Right-of-way	14.6	14.6
Additional Temporary Workspace	0.2	0.0
Richmond Lateral		
Right-of-way	14.1	14.1

Table 2 Summary of Land Requirements		
Facility	**Land Affected During Construction (acres) [a]**	**Land Affected During Operation (acres) [b]**
Line DT Abandonment		
Right-of-way	223.9	0.0
Additional Temporary Workspace (ATWS)	0.8	0.0
Access Roads	13.8	0.0
Line DS Abandonment		
Right-of-way	22.9	0.00
Pipeline Facilities Subtotal	***1,046.6***	***299.5***
Aboveground Facilities		
Line DPA		
Welda Compressor Station	17.8	0.00
Ottawa Compressor Station	13.6	0.00
Launcher/Receiver	0.00 [c]	0.00 [c]
Panhandle Tie-in	0.9	0.01
Princeton Tie-in	0.4	0.01
Mainline Valve	0.06	0.06
Existing Auxiliary Facilities	0.00 [d]	0.00 [d]
Access Roads	0.5	0.5
Garnett Lateral		
New Tie-in (MP 0.00)	0.10	0.01
New Tie-in (MP 0.85)	0.00 [e]	0.00 [e]
Existing Tie-ins	0.6	0.00
Access Roads	0.01	0.01
Scipio Lateral		
New Tie-in (MP 0.00)	0.00 [e]	0.00 [e]
Scipio Sales Tie-in	0.1	0.01
Access Roads	0.01	0.01
Richmond Lateral		
New Tie-in (MP 0.01)	0.00 [e]	0.00 [e]
New Richmond Regulator Station	0.2	0.2
Line DT Abandonment		
Existing Richmond East Regulator Station	0.00 [f]	0.00 [f]
Existing Auxiliary Facilities	0.08	0.00
Access Roads	0.5	0.00
Aboveground Facilities Subtotal	***34.9***	***0.9***
Project Total	**1,081.5**	**300.4**

Table 2 Summary of Land Requirements		
Facility	**Land Affected During Construction (acres) [a]**	**Land Affected During Operation (acres) [b]**
[a] Land affected during construction is inclusive of operation impacts (permanent). [b] The term "operation" refers to impacts associated with permanent right-of-way areas along the new pipelines, and new permanent impacts at aboveground facilities and permanent access roads. These are considered long-term impacts as they would last the life of the Project. [c] Workspace associated with installation of the launcher and receiver is captured within the Welda CS and Ottawa CS impacts. [d] Workspace associated with the existing auxiliary facilities is captured within the Line DPA right-of-way, ATWS, and access road impacts. [e] Workspace associated with the three tie-ins with the existing Line DP are included in the construction right-of-way and ATWS for the new laterals in which they are located. There would be no new operational impacts associated with these three tie-ins, as the permanent sites would be constructed in 2019 under Southern Star's blanket certificate. [f] Workspace associated with the existing Richmond East Regulator Station is captured within the Line DT right-of-way and ATWS impacts.		

In order to minimize the Project footprint, Southern Star proposes to overlap temporary workspace for the new Line DPA with its existing Lines DT, DS, and/or DP easements to the extent feasible, while providing a safe distance (e.g., approximately 25 feet) of separation between the proposed Line DPA and existing pipelines.

Following construction, a 66-foot-wide permanent easement generally centered on Line DPA and the new pipeline laterals would be retained along the pipeline routes; however, much of the permanent easement associated with Line DPA would overlap up to 41 feet with Southern Star's existing pipeline rights-of-way. The proposed permanent right-of-way width of 66 feet along the new pipelines is necessary to accommodate right-of-way spacing requirements, future maintenance work, and to protect the pipelines from ground disturbing work that may occur in proximity to the pipelines in the future. Areas disturbed by abandonment of Lines DT and DS that are not part of the 66-foot-wide permanent easements for the new Line DPA or new pipeline laterals would be allowed to revegetate and contours would be restored to pre-construction conditions following the completion of construction activities. With the exception of those areas which overlap with the proposed permanent rights-of-way for the new Line DPA and pipeline laterals, easement agreements associated with Line DT would be released to the owners of record upon completion of the Line DT abandonment/removal activities. In areas of overlap with Line DPA and the pipeline laterals, easement agreements for the Line DT would remain in place for operation of the new pipelines. Easement agreements associated with Line DS would remain in place. Upon completion of the proposed pipeline abandonment activities. Southern Star would no longer perform operational maintenance/clearing activities within the Lines DT and DS permanent easement, with the exception of the areas that overlap with the proposed right-of-way for the new line DPA and pipeline laterals.

Additional Temporary Workspaces

Southern Star would use additional temporary work spaces (ATWS) outside of its construction rights-of-way where site-specific conditions warrant the use of specialized construction procedures. Where necessary to allow for the safe operation and staging of equipment and materials for installation of the pipelines, ATWS would be required for road, wetland, waterbody, and utility line crossings; horizontal directional drills (HDD); and areas where topsoil segregation is required.

As indicated in table 2, ATWS needed for the Project would total 21.5 acres. ATWS would be restored to pre-existing conditions following construction activities.

Contractor/Pipe Yards

The contractor would require off right-of-way areas for the storage of pipe and equipment necessary for the construction of the Project facilities. A total of 11 temporary contractor/pipe yards would be used in the vicinity of the Project. These contractor/pipe yards would be located at various points along the length of the Project at locations with convenient and safe access to the Project area.

A total of 300 acres of land would be temporarily affected by the contractor/pipe yards during construction of the Project. All areas used for contractor/pipe yards throughout the Project will be restored to pre-construction conditions upon Project completion unless otherwise agreed upon with the landowner and submitted to FERC for review and approval.

Table 3 identifies the name, MP, proposed use, and current land use of the contractor/pipe yards to be used for the Project.

Table 3 Summary of Contractor/Pipe Yards for the Project

Milepost	Name	County	Use	Current Land Use
Line DPA				
0.00	Yard 01	Anderson	Access / Pipe and equipment storage / Welda CS modifications	Agricultural, Open Land, Industrial
8.37	Yard 02	Anderson	Access / Pipe and equipment storage	Agricultural, Forest
9.94	Yard 03	Anderson	Access / Pipe and equipment storage / Contractor parking	Agricultural
13.82	Yard 04	Anderson	Access / Pipe and equipment storage	Agricultural
20.73	Yard 05	Franklin	Access / Pipe and equipment storage	Agricultural, Open Land
23.37	Yard 06	Franklin	Access / Pipe and equipment storage	Agricultural, Industrial

Table 3 Summary of Contractor/Pipe Yards for the Project				
Milepost	**Name**	**County**	**Use**	**Current Land Use**
25.76	Yard 07	Franklin	Access / Pipe and equipment storage	Agricultural
25.76 [a]	Yard 08	Franklin	Access / Pipe and equipment storage / Contractor parking	Agricultural
28.58	Yard 09	Franklin	Access / Pipe and equipment storage	Agricultural
28.58 [a]	Yard 10	Franklin	Access / Pipe and equipment storage	Agricultural
31.50 [a]	Yard 11	Franklin	Access / Pipe and equipment storage / Ottawa CS modifications	Open Land, Industrial
[a] Contractor/pipe yard is located offline from Line DPA; therefore, the MP provided is associated with the nearest temporary workspace or ATWS for Line DPA.				

Compressor Stations

The total workspace required for construction at the Welda CS and Ottawa CS is 17.8 acres and 13.6 acres, respectively, with no new permanent impacts. The majority of construction activities at the compressor stations would occur within the existing facility fence lines or associated access roads and entirely within land owned by Southern Star. Upon completion of construction, land within the existing facility fence lines not covered by rock or facility foundations would be maintained in an herbaceous state.

6.0 Construction Schedule and Workforce

The sequence of construction consists of mobilization and construction of the new Line DPA to commence in early 2020 in order to meet a November 2020 in-service date. Southern Star proposes to begin construction of the three new pipeline laterals, new Richmond Regulator Station, and all tie-ins in February 2021 and plans to place these facilities in-service by May 2021. Construction kick-off for the laterals has been scheduled to avoid the harsher winter weather conditions anticipated. By delaying the lateral work, Southern Star can optimize construction due to required stopple and bypass technique during the high demand winter months. After completion of the above work, Southern Star proposes to begin pipeline abandonment activities for the existing Lines DT and DS, including in place abandonment and pipe removal. Existing Lines DP, DT, and DS would remain in-service during installation of Line DPA and new pipeline laterals. Line DP is not proposed for abandonment and would continue to remain in service. Modifications at the existing Welda CS and Ottawa CS would begin in April 2021 and be completed by October 2021.

Southern Star considered and evaluated the potential for lift and lay construction techniques to replace the existing pipelines in lieu of constructing the proposed Line DPA

and abandonment of Lines DT and DS. However, it was concluded that lift and lay to replace either of the existing pipelines is not feasible, as it would result in an unacceptable temporary loss of service for existing customers during construction. As a safety precaution, however, Line DS would operate at a reduced pressure of 150 psig throughout the majority of Line DPA construction activities. Similarly, once in service, Line DPA may be operated at a reduced pressure to allow for Line DS to be safety abandoned and removed.

Construction activities would generally occur 6 days per week for an average of 8 to 10 hours per day. Certain construction activities may require extended work hours such as tie-ins, hydrostatic testing, HDD activities, and operation of pumps at waterbody crossings. During peak construction, the maximum number of workers would total approximately 325 workers. Outside of peak construction, Project construction is anticipated to require an average of approximately 200 workers. Approximately 75 percent of the workers are anticipated to be non-local and would temporarily relocate to the Project area during construction.

7.0 Construction, Operation, and Maintenance Procedures

The proposed facilities would be designed, constructed, tested, operated, and maintained to conform with or exceed federal, state, and local requirements, including the Department of Transportation's (DOT) Minimum Safety Standards in 49 CFR 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards," and 18 CFR 380.15, "Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing, and Maintenance of Rights-of-Way and the Construction of Aboveground Facilities."

Construction Procedures

The Project would be constructed using a combination of conventional and specialized construction procedures. Typical overland construction techniques would be used for installation of Line DPA and the new pipeline laterals. Construction of each pipeline typically begins with the marking or staking of the construction work area. Once marking is completed, it is followed by these activities: clearing, fencing, grading, trenching, pipe laying, stringing, bending, welding, coating, lowering-in, backfilling, hydrostatic testing, and cleanup and restoration. In addition to conventional construction techniques, specialized techniques would be used in sensitive resource areas including waterbody crossings, wetland crossings, agricultural areas, road and railroad crossings, and utility crossings. Southern Star would also perform a total of three HDDs to avoid direct impacts on waterbodies.

To avoid and minimize the impacts of abandoning and constructing the Project facilities, Southern Star has developed numerous plans. Southern Star has developed a Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) and Plan for

Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Waterbody Crossing (HDD Plan) to protect sensitive resources from inadvertent releases during construction activities. Southern Star has committed to constructing the Project is accordance with FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and the FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures). However, there are places where the topography, right-of-way, existing infrastructure, and/or natural conditions make it impractical to implement some of the measures specified in these documents. In these specific cases, Southern Star is requesting site-specific deviations to the FERC Plan and Procedures. Southern Star is requesting site-specific exceptions to section VI.A.3 of the FERC Procedures for using a construction right-of-way of 85 feet in wetlands to accommodate the installation of the pipeline. Locations where these alternative measures are being proposed and Southern Star's site-specific justifications are summarized in section B3.2. For this EA, we refer to the Plan and Procedures with incorporation of Southern Star's requested modifications, as "Southern Star's Procedures" and "Southern Star's Plan".

Landowner notification, surveying, and staking of the temporary workspaces and access roads associated with the proposed abandonment of Lines DT and DS and associated auxiliary facilities would be conducted. Prior to removal or abandoning in place, the existing Lines DT and DS would be cleaned with a pig tool to remove any residual materials. Containment would be placed under the door of the pig receiver to capture the foreign material, and any collected materials would be disposed of at an approved facility.

Specific construction procedures would vary by site; however, activities associated with pipeline abandonment by removal would generally include excavating the trench over the existing pipeline, cutting the existing pipe into segments, lifting the pipe out of the trench, and transporting the pipe to an authorized facility in accordance with applicable federal and state regulations. Following pipe removal, the excavated trench would be backfilled with the previously excavated native material, pre-construction contours would be restored, and disturbed areas, except annual cropland, would be seeded with a perennial seed mix. Should additional backfill material be required to achieve pre-construction contours, Southern Star would obtain suitable clean fill material from offsite sources and would temporarily store this material within the proposed contractor/pipe yards and/or proposed temporary workspaces for the pipeline abandonments. In areas where topsoil segregation is required, the native topsoil would be spread over top of the imported subsoil.

Segments of the existing Lines DT and DS, which would not be removed, would be abandoned in place by cutting and capping the pipe with weld caps or a steel plate. In addition, all existing aboveground appurtenances located along Lines DT and DS would be relocated to Line DPA or abandoned and removed. Existing customers disconnected

from service as a result of the proposed abandonments of Lines DT and DS would be compensated to allow continued service via alternative energy sources, such as propane or electric, and in accordance with existing service agreements.

All removed piping and other materials would be stored or disposed of by the contractor at authorized facilities in accordance with all federal, state, and local regulations, with the exception of various appurtenant facilities that would be reinstalled along the proposed Line DPA.

Typical construction activities associated with installation of the aboveground facilities would consist of the following. New permanent sites associated with the mainline valves (MLVs), tie-ins, regulator/measuring station, and other auxiliary facilities would be cleared, graded, and soils would be leveled and compacted for placement of building foundations. Aboveground and below ground piping would be installed and hydrostatically tested prior to placing it in-service. Additionally, safety and control devices would be installed and tested prior to operation.

Following installation of the aboveground facilities, the permanent sites would be covered with gravel, asphalt or concrete, as appropriate, and fenced for operation and maintenance of the facilities. Once construction is complete, all disturbed areas not covered with gravel or asphalt would be graded, restored, and reseeded.

Operation and Maintenance

All proposed facilities would be operated and maintained in compliance with DOT Minimum Federal Safety Standards (49 CFR 192) pursuant to the provisions of the Natural Gas Pipeline Safety act of 1968, as amended, and in a manner consistent with industry standards.

Maintenance of pipeline facilities would include periodic visual inspections as well as pedestrian surveys in accordance with the applicable regulatory requirements and Southern Star's Operation requirements. In accordance with DOT requirements, periodic leak inspections and cathodic protection maintenance would be conducted. Post-construction monitoring would be conducted to identify erosion or washout areas, damaged or non-functional permanent erosion control devices, and to evaluate restoration of affected wetlands.

Maintenance of the permanent pipeline right-of-way would include periodic mowing as necessary, in accordance with Southern Star's Procedures to allow for visual inspections. Actively cultivated areas would be allowed to revert to pre-construction use for the full width of the right-of-way. In all other upland areas, a 66-foot-wide permanent pipeline right-of-way would be maintained in a primarily herbaceous state in accordance

with Southern Star's procedures. In wetlands, a 10-foot corridor centered over the pipeline would be maintained.

For aboveground facilities, there would be no new permanent employees required to operate and maintain the Project facilities since these would be monitored remotely by Southern Star Gas Control. Personnel would perform routine checks of the aboveground facilities, including calibration of equipment and instrumentation, inspection of critical components and scheduled routine maintenance of equipment and grounds. Operational testing would be performed on safety equipment to ensure proper function. Corrective actions would be taken as necessary if issues are identified.

Environmental Compliance Inspection and Monitoring

The contractor and Southern Star personnel responsible for various steps of construction would be required to comply with the FERC Certificate conditions, all mitigation measures identified in Southern Star's Application, and any other conditions of federal and state permits and authorizations. At least four environmental inspectors (EIs) would be designated for the Project. The EIs performing environmental oversight would serve to monitor the implementation of all environmental requirements during construction. The EIs' responsibility is to ensure that Projects' construction is in compliance with all environmental conditions contained with the FERC Order and all other authorizations and permits. The EIs would have the authority to enforce permit conditions and considerations and comments from FERC. FERC staff would also conduct routine inspections during construction to determine compliance with any conditions of the FERC certificate.

8.0 Permit Approvals and Regulatory Consultations

Table 4 summarizes the permits, approvals, and consultation applicable to the Project. Southern Star would be required to obtain all necessary permits regardless if they appear in the table or not.

Table 4 Federal and State Permits and Approvals

Agency or Organization	Permit/Approval	Status
Federal		
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity	Filed December 21, 2018 Pending
U.S. Fish and Wildlife Service – Kansas Ecological Services Field Office	*Endangered Species Act*, Section 7 Consultation; *Migratory Bird Treaty Act* Consultation	Concurrence received March 6, 2019 and July 11, 2019

Table 4 Federal and State Permits and Approvals		
Agency or Organization	**Permit/Approval**	**Status**
U.S. Army Corps of Engineers – Kansas City District (USACE)	*Clean Water Act*, Section 404 Nationwide Permit 12	Nationwide permit authorization received March 26, 2019 Applicable Nationwide Permit 12 conditions, including general and regional conditions; No special conditions identified
State		
Kansas Department of Health and Environment	Section 401 Water Quality Certification	Automatic with USACE Nationwide Permit 12 Authorization General conditions of the Kansas Section 401 Water Quality Certification for nationwide permits
	Hydrostatic Test Water Discharge Permit	To be submitted 4th Quarter 2019 Pending
	Project Water Quality Protection Plan	Concurrence received June 10, 2019
Kansas Department of Wildlife, Parks, and Tourism	State Threatened and Endangered Species Consultation	Concurrence received May 5, 2019
	Action Permit for potential impact on threatened and endangered species or their critical habitats	Received May 5, 2019
Kansas Department of Agriculture, Division of Water Resources	Temporary Permit for Water Appropriation	To be submitted 4th Quarter 2019 Pending
	General Permit for Stream Obstruction, Floodplain Fill, and Levee	To be submitted 4th Quarter 2019 Pending
Kansas State Historic Preservation Office	*National Historic Preservation Act*, Section 106 Consultation	Concurrence received January 22, 2019 No impacts on the existing compressor building within the Welda CS would occur
Local		
Franklin County Planning Department	Floodplain Development Permit	To be submitted 4th Quarter 2019 Pending
Anderson County Planning & Zoning Department	Floodplain Development Permit	To be submitted 4th Quarter 2019 Pending

9.0 Non-jurisdictional Facilities

Non-jurisdictional facilities are those facilities related to the Project that are constructed, owned, and operated by other entities that are not subject to FERC jurisdiction. Non-jurisdictional facilities necessary to operate the Project are anticipated to include electric power for the new Richmond Regulator Station. An existing power line is located across North Street and southwest of the proposed Richmond Regulator Station site. In order to power the new regulator station, the local electricity provider would install a new power pole within the southwest corner of the permanent site proposed for the Richmond Regulator Station and would extend the existing power line approximately 70 feet northwest across North Street to the new power pole. The local electricity provider would utilize a boom lift that is attached to a truck to perform the power line extension, and the truck would operate from the existing public road. The utility company would utilize a portion of Southern Star's proposed workspace associated with the Richmond Regulator Station for installation of the new power pole at the facility. No additional workspace beyond that proposed for the Project or outside of the existing public road would be required for the power line work planned for the new Richmond Regulator Station.

The new power pole, which would be installed within the permanent workspace proposed for the Richmond Regulator Station, would be located within agricultural land, and no sensitive environmental features, including wetlands, waterbodies, and cultural resources, would be affected by installation of the new power pole.

SECTION B – ENVIRONMENTAL ANALYSIS

Constructing, abandoning, and operating the proposed facilities would have temporary, short-term, long-term, and permanent impacts on the environment. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting between two to five years. Long-term impacts would eventually recover, but require more than five years. Permanent impacts are defined as lasting throughout the life of the Project. Our analysis also addresses direct and indirect effects collectively by resource.

The analysis contained in this EA is based upon Southern Star's application and supplemental filings and our experience with the construction and operation of natural gas infrastructure. However, if the Project is approved and proceeds to the construction phase, it is not uncommon for a project proponent to require minor modifications (e.g., minor changes in workspace configurations). These changes are often identified by a company once on-the-ground implementation work is initiated. Any Project modifications would be subject to review and approval from FERC's Director of the Office of Energy Projects (Director of OEP) and any other permitting/authorizing agencies with federal or federally delegated jurisdiction.

1.0 Geology

Project-related activities would occur in eastern Kansas in the Osage Plains section of the Central Lowland physiographic province (U.S. Geological Survey [USGS], 2018a). The Osage Plains section is characterized by a series of broad escarpments that generally extend northeast to southwest and separate level to gently rolling plains (U.S. Forest Service, 1996). The topography across the Project area is generally flat with low and gently sloping hills. Elevations ranges from approximately 860 feet to 1,115 feet above mean sea level. The primary lithology of the Project vicinity is sandstone, shale, and limestone (USGS, 2018b).

1.1 Mineral and Paleontological Resources

Kansas's primary non-fuel mineral resources are cement, helium, salt, sand and gravel, and crushed stone (USGS, 2019a). Three quarries and one gravel pit were identified within 0.25 mile of Project workspace, the closest two of which are both 0.13 mile away (U.S. Energy Information Administration, 2018; USGS, 2011, 2016a, 2003a). Due to the distance from the Project area, impacts on quarries, mines, or mine spoil areas are not anticipated to occur as a result of abandonment, construction, or operation of the Project facilities.

A search of Kansas Geological Survey (KGS) information identified 585 oil and gas wells within 0.25 mile of the Project. Of these wells, 156 would be within 250 feet of the Project workspace, including 28 within the proposed workspace (refer to table 5).

Table 5 Oil and Gas Wells within the Project Workspace			
Milepost/Facility	**Distance (feet) and Direction from Pipeline/Lateral**	**Type**	**Status**
Line DPA			
Welda CS	N/A	Saltwater Disposal	Authorized Injection Well
Welda CS	N/A	Oil and Gas	Recompleted
Welda CS	N/A	Gas-Injection	Authorized Injection Well
0.38	13 W	Oil	Approved Intent to Drill
0.40	34 W	Oil	Plugged and Abandoned
0.52	14 W	Oil	Plugged and Abandoned
0.54	30 W	Oil	Approved Intent to Drill
0.54	30 W	Oil	Approved Intent to Drill
0.54	30 W	Oil	Approved Intent to Drill
0.66	40 W	Oil	Plugged and Abandoned
0.67	62 E	Enhanced Oil Recovery	Plugged and Abandoned
0.72	47 W	Injection	Plugged and Abandoned
1.72	5 W	Oil	Plugged and Abandoned
2.64	61 W	Oil	Plugged and Abandoned
2.73	20 E	Oil	Plugged and Abandoned
2.81	25 E	Oil	Plugged and Abandoned
4.85	1 W	Oil	Producing
4.95	11 W	Oil	Producing
5.03	25 W	Oil	Producing
5.10	13 W	Oil	Producing
5.18	25 E	Oil	Producing
Garnett Lateral			
1.96	14 E	Injection	Plugged and Abandoned
Line DT Abandonment			
0.67	31 E	Oil	Approved Intent to Drill
0.69	20 E	Oil and Gas	Converted to Enhanced Oil Recovery Well
0.69	20 E	Enhanced Oil Recovery	Plugged and Abandoned
0.71	28 W	Oil	Plugged and Abandoned
DT-TAR-04	N/A	Injection	Plugged and Abandoned
19.79	2 W	Dry and Abandoned	Plugged and Abandoned
Source: KGS, 2018a			

The locations of oil and gas wells within the Project workspace would be field-verified through civil surveys prior to the start of construction. Give the high density of oil and gas extraction in the Project vicinity, and because field surveys are not yet complete, **we recommend that:**

- Prior to construction, Southern Star should file with the Secretary of the Commission (Secretary), for review and written approval by the Director of OEP, field verified locations of active oil and gas wells within 100 feet Project workspaces and site-specific measures to protect these wells from damage**.**

If a previously unidentified oil or gas well is encountered during construction, Southern Star would determine an appropriate buffer and construction procedure around the well based on site-specific conditions and coordinate with the well owner. Additionally, Southern Star would implement measures during construction to reduce the likelihood of impacts, such as flagging wells and flow lines and reducing the construction workspace, as necessary, to keep a safe buffer from the well. As reported above in table 5, there are four oil wells pending construction ("Approved Intent to Drill") within the proposed construction workspace for Line DPA between MP 0.38 and 0.54. However, at these locations, Line DPA would parallel the existing Lines DP and DS. Reported locations for these pending wells are within the permanent easements for these existing utility lines. Given the presence of existing utility easements at the proposed well locations, the construction and operation of Line DPA would not significantly affect pending well installations. Further, the Project would not affect future oil and gas exploration or production, as the use of unconventional (directional) drilling techniques would allow for oil and gas wells to be drilled outside of the pipeline right-of-way.

The North Welda field, a depleted reservoir owned by Southern Star and used for natural gas storage, is crossed by Line DPA from MP 0.00 to MP 3.21, Line DT from MP 0.00 to MP 3.27, Line DS from MP 0.00 to MP 4.12, and the Welda CS . The shallowest top of the North Welda field is more than 700 feet below ground; therefore, the Project would not impact or be affected by the North Welda field or other underground natural gas storage reservoirs.

Marine fossils (bivalves, corals, and trilobites) and primitive plant, amphibian, and early reptile fossils are common in the eastern portion of Kansas, including Anderson and Franklin Counties; however, the State of Kansas does not have any fossils for which it has designated protection (The Paleontology Portal, 2018; Suchy, 2018). In the event that paleontological resources are discovered during construction of the Project, Southern Star would temporarily cease excavation in the area and would notify the relevant local and state agencies as well as FERC, so that all finds may be properly documented. Therefore, no significant impacts on fossil resources are anticipated as a result of the Project.

1.2 Geologic Hazards

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. Such hazards include earthquakes, surface faulting, and soil liquefaction; landslides, flooding, and karst terrain; or ground subsidence hazards.

These hazards, as well as the feasibility of utilizing HDD, based on hydrogeologic conditions present in the Project area are discussed below.

The shaking during an earthquake can be expressed in terms of the acceleration as a percent of gravity (g), and seismic risk can be quantified by the motions experienced at ground surface or by structures during a given earthquake expressed in terms of g. USGS National Seismic Hazard Probability Mapping shows that for the Project area, within a 50-year period, there is a 2 percent probability of an earthquake with an effective peak ground acceleration (PGA) of 4 to 6 percent g; and a 10 percent probability of an earthquake with an effective PGA of 1 to 3 percent g being exceeded (USGS, 2014). For reference, PGA of 10 percent g (0.1g) is generally considered the minimum threshold for damage to older structures or structures not constructed to resist earthquakes.

According to the KGS (2018a), there are 172 injection wells associated with oil and gas production located within 1 mile of the Project area, 97 of which are considered active. Seismicity induced by an injection well may occur within approximately 10 miles from the source well point (Peterie et al., 2018). However, no known earthquakes, including from induced seismicity, have occurred in Anderson or Franklin counties since at least 1867 (KGS, 2018b; USGS, 2019b).

The Project is in an area with low seismicity, including potentially induced seismicity, therefore we conclude the Project is not likely to be adversely affected by future seismic incidents, or soil liquefaction.

USGS landslide incidence and susceptibility mapping indicates that the Project facilities would be in areas of low landslide incidence (USGS, 1982). This is reflective of the generally flat or gently sloping topography in the Project area. As such, the potential for landslides to occur during construction or operation of the Project is low.

Ground subsidence, involving the localized or regional lowering of the ground surface, may be caused by karst formation due to limestone or gypsum bedrock dissolution; sediment compaction due to groundwater pumping and/or oil and gas extraction, and underground mining. Oil and gas extraction occurs in the Project vicinity; however, there have been no reported subsidence hazards as a result of these activities. Subsurface mines do not occur in the Project area and Project areas do not overlie unconsolidated aquifers susceptible to subsidence from excessive pumping.

Based on consultation with the KGS, the Project area does not overlie any known karst features. The potential for karst formation in this area is very low because the limestone formations are relatively thin and are encased in shale above and below. Consequently, there is little potential for groundwater to move through the limestone in adequate volumes to cause significant dissolution (Suchy, 2019). Therefore, we conclude that the Project is not likely to be significantly affected by ground subsidence.

The Project could be affected by flooding due to its proximity to streams, rivers, and other nearby waterbodies and because portions of the Project would be within the 100-year floodplain (A or AE Zone) as determined by the Federal Emergency Management Agency. A and AE Zones are subject to inundation by the 1 percent chance of an annual flood event. No aboveground facilities or permanent access roads associated with the Project are located within a 100-year floodplain.

Portions of the Line DPA, the Scipio Lateral, the existing Lines DT and DS, Yard 2, and several temporary access roads would be within the 100-year floodplain; however, impacts associated with the pipeline in the floodplain would not result in a discernable loss of flood storage capacity. Similarly, the use of the temporary access roads and contractor/pipe yards would not affect floodplains. Flooding could affect the new pipelines by increasing buoyancy, causing the pipe to rise toward the land surface where it may become exposed. Southern Star would design the pipelines to minimize potential impacts from flooding, including measures such as concrete coating or weights, where necessary. Therefore, we conclude that the Project would not significantly impact or be affected by flood hazards. In addition, Southern Star would obtain all necessary permits and/or approvals for construction within the floodplain, and the proposed facilities would meet or exceed federal, state, and local standards.

Southern Star has proposed the use of the HDD construction method to cross three waterbodies: Cedar Creek, Pottawatomie Creek, and the Marais des Cygnes River. During HDD operations, bentonite-based drilling mud is pumped under pressure through the inside of the drill pipe and flows back (returns) to the drill entry point along annular space between the outside of the drill pipe and the drilled hole. Because the drilling mud is pressurized, it can be lost, resulting in an inadvertent return of fluids to the ground surface (IR), if the drill path encounters porous material and/or fractures or fissures in the bedrock. Chances for an IR to occur are greatest near the drill entry and exit points where the drill path has the least amount of ground cover. It is also possible for HDD operations to fail, primarily due to encountering unexpected geologic conditions such as coarse materials or if the pipe were to become lodged in the hole during pullback operations.

Southern Star drilled three geotechnical borings along the proposed alignments for the Cedar Creek and Marais des Cygnes River HDD crossings, and two geotechnical borings along the proposed alignment for the Pottawatomie Creek crossing to depths of approximately 150 feet below the ground surface (fbs). Geotechnical investigations revealed subsurface geology comprised of soil underlain by lean to fat clay to depths of approximately 11 to 30 fbs. Surficial material was underlain by shale, interbedded with generally thin (less than 20 feet thick) layers of limestone. Rock quality for bedrock at each crossing (based on rock quality designations) was found to generally be fair to excellent; evidence of voids or cavities within limestone layers were not identified. Proposed HDD alignments would maintain approximately 60 to 75 feet of cover beneath the Cedar Creek, Marais des Cygnes River, and Pottawatomie Creek and are anticipated

to primarily be installed within shale layers. Based on the above assessment, we conclude that HDDs are a feasible construction method in the Project vicinity.

While use of the HDD method would significantly minimize potential impacts on the proposed crossings of waterbodies and wetlands, HDDs could result in an unanticipated release of drilling fluids into a waterbody or wetland during drilling. In the event of an IR, Southern Star would implement measures outlined in its HDD Plan. Southern Star's HDD Plan would ensure that drill operations are monitored and adjusted to avoid potential IRs, and if one should occur, the release would be contained to the extent practicable and remediated. We have reviewed Southern Star's HDD Plan and find it acceptable.

Based on the above assessment, we conclude that the impact from geologic hazards on the Project facilities during construction and/or operation would be minimal and the Project would not have significant impacts on geologic resources.

2.0 Soils

Project area soils consist predominantly of well drained silt loams and silty clay loams with slopes less than 8 percent. Approximately 38 percent of the soils that would be disturbed are underlain by shallow bedrock (bedrock 60 inches or less from the ground surface). The introduction of stones or rocks to surface soil layers may reduce soil moisture-holding capacity, resulting in a reduction of soil productivity. If bedrock is encountered during construction, Southern Star would use rock pickers or other rock removal equipment to remove large rock fragments during restoration. To minimize the introduction of stones or rocks to surface soil layers, Southern Star's Procedures require that the size, density, and distribution of rock on the construction work area in agricultural lands be similar to adjacent areas undisturbed by construction and require that excess rock be removed from at least the top 12 inches of soil in agricultural areas or in compliance with landowner agreements.

Project area soils are generally not highly compaction prone, but exhibit high potential for rutting. Southern Star would minimize rutting and compaction by using timber mats, geo-textile fabric, or equivalent in saturated soils. Other methods, such as using low ground pressure equipment, may also be used as conditions dictate. During restoration in agricultural lands, disturbed areas would be tested for soil compaction. Any areas exhibiting compaction compared to adjacent undisturbed soils would be subjected to primary tillage such as sub-soiling, chisel plowing, or disking.

The majority of soils have moderate to high revegetation potential and are not highly susceptible to erosion by wind or water; however, clearing, grading, and equipment movement can accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands. To minimize or avoid potential impacts due to soil erosion, Southern Star would implement controls in accordance with Southern Star's Plan and Procedures. Temporary erosion controls,

including interceptor diversions and sediment filter devices, such as silt fences, would be installed immediately following land disturbing activities. Southern Star would inspect these devices on a regular basis and after each rainfall event of 0.5 inch or greater to ensure proper function. Temporary erosion control devices would be maintained until the Project area is successfully revegetated. Southern Star would also utilize dust-control measures, including routine wetting of the construction workspace as necessary where soils are exposed.

Revegetation would be completed in accordance with Southern Star's Plan and Procedures; Project-specific recommendations provided via consultations with the local NRCS field offices and the KDWPT; the Project's Revegetation Plan; and landowner preferences.

The United States Department of Agriculture defines prime farmland as land that has the best combination of physical and chemical characteristics for growing food, feed, forage, fiber, and oilseed crops. Unique farmland is land, other than prime farmland, that is used for production of specific high-value food and fiber crops. Soils that do not meet all of the requirements to be considered prime or unique farmland may be considered farmland of statewide or local importance if soils are capable of producing a high yield of crops when treated or managed according to accepted farming methods. Project construction would disturb approximately 958.7 acres of soils classified as prime farmland or farmland of statewide or local importance. During construction activities, Southern Star would minimize impacts on soils in agricultural and residential areas in accordance with the Southern Star's Plan. The topsoil layer would be stripped and segregated to a maximum depth of 12 inches from all cultivated or rotated croplands and pastures, hayfields, and other areas at the landowner's or land managing agency's request. With the exception of areas in which aboveground facilities and permanent access roads are installed, all agricultural land affected by the Project would be restored to its original use, including the permanent pipeline right-of-way. Project activities would permanently convert 0.9 acre of prime farmland to industrial use. However, this impact is negligible when compared to the total acreage of prime farmland in Anderson County (approximately 234,076 acres) and Franklin County (approximately 238,515 acres) (NRCS, 2018).

Given Southern Star's proposed construction and impact minimization measures and that it would return disturbed areas to pre-construction conditions, maintain the right-of-way in an herbaceous state, or stabilize aboveground facilities with gravel cover, permanent impacts due to soil erosion or poor revegetation potential are not anticipated.

Inadvertent Spills or Discovery of Contaminants

As a result of the historical use of lubricating oil that contained polychlorinated biphenyls (PCBs), compressed air systems at the Ottawa and Welda compressor stations were previously contaminated with PCBs. Both sites have undergone remediation activities for PCB-contaminated infrastructure (drain lines, concrete, and/or used oil storage areas); and for PCB and polycyclic aromatic hydrocarbon (PAH) soil impacts. Response actions to remove and remediate PCB and PAH contamination at the Welda and Ottawa compressor stations were performed in accordance with the Toxic Substance Control Act of 1976 as well as a Consent Order developed for each facility in coordination with the U.S. Environmental Protection Agency (EPA). The EPA formally acknowledged completion of the required response actions via termination of the Consent Orders for the Welda and Ottawa compressor stations in letters dated February 25, 2000 and August 25, 2003, respectively.

Per the EPA Consent Order termination letters for the Ottawa and Welda compressor stations, cleanup activities were performed in accordance with EPA directive, and the sites were returned to conditions deemed acceptable by the EPA. Concentrations of PCBs and PAHs remain in soils within the remediated areas; however, no engineering or institutional controls are in place at either compressor station. All Project activities at the existing Ottawa and Welda compressor stations would be in areas which are regularly disturbed for ongoing maintenance and operations and no disturbance of the remediated areas is proposed.

A review of the EPA NEPAssist online database as well as the Kansas Department of Health and Environment's (KDHE) online databases was conducted to identify recent or historic areas of contamination within 0.5 mile of the Project facilities (EPA, 2018a; KDHE, 2018a, 2018b, 2018c). Based on this review, seven sites were identified; however, remediation activities are only ongoing at one of these sites, a leaking underground storage tank 0.27 mile from Yard 1. Due to the distance from the Project area, this leaking underground storage tank is not anticipated to impact or be affected by the Project. Additionally, 21 spills were identified within 0.50 mile of the Project, all of which have been fully remediated. In the event that contaminated soils or other environmental media are identified during construction, Southern Star would implement its Plan for the Unanticipated Discovery of Contaminated Environmental Media which specifies measures to avoid the spread of contamination, characterize the contamination, and notify appropriate agencies.

During construction, contamination from accidental spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely impact soils. To minimize impacts, Southern Star would implement measures contained in its SPCC Plan which specifies cleanup procedures in the event of inadvertent spills during Project construction. We have reviewed this plan and find it to be acceptable.

3.0 Water Resources

3.1 Surface Water

Existing Surface Water Resources

The Project would require 103 waterbody crossings of 93 waterbodies. The streams affected include 6 perennial, 13 intermittent, and 70 ephemeral waterbodies. In addition, the Project would cross four waterbodies classified as manmade ponds. Furthermore, the Project would cross, 84 minor (less than 10 feet wide), 13 intermediate (10 to 100 feet wide), and 2 major waterbodies (greater than 100 feet). Additional information for each waterbody crossing, including name, water quality classification, flow regime, crossing width, and crossing method is provided in appendix 3.

Line DPA would require 47 open cut crossings and 6 waterbodies would be crossed via 3 HDDs. The abandonment of Lines DS and DT would require the crossing of numerous waterbodies via timber mat bridges. DS and DT pipeline segments located below 40 waterbodies would be abandoned in-place; however, these waterbodies could still be affected by the placement and use of timber mat bridges. Additionally, 9 waterbodies are located in the Project workspaces but would not be crossed by the pipeline centerlines. These waterbodies would also be crossed via timber mat bridges. Lastly one waterbody would be crossed via an existing culvert and timber mat.

Sensitive Surface Waterbody Crossings

The Project would cross four waterbodies listed on the Kansas Department of Health and Environment's 2018 303(d) List of All Impaired & Potentially Impaired Waters. The Marais Des Cygnes River is listed as impaired due to *Escherichia coli* (E. coli) and Cedar Creek and Pottawatomie Creek are listed as impaired due to E. coli, biology, and dissolved oxygen. All three of these waterbodies would be crossed via HDD, thereby reducing potential impacts on these waterbodies and minimizing the potential for further impairment.

The fourth impaired stream the Project would cross is Middle Creek. Middle Creek and is listed for atrazine (KDHE, 2018a). This stream is currently not meeting its designated uses but no total maximum daily load (TMDL) has been established for this waterbody. This waterbody would be crossed via open cut for the installation of Line DPA. Southern Star would implement erosion and sediment control devices and other best management practices (BMP) and would complete the crossing in accordance with Southern Star's Procedures. Southern Star would also install trench breakers after the installation is complete to restrict water flow between the trench and waterbody if water is present at the time of the excavation. If contaminated sediments are encountered, Southern Star would implement measures in its project specific *Plan for the*

Unanticipated Discovery of Contaminated Media. Southern Star would abandon Lines DT and DS in place at the Middle Creek crossings.

However, despite the minimization measures proposed by Southern Star above, the open cut waterbody crossing method of Middle Creek may disturb and suspend contaminated sediments if present at the crossing location. Based on this information, **we recommend that:**

- **<u>Prior to construction</u>, Southern Star should file with the Secretary, for review and written approval by the Director of OEP:**

  a. results of testing that shows that atrazine levels within the sediments at the Middle Creek crossing location are within the acceptable range; or

  b. a revised crossing plan for Middle Creek that includes the use of a trenchless crossing method (i.e. conventional bore or HDD).

The Project would not cross any additional waterbodies identified as having contaminated sediments (EPA, 2018a; 2018c, KDHE, 2018b; 2018c). The Project would also not cross any surface waterbodies listed as National Wild or Scenic Rivers or as Section 10 Navigable Waters (National Wild and Scenic Rivers System, 2018; United States Army Corps. of Engineers (USACE 2018).

The Project would cross segments of Pottawatomie Creek in Anderson County and the Maris des Cygnes River in Franklin County that have been designated as Special Aquatic Life Support Use waters by the KDHE. Southern Start would perform these crossings via HDD. The Project would also have 17 crossings of unnamed tributaries of the Marais Des Cygnes River, including 10 for the construction of Line DPA. Eight of these crossings would be open cut and two would be installed via HDD. The remaining seven would be completed via timber mat bridges as they are associated with access along the existing Lines DT and DS rights-of-way and for construction activities at the Ottawa CS. The Project would also include nine crossings of unnamed tributaries of Pottawatomie Creek. These include one open-cut crossing, one HDD crossing, and one timber mat crossing associated with the Line DPA installation as well as one open-cut crossing associated with the Scipio Lateral. The remaining five crossings would be via timber mat as they are associated with access of the existing Line DT right-of-way. The tributaries of the Marais Des Cygnes River and Pottawatomie Creek are not listed on the Kansas Surface Water Register and do not have a designated use. However, undesignated unnamed tributaries are assigned the water quality criteria and designated use of the receiving stream by the KDHE.

Surface Water Intakes and Source Water Protection Areas

One public surface water intake was identified within three miles of the Project area. This intake is located on Cedar Creek and is 0.16 mile west of Line DPA at MP 7.5. The intake is operated by the City of Garnett and is upstream from the Project area, so it would not be affected by construction No source water protection area (SWPA) is associated with the City of Garnett intake. However, four SWPAs are crossed by the Project. These SWPAs are listed in table 6.

Table 6 Source Water Protection Areas Crossed by the Project

Source Water Protection Area Zone	Project Facility[a]	Milepost Location	Distance and Direction of SWPA From Project (miles)	Distance & Direction of Public Water Supply Surface Water Intake(s) from Project (miles) [b]
City of La Cygne				
Zone B	Line DPA	5.49 – 10.67	0.00 [c]	IU
		11.72 – 12.77		
		20.82 – 23.38		
		24.36 – 24.78		
		29.89 – 30.97		
	Garnett Lateral	0.00 – 0.24		
	Line DT	11.44 – 12.62		
		22.73 – 25.45		
		29.96 – 31.14		
	Line DS	5.53 – 10.56		
		11.56 – 12.62		
		20.62 – 23.17		
		24.13 – 24.55		
		29.58 – 30.67		
	Line DT	3.66 – 5.70	0.58 E	
		19.12 – 19.82	0.97 E	
Zone C	All Project Facilities	N/A	0.00 [c]	
City of Osawatomie				
Zone B	Line DPA	24.36 – 24.78	0.00 [c]	IU
		29.89 – 30.97		
	Line DT	22.73 – 25.45		
		29.96 – 31.14		
	Line DS	24.13 – 24.55		
		29.58 – 30.67		

Table 6 Source Water Protection Areas Crossed by the Project				
Zone C	Line DPA	16.86 – 31.50		
	Richmond Lateral	0.00 – 1.78		
	Line DT	16.12 – 16.62		
		16.87 – 17.08		
		17.31 – 17.39		
		17.52 - 31.79		
	Line DS	16.67 – 31.36		
City of Richmond [d]				
Zone A	Line DT	16.22	0.88 E	0.89 E
Zone B		16.24	0.65 E	
Zone C		16.07 – 16.12	0.00 [c]	
Franklin County Rural Water District 6				
Zone B	Line DPA	24.36 – 24.78	0.00 [c]	9.2 E [e]
		29.89 – 30.97		
	Line DT	22.73 – 25.45		9.0 E [e]
		29.96 – 31.14		
	Line DS	24.13 – 24.55		9.2 E [e]
		29.58 – 30.67		
Zone C	Line DPA	16.86 – 31.50		9.2 E [e]
	Richmond Lateral	0.00 – 1.78		14.2 NE [e]
	Line DT	16.12 – 16.62		9.0 E [e]
		16.87 – 17.08		
		17.31 – 17.39		
		17.52 - 31.79		
	Line DS	16.67 – 31.36		9.2 E [e]

Sources: Huard, 2018; Madden, 2018; Titus, 2018; Wade, 2018; Zwiener, 2018
IU – information unavailable
N/A - not applicable

[a] Due to the proximity of the Project aboveground facilities, contractor/pipe yards, and access roads to the Project pipelines and laterals, the Project aboveground facilities, contractor/pipe yards, and access roads are not specifically identified in this table.

[b] Distance is measured from the nearest workspace associated with the corresponding Project facility.

[c] SWPA occurs within the Project workspace.

[d] The surface water intake associated with the City of Richmond public water supply is abandoned and inactive.

[e] Location of surface water intake is based on a general description provided by the SWPA operator.

Southern Star received confirmation from the City of Oswatomie SWPA and the City of La Cygne SWPA on January 7 and April 16, 2019, respectively, that no additional BMPs other than those listed in the Procedures would be required for crossing the

SWPAs. In addition, these operators did not request advanced notification for these crossings. Southern Star also attempted to contact the City of Richmond SWPA operator, however, it has not received any response. If additional BMPs or measures are received by the City of Richmond, Southern Star would implement all requested measures and notification procedures. Should Southern Star not implement a requested measures they would notify FERC. In correspondence with Southern Star, the Franklin County Rural Water District #6 requested advanced notification prior to construction in the SWPA but did not specify any BMPs to be implemented during construction.

Water Usage

Southern Star would utilize municipal water and surface water resources for drilling fluid, fugitive dust control, and to hydrostatically test the pipeline. Southern Star would use a maximum of 10,000 gallons of water per day for dust suppression. Southern Star would only apply water for dust control as necessary and would do so in accordance with its *Fugitive Dust Control Plan.* In total, Southern Star would use approximately 8.8 million gallons of water for hydrostatic testing, 1.6 million gallons for HDD activities, and 2.4 million gallons for fugitive dust control. Of the water used for hydrostatic testing and HDD activities approximately 1.3 million gallons would be withdrawn from waterbodies and approximately 9.0 million would be acquired from municipal sources. Table 7 presents the withdraw locations, sources, and estimated quantities of water proposed to be withdrawn from waterbodies.

Table 7 Summary of Water Withdrawals from Non-municipal Sources for Hydrostatic Testing and HDD Fluid

Pipeline Test Section / HDD / Facility	Begin Milepost	End Milepost	Length (feet)	Water Source	Water Withdrawal Location (milepost)	Approximate Hydrostatic Testing Water Volume (gallons)	Water Discharge Location (milepost)	Water Discharge Rate (gpm)
Horizontal Directional Drills Hydrostatic Testing								
Cedar Creek HDD	8.16	8.56	2,100	Cedar Creek	8.35	104,910	8.56	2,000
Flint Hills HDD	30.26	30.67	2,148	Marais des Cygnes River	30.44	107,441	30.26	2,000
Horizontal Directional Drilling Fluid								
Cedar Creek HDD	8.16	8.56	2,100	Cedar Creek	8.35	556,412	Offsite Facility	N/A
Flint Hills HDD	30.26	30.67	2,148	Marais des Cygnes River	30.44	568,765	Offsite Facility	N/A
Total						**1,337,528**		

N/A – not applicable

Impacts and Mitigation

Southern Star would conduct stream crossings during low-flow periods when possible and limit the time it would take to complete the crossings. The clearing of vegetative cover could increase streambank erosion. In addition heavy equipment could compact soil near the stream banks and may cause additional erosion and transportation of sediment in storm water. Pipeline construction could also result in temporary impacts on water quality resulting from increased turbidity and sedimentation. This may lead to reduced dissolved oxygen levels as well as changes to the chemical and physical characteristics of the water column.

To reduce impacts on surface waterbodies, Southern Star would install and use timber mat bridges and/or equipment bridges. Southern Star would install silt fence and/or filter socks around any spoil piles near waterbodies and across the entire right-of-way. Southern Star would also implement the BMPs in Southern Star's Procedures. These include limiting in-stream work to 24 hours for minor waterbody crossings and 48 hours for intermediate waterbody crossings. If these timing restrictions cannot be met, Southern Star would utilize a dry ditch technique such as fluming or dam and pump with prior approval of all relevant permitting agencies. In addition, Southern Star's adherence to measures within its SPCC Plan, including locating hazardous material storage and equipment refueling activities at least 100 feet from waterbodies, would reduce the potential for hazardous materials to enter waterbodies.

Where waterbodies are crossed via HDD, impacts would generally be avoided; however, if an IR occurs within a waterbody, the resulting turbidity would temporarily affect water quality. In addition, Southern Star would also implement the measures in its HDD Plan which addresses measures for prevention, detection, and mitigation for IRs.

All waterbodies crossed by the Project were identified by the KDWPT as warm water fisheries. According to consultations with the KDWPT and the Kansas Department of Agriculture, it was determined that none of the streams, excluding those considered designated critical habitat for state-listed species, would require any timing restriction to conduct in-stream activities. However, three waterbodies contain designated habitat for state listed species including the hornyhead chub, northern map turtle, mucket mussle, rock pocketbook mussel, and sharp horsnail as further discussed below. These waterbodies are Cedar Creek, Pottawatomie Creek, and Marais des Cygnes River. All three of these waterbodies would be crossed via HDD.

As discussed above, Southern Star would withdrawal water from Cedar Creek and Marais des Cygnes River for hydrostatic testing of the pipeline and for HDD fluid. Southern Star would implement best management practices during the water withdrawal including using floats and mesh screens on intake hoses and pumps to avoid the entrapment of aquatic species. Southern Star received an Action Permit for the Project

from the KDPWT on May 3, 2019. This permit states that HDD would be used at these waterbodies and that, except for the clearing required for drilling safety, no clearing of the riparian vegetation would occur. Southern Star would hand clear one to two paths, not to exceed five-feet-wide, to allow placement and surveying of electric guide wire coil on the ground surface between the entry and exit points of each HDD. In addition the permit states that mechanical disturbance of the river banks would be avoided. Lastly, the permit states that no activity, including water withdrawal, would occur between May 1 and July 1 in Cedar Creek. Southern Star agrees with these requirements.

During final restoration, Southern Star would seed stream banks and riparian areas in accordance with Southern Star's Procedures. In addition all stream banks and stream beds would be restored to pre-construction contours to the maximum extent possible.

Implementation of Southern Star's Procedures would minimize and mitigate impacts on surface waters, including sensitive surface waters. Therefore, we conclude that the Project would not have a significant impact on surface waters.

3.2 Groundwater

The majority of the Project is underlain by "minor aquifers"/"other rocks" (USGS, 2003b). Minor aquifers cover a small area and supply a large amount of groundwater or cover a larger area and supply a small amount of groundwater (USGS, 2016b). "Other rocks" are characterized as low-permeability deposits and rocks, unsaturated materials, or aquifers that supply little water because they are localized, have poor permeability, or both (USGS, 2016b; USGS, 1996). A portion of the Project in Franklin County is underlain by the Osage Cuestas aquifer system, a minor aquifer system consisting of fluvial sandstones (KGS, 2018c; Kansas Water Office [KWO], 2013). Although the water-bearing fluvial sandstone formations of the Osage Cuestas aquifer system yield small quantities of water, it is used as a groundwater source for smaller communities and farms in rural areas of Franklin County (KWO, 2013). Portions of the Project in both Anderson and Franklin counties are also underlain by alluvial aquifers. These areas are characterized by unconsolidated alluvial deposits consisting of sand, silt, gravel, and clays that border streams and rivers. The stored water contained in the alluvial deposits is generally hydraulically connected to a stream. The thickness of the alluvial deposits that are capable of storing water ranges from a few feet to approximately 300 feet (KWO, 2013).

Sole Source Aquifers and Wellhead Protection Areas

The Project area does not overlie any EPA-designated sole-source aquifer (EPA, 2018b)nor are any wellhead protection areas located within 1 mile of the Project area (Zwiener, 2018).

Public and Private Water Supply Wells

Well records data from the KDHE, KGS, USGS, as well as field surveys identified one water well (a private geothermal heating and cooling system well) within 150 feet of the Project (Zwiener, 2018; KGS, 2018a; 2018c; USGS, 2018c). Specifically, this well would be 83 feet west of Line DPA MP 6.58. One plugged water well was also identified within temporary workspace for Line DT at MP 17.68. There are no known springs located within 1 mile of the Project area (USGS, 2018c; KGS, 2018d).

Groundwater Contamination

There are no known sources of groundwater contamination in the immediate vicinity of the Project work areas (EPA, 2018a; KDHE, 2018a, 2018b, 2018c). If contaminated groundwater is encountered during construction of the Project, Southern Star would implement measures outlined in its Project-specific Plan for the Unanticipated Discovery of Contaminated Environmental Media. The plan identifies steps to be followed in the event that contaminated groundwater, as identified by evidence of odor, sheen, or other such indicators, is encountered during construction.

An accidental spill of fuel or hazardous material during refueling or maintenance of construction equipment could affect groundwater if not cleaned up appropriately. To minimize the risk of potential fuel or hazardous material spills, Southern Star would implement measures within Southern Star's Procedures.

Groundwater Impacts and Mitigation

Surface drainage and groundwater recharge patterns can be temporarily altered by clearing, grading, trenching, and soil stockpiling activities, potentially causing minor fluctuations in groundwater levels and/or increased turbidity, particularly in shallow surficial aquifers. We expect the resulting changes in water levels and/or turbidity in these aquifers to be localized and temporary because water levels quickly re-establish equilibrium and turbidity levels rapidly subside. Further, upon completion of construction, Southern Star would restore the ground surface to original contours, to the extent practicable, and would re-vegetate disturbed areas, excluding areas within permanent aboveground facility fence lines and access roads, with the goal of restoring preconstruction overland flow and recharge patterns.

Southern Star would offer pre-and post-construction water quality and yield testing to landowners with water supply wells and springs located within 150 feet of Project construction workspace, if any are identified prior to construction. If a well is determined to have been impaired by construction activities, Southern Star would compensate the landowner for the repair of the well, installation of a new well, or otherwise arrange for a suitable water supply.

While not anticipated, in the event that an unknown well is identified within the Project workspace, Southern Star would contact the landowner and/or the KDHE as applicable, to determine the type of well and its status (active or inactive). If the well is determined to be an active water well, Southern Star would implement measures to ensure the well is not affected during construction. In the event that the well is located in the proposed trench for the pipeline, Southern Star would coordinate with FERC, as necessary to determine the appropriate measures necessary to avoid impacts on the well.

We conclude no significant or long-term impacts from construction or operation of the facilities would occur on groundwater resources.

3.3 Wetlands

Existing Wetland Resources

Palustrine emergent (PEM) and palustrine forested (PFO) wetlands were documented in the Project area. PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Dominant vegetation documented during wetland surveys include Davis' sedge (*Carex davisii*), bottlebrush sedge (*Carex hystericina*), troublesome sedge (*Carex molesta*), barnyardgrass (*Echinochloa crus-galli*), common water hyacinth (*Eichhornia crassipes*), flatstem spikerush (*Eleocharis compressa*), common spikerush (*Eleocharis palustris*), foxtail barley (*Hordeum jubatum*), annual marsh elder (*Iva annua*), rice cutgrass (*Leersia oryzoides*), red mulberry (*Morus rubra*), thin paspalum (*Paspalum setaceum*), smartweed (*Persicaria hydropiperoides*), reed canarygrass (*Phalaris arundinacea*), Kentucky bluegrass (*Poa pratensis*), eastern cottonwood (*Populus deltoides*), curly dock (*Rumex crispus*), broadleaf arrowhead (*Sagittaria latifolia*), softstem bulrush (*Schoenoplectus tabernaemontani),* blackgirdle bulrush (*Scirpus atrocinctus*), green bulrush (*Scirpus atrovirens*), woolgrass (*Scirpus cyperinus*), green bristlegrass (*Setaria viridis*), broadleaf cattail (*Typha latifolia*), and American elm (*Ulmus americana*).

PFO wetlands are dominated by hydrophytic tree species at least 20 feet tall. Souther Star documented Indian woodoats (*Chasmanthium latifolium*), green ash (*Fraxinus pennsylvanica*), red mulberry, spotted ladysthumb (*Polygonum persicaria*), black willow (*Salix nigra*), and American elm during field surveys in PFO wetlands.

A total of 21 wetlands (20 PEM wetlands and 1 PFO wetland) would be crossed or are located within construction workspace for the Project. Appendix 3 provides the wetland type and classification of each wetland crossed by the Project. The basic wetland types delineated in the Project area and total impact acreage are summarized in table 8. No NRCS Wetlands Reserve Program land is located within the Project area (NRCS, 2018b).

Table 8 Wetland Impact Summary of the Project		
NWI Classification[a]	Wetland Area Affected During Construction (acres)[b]	Wetland Area Affected During Operation (acres)[c]
PFO	0.03	0.01
PEM	1.2	0.00
Project Total	1.2[b]	0.01[b]

[a] cowardin Wetland Types: PEM - palustrine emergent; PFO – palustrine forested

[b] the numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[c] operational impacts on PEM, PFO, and PSS wetlands account for the 10-foot-wide corridor centered on the pipeline that would be permanently maintained as PEM. As such, there would be no operational impacts on PEM wetlands.

No permanent access roads are proposed for use in wetlands. No wetlands would be affected by construction and operation of the aboveground facilities.

Site-Specific Deviations to the FERC Plan and Procedures

Southern Star requested a modification to section V1.A.3 of our Procedures to allow for a construction right-of-way of 85 feet in several wetland areas.

These modifications are listed in table 9 below. We have reviewed these modifications and find them acceptable.

It should be noted that there are several ATWS and storage yards located within 50 feet of wetlands or waterbodies. These include ATWS-12, Storage Yard 02, ATWS-68, ATWS-71, and Storage Yard 5. However, Southern Star stated that these are areas where the adjacent upland consists of cultivated or rotated cropland or developed land and the 50-foot setback requirement does not apply in accordance with Sections V.B.2.a and VI.B.1.a for the FERC Procedures. Southern Star stated that they have attempted to site these areas at least 10 feet from waterbodies or wetlands and would prohibit spoil placement within 10 feet of sensitive resources. We have reviewed the alignment sheets and have confirmed these workspaces are sited in accordance with Section V.B.2.a and VI.B.1.a.

Table 9 Site-Specific Deviations to the FERC Plan and Procedures						
Workspace Type / ID	**MP**	**Waterbody / Wetland ID**	**Section of Plan and Procedures**	**Deviations to FERC Plan and Procedures**	**Justification**	**Equal Compliance Measures**
Line DPA Construction right-of-way	5.18	WPA1AN004	Procedures Section VI.A.3	Construction right-of-way of 85' in a wetland	Necessary to accommodate the installation of a new large-diameter pipeline while maintaining safe offset from the existing Line DS; extra work area for adjacent waterbody crossing; and ingress/egress near adjacent road crossing.	Timber mats to be installed where necessary to create a stable surface, and temporary erosion and sediment controls to be installed as necessary to protect adjacent undisturbed wetland areas.
Line DPA Construction right-of-way	11.62	WP1AN005	Procedures Section VI.A.3	Construction right-of-way of 85' in a wetland	Necessary to accommodate the installation of a new large-diameter pipeline, PI, and equipment maneuverability.	Timber mats to be installed where necessary to create a stable surface, and temporary erosion and sediment controls to be installed as necessary to protect adjacent undisturbed wetland areas.
Line DPA Construction right-of-way	14.12	WP1AN006	Procedures Section VI.A.3	Construction right-of-way of 85' in a wetland	Necessary to accommodate the installation of a new large-diameter pipeline while maintaining safe offset from the existing Line DS and equipment maneuverability to avoid contractor move-around.	Timber mats to be installed where necessary to create a stable surface, and temporary erosion and sediment controls to be installed as necessary to protect adjacent undisturbed wetland areas.
Line DPA Construction right-of-way	20.72	WP1FR012	Procedures Section VI.A.3	Construction right-of-way of 85' in a wetland	Necessary to accommodate the installation of a new large-diameter pipeline while maintaining safe offset from the existing Line DS and equipment maneuverability to avoid contractor move-around.	Timber mats to be installed where necessary to create a stable surface, and temporary erosion and sediment controls to be installed as necessary to protect adjacent undisturbed wetland areas.
N/A – not applicable						

Impacts and Mitigation

The pipeline would be installed in wetlands using open-cut methods. For those wetlands located in areas of the pipeline abandonment or in areas adjacent to the pipeline trench, temporary work surfaces consisting of timber mats would be installed over wetland areas that cannot support the weight of equipment to provide access along the right-of-way.

The primary impact of Project construction on wetlands would be the clearing and alteration of wetland vegetation. Construction could also affect soils, and water quality within wetlands due to sediment loading or inadvertent spills of fuel or chemicals. Impacts on wetlands would be greatest during and immediately following construction. The majority of these effects would be short-term in nature and would cease when, or shortly after, the wetlands are restored and revegetated. Following revegetation, wetlands would eventually transition back into a community similar to that of the pre-construction state. In emergent wetlands, the herbaceous vegetation would regenerate quickly (typically within 1 to 3 years).

Southern Star would minimize wetland impacts by implementing the construction and mitigation measures outlined in its Procedures, and by adhering to applicable permit requirements. Impact minimization measures include:

- limiting construction equipment in wetlands;
- segregating topsoil in unsaturated wetlands
- installing sediment barriers and properly maintaining them throughout construction;
- using low ground weight equipment or operating equipment on timber riprap on saturated soils or where standing water is present;
- adhering to measures outlined in the SPCC Plan and its Procedures to avoid impacts from hazardous materials;
- installing trench plugs to maintain the original wetland hydrology including restoring any confining layers that are breeched during construction; and
- limiting vegetation maintenance on the operational right-of-way in wetlands to a 10-foot-wide herbaceous corridor centered over the pipeline and the selective cutting of trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating.

With implementation of these measures, we conclude that wetland impacts would not be significant.

4.0 Vegetation, Aquatic Resources, and Wildlife and Special Status Species

4.1 Vegetation

Existing Vegetation Resources

The Project would be located across lands characterized by the following vegetative communities: agricultural, open land, developed land, forest, and wetlands. The Project impact acreages are presented in appendix 4. Wetland vegetation is discussed in section 4.1 above.

Agricultural vegetation (about 66 percent of the construction impacts and 58 percent of the operational impacts) includes cultivated row crops with some pasture areas. Common crops include corn (*Zea mays*) and soybean (*Glycine max*).

Open land affected by the Project (about 25 percent of vegetation construction impacts and 33 percent of operational impacts) includes herbaceous species such as Canada goldenrod (*Solidago canadensis*), little bluestem (*Schizachyrium scoparium*), soft brome (*Bromus hordeaceus*), sideoats grama (*Bouteloua curtipendula*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), common dandelion (*Taraxacum officinale*), prairie ironweed (*Vernonia fasciculata*), common milkweed (*Asclepias syriaca*), and Queen Anne's lace (*Daucus carota*).

Developed land (about 4 percent of construction vegetation impacts and 1.8 percent of operational impacts) lacks vegetation or is sparsely vegetated. Representative species include Bermudagrass (*Cynodon dactylon*), red clover, and common dandelion.

Upland forested vegetation constitutes about 3.6 percent of all vegetation affected during construction (39.1 acres) and 6.3 percent of vegetation affected during operation (19.3 acres) of the Project. Dominant species include Osage-orange (*Maclura pomifera*), American elm (*Ulmus americana*), roughleaf dogwood (*Cornus drummondii*), western snowberry (*Symphoricarpos occidentalis*), eastern redcedar (*Juniperus virginiana*), and bitternut hickory (*Carya cordiformis*).

No vegetation communities of special concern were identified in the Project area during either agency consultations or field surveys. The Project is located within two KDWPT Ecological Focus Areas (EFA). The crossing of the EFAs is discussed in section 4.3 below.

Noxious and Invasive Weeds

Noxious and invasive plant species can out-compete and displace native plant species, thereby adversely altering the composition and function of affected vegetation. Plant species identified as noxious and invasive by the NRCS were identified during Project surveys (NRCS, 2018a). These species include Johnson grass (*Sorghum halepense*), sericea lespedeza (*Lespedeza cuneata*), and Canada thistle (*Cirsium arvense*). To avoid and minimize the potential for the introduction and/or spread of invasive and noxious weed species Southern Star would implement numerous measures including:

- using construction techniques to minimize the time soil is exposed;
- pressure washing all construction equipment before it is brought onto the construction site for the first time; and
- capturing and properly disposing of all water and material from the pressure washing sites for proper disposal.

The Garnett Kansas local NRCS office confirmed that Southern Star's management and control measures are adequate in a letter dated April 15, 2019.

Impacts and Mitigation

Abandoning and installing the proposed facilities would require the temporary and permanent clearing of vegetation. Upland forest vegetation in the permanent right-of-way would be maintained in an herbaceous state through the operational life of the Project.

For non-forested vegetation types, including agricultural land, open land, and non-forested wetlands, impacts from pipeline construction would generally be short-term and temporary. To facilitate revegetation, Southern Star would seed construction workspaces using seed mixes in accordance with its Plan, Project-specific recommendations identified through consultation with the local NRCS field offices and the KDWPT, or landowner requests.

Based on the types and amounts of vegetation affected by the Project and Southern Star's proposed avoidance, minimization, and mitigation measures to limit Project impacts, we conclude that impacts on vegetation from the Project would not be significant.

4.2 Aquatic Resources

Existing Aquatic Resources

Waterbodies in Kansas are classified by the KDWPT according to water quality and aquatic communities. A list of waterbodies crossed along with associated fishery classification is provided in appendix 2. All the waterbodies crossed by the Project are classified as warmwater fisheries by the KDWPT (Morrison, 2018). Warmwater species that are common in the Project area include red shiner (*Cyprinella lutrensis*), fathead minnow (*Pimephales promelas*), black bullhead (*Ameiurus melas*), and green sunfish (*Lepomis cyanellus*). In addition, perennial warmwater streams may support largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), spotted bass (*Micropterus punctulatus*), striped bass (*Morone saxatilis*), white bass (*Morone chrysops*), freshwater drum (*Aplodinotus grunniens*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), black crappie (*Pomoxis nigromaculatus*), white crappie (*Pomoxis annularis*), northern pike (*Esox lucius*), walleye (*Sander vitreus*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), and redear sunfish (*Lepomis microlophus*) (KDWPT, 2018a).

Fisheries of Special Concern

As mentioned above, the Project does cross Pottawatomie Creek in Anderson County and Marais des Cygnes River in Franklin County which are designated by the KDHE as Special Aquatic Life support. This designation is also assigned to 17 unnamed tributaries of Marais des Cygnes River and 9 unnamed tributaries of Pottawatomie Creek crossed by the Project. This designation is assigned to waterbodies that provide unique habitat types, uncommon biota, or when the waterbodies contain populations of threatened or endangered species.

General Impacts and Mitigation

As described previously, Southern Star would utilize open-cut crossings for most of the waterbodies in the Project area. This crossing method would affect fish by altering the streambed, increasing sedimentation and turbidity, and by direct contact with aquatic species. Turbidity and sedimentation may alter fish behavior due to decreased visibility and could damage gill structures. In addition, sediment deposition may also smother aquatic vegetation, change the substrate composition, or bury eggs and larva.

Southern Star would implement the measures in its Procedures to minimize sedimentation and turbidity. All in-stream construction associated with open cut crossings would be completed within 24 hours for minor waterbodies and 48 hours for intermediate waterbodies. If this cannot occur, dry ditch crossing techniques such as

fluming or the dam and pump method would be used. Though the Procedures state that all in-stream work in waterbodies containing warm water fisheries needs to be completed between June 1 and November 30, Southern Star received approval from the KDWPT and the Kansas Department of Agriculture to conduct in-stream activities without any restrictions in waterbodies that do not have designated critical habitat for state-listed species by the KDWPT.

Southern Star would also utilize the HDD crossing method for three waterbody crossings. This method would avoid direct impacts on fisheries, habitat, and other aquatic resources. The potential does exist for the non-toxic drilling mud to be released by migrating to the surface through a fracture in the underlying rock or substrate. If this would occur the impacts would be similar to the sedimentation and turbidity impacts described above. In the case of an inadvertent return Southern Star would implement the measures described in its HDD Plan.

Spills of hazardous materials and fuels could impact fishery resources and aquatic species. Fish may come into contact directly with spilled materials or large volumes could impact the aquatic habitat including vegetation. To minimize or avoid these hazards, Southern Star would implement measures in its SPCC Plan as well as its Procedures. This include storing hazardous materials and fuel more than 100 feet from surface waterbodies and not fueling or parking heavy equipment within 100 feet of these features as well. Other precautions such as having secondary containment structures, utilizing spill kit readiness, and monitoring of fuel transfers would also occur.

As mentioned above, Southern Star would utilize water from surface waterbodies or municipal surfaces to complete hydrostatic testing. Following testing, the water would pass through energy dissipation devices and would be discharged into well-vegetated upland areas. This would minimize stream scour and impacts on aquatic habitats. Withdraws from surface waterbodies would be conducted in accordance with state regulations. Southern Star would install floats and intake screens on hoses to minimize impacts. In addition, in conformance with the KDWPT Action Permit, Southern Star would not withdraw water from Cedar Creek from May 1 through July 1.

To minimize aquatic impacts, Southern Star would install erosion and sediment control devices such as slope breakers and silt fence and would install trench plugs near waterbody crossings. In addition, any trench dewatering hoses would have a sediment filter and the water would pass through energy dissipation devices. Following construction all streambeds and banks would be restored to their pre-construction conditions.

Impacts on aquatic resources from construction and operation of the Project would be temporary and Southern Star would minimize impacts on aquatic resources by implementing its proposed construction methods and avoidance, minimization, and

mitigation measures. Therefore, we conclude that impacts on aquatic resources from the Project would not be significant.

4.3 Wildlife Resources

Existing Wildlife Resources

Wildlife habitat types are based on the vegetation cover types within the Project area and, as stated above, include agricultural land, forested upland, open upland, developed land, open water, and wetlands. General vegetation cover types are addressed in section 4.1. Each of these vegetation communities provides foraging, cover, and nesting habitat for a variety of wildlife species, as described in table 10 below.

Table 10 Common Wildlife Species in the Project Area

Vegetative Cover Type	Common Wildlife Species
Agriculture	Woodchuck (*Marmota monax*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), house finch (*Haemorhous mexicanus*), barn swallow (*Hirundo rustica*), and garter snake (*Thamnophis sirtalis)*
Open (herbaceous/shrub) upland	Coyote, (*Canis latrans*) cottontail rabbit (*Sylvilagus floridanus)*, least shrew (*Cryptotis parva*), white-tailed deer (*Odocoileus virginanus*), deer mouse (*Peromyscus maniculatus*), mourning dove, red-tailed hawk (*Buteo jamaicensis*), scissor-tailed flycatcher (*Tyrannus forficatus*), American kestrel (*Falco sparverius*), field sparrow (*Spizella pusilla*), and box turtle (*Terrapene ornata* spp.)
Developed land	Mostly human commensal species such as common garter snake, raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), northern mockingbird (*Mimus polyglottos*), house finch, and mourning dove
Upland forest	Opossum (*Didelphis virginiana*), least shrew (*Cryptotis parva*), woodchuck, cottontail rabbit, deer mouse, cardinal (*Cardinalis cardinalis*), gray squirrel, raccoon, and copperhead (*Agkistrodon contortrix*)
Wetlands	Raccoons, squirrels, Woodhouse's toad (*Anaxyrus woodhousii*), beaver (*Castor canadensis missouriensis*), red-winged blackbird (*Agelaius phoeniceus*), wood duck (*Aix sponsa*), and red eared slider (*Trachemys scripta elegans*).
Open Water	Bullfrog (*Lithobates catesbeiana),* common snapping turtle (*Cheldrya serpentine*), Plains spadefoot toad (*Spea bombifrons),* Woodhouse's toad, western painted turtle (*Chrysemys picta bellii*), red-eared slider (*Trahemys scripta elegans*), and ribbonsnake (*Thamnophis sauritus*)

Managed and Sensitive Wildlife Areas

The Project is not located within 0.25-mile of any nature preserves, wildlife refuges, or wildlife management areas (Kansas Biological Survey, 2018, KDWPT, 2018c, Travel KS, 2018). However, the Project is within the KDWPT designated terrestrial Eastern Tallgrass Prairies Ecological Focus Area (EFA) and the aquatic Marais des Cygnes EFA. The KDWPT designates EFAs in areas that represent habitat where conservations actions have maximum benefits for wildlife including those that are federally state listed as endangered or threatened (Rohweder, 2015).

The Eastern Tallgrass Prairies EFA is one of the largest tracks of unbroken prairie remaining in eastern Kansas and provides habitat for the state listed eastern spotted skunk (*Spilogale putorius*) (Rohweder, 2015). Portions of the Line DPA (from MP 0.0 to 5.47), Line DS (MP 0.0 to MP 5.51), Line DT (MP 0.0 to 5.96), Yard 1, and the Welda Compressor station are located in this EFA. The majority of the Project is located within the Marais des Cygnes EFA which provides habitat for the hornyhead chub, flat floater mussel (*Anodonta suborbiculata*), flutedshell mussel (*Lasmigona costata*), mucket mussel (*Actinonaias ligamentina*), rock pocketbook mussel (*Arcidens confragosus*), and northern map turtle (*Graptemys geographica*). Threatened and state listed species are discussed below.

Southern Star received an email from the KDWPT on April 12, 2019 that with the exception of the measures recommended for the crossings of state-designated critical habitat, no additional best management practices for crossing of the EFAs are required. Southern Star stated they would implement the avoidance and minimizations measures for the crossing of state-designated critical habitat as discussed in Section 4.0. In addition, Southern Star would implement all special conditions included in the Action Permit received from the KDWPT on May 1, 2019.

General Impacts and Mitigation

Construction and operation of the Project would result in short- and long-term impacts on wildlife. Impacts would vary depending on the specific habitat requirements of the species in the area and the vegetative land cover affected. Potential short-term impacts on wildlife include the displacement of individuals from construction areas and adjacent habitats and the direct mortality of small, less mobile mammals, reptiles, and amphibians that are unable to vacate the construction area. Long-term impacts would include conversion of forested or scrub-shrub habitats to cleared and maintained right-of-way, as well as periodic disturbance of wildlife during operation and maintenance. Construction of the Project would impact about 39.1 acres of forest. Altered habitat and periodic disturbance could also increase wildlife mortality, injury, and stress.

To reduce impacts on wildlife, Southern Star would implement measures identified in its Plan and Procedures including:

- limiting the amount of time the trench is open during construction to minimize the risk of wildlife entrapment;
- stabilizing and reseeding disturbed arounds following construction; and
- training contractors and workers in the appropriate steps to take should wildlife be encountered.

Although individual mortality of some wildlife species could occur as a result of the Project, the effects of these individual losses on wildlife populations would be minor. Based on the presence of similar habitats adjacent to and in the vicinity of construction activities, and the implementation of impact avoidance and minimization measures, we conclude that construction and operation of the Project would not significantly impact wildlife.

Migratory Birds

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S Code [U.S.C.] 703-711); bald and golden eagles are additionally protected under the Bald and Golden Eagle Protection Act (16 U.SC. 668-668d). Executive Order (EO) 13186 (66 FR 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the U.S. Fish and Wildlife Service (FWS).

EO 13186 was issued, in part, to ensure that environmental analyses of federal actions assess the impacts of these actions/plans on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and it prohibits the take of any migratory bird without authorization from the FWS.

The Project would be within Region 22-Eastern Tallgrass Prairie of the North American Bird Conservation Initiative (FWS, 2008).

The primary concern for impacts on migratory birds, including bald eagles, is mortality of eggs and/or young, since immature birds could not avoid active construction. Tree clearing and ground disturbing activities could cause disturbance during critical breeding and nesting periods, potentially resulting in the loss of nests, eggs, or young. Southern Star proposes a pipeline route that would minimize impacts on migratory birds by routing through mostly agricultural areas and by being adjacent or within existing pipeline rights-of-way. In addition, Southern Star anticipates completing vegetation

clearing activities outside of the primary bird nesting season (April 15 through August 1).

Based on the characteristics and habitat requirements of wildlife and migratory birds known to occur in the proposed Project area, the amount of similar habitat adjacent to and in the vicinity of the Project, and Southern Star's implementation of the its Plan and Procedures, we have determined that the Project would not result in population-level impacts or significant measurable negative impacts on migratory birds.

4.4 Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Special status species include federally listed species protected under the ESA, species proposed or candidates for listing by the FWS, and those species that are state listed as threatened or endangered, or other special status. Section 7(a)(2) of the ESA requires the Commission to ensure that any action it authorizes, funds, or carries out would not jeopardize the continued existence of federally listed or proposed listed species, or result in the adverse modification or destruction of critical habitat for federally listed and proposed species.

Informal consultations were conducted by Southern Star, as our non-federal representative, with the FWS – Kansas Ecological Field Office to determine whether any federally listed threatened or endangered species, federal species of concern, or designated critical habitats occur in the Project area. Southern Star also consulted with KDWPT regarding state listed species and habitats. Southern Star also conducted species-specific surveys as described below. Appendix 6 describe the federally listed and state listed species, respectively, that occur in the Project area, their preferred habitat, and our determination of effect.

State listed species with a determination of "no effect" or "may affect, not likely to adversely affect" are discussed only in appendix 5, unless additional discussion was warranted and/or if we have recommended additional mitigation measures to arrive at our determination. State designated critical habitat is present within the Project area. The KDWPT stated that the HDD and restoration actions proposed for these areas would likely minimize impacts to all state listed species and no additional specific best management practices would be required. No federal designated critical habitat occurs in the Project area.

Federally Listed Species

Northern Long-Eared Bat

The northern long-eared bat is federally and state listed as threatened due to population declines related to white-nose syndrome (FWS, 2015). Mature hardwood forest containing suitable summertime roosting and foraging habitat is present within the Project area. Project-related impacts on the northern long-eared bat could include temporary impacts due to habitat disturbance during construction activities. Long-term impacts could occur due to permanent loss of suitable habitat from vegetation clearing for construction and operation.

Southern Star would assume presence of suitable summer habitat and would not perform tree clearing during the summer roosting season which the FWS identified as occurring between June 1 and July 31. Since Southern Star would clear only about 39.1 acres of forest, would avoid and minimize impacts on northern long-eared bat habitat, and would implement timing restrictions to clear forest outside the summer roosting period, we have determined that construction and operation of the Project *may affect, but is not likely to adversely affect* the Indiana bat. The FWS responded via a letter dated March 6, 2019 that they concur with our determination.

Mead's Milkweed

The Project crosses several areas that are characterized as high quality natural prairie. These areas provide suitable habitat for Mead's milkweed. Southern Star conducted surveys with qualified biologist in 2018 to determine if Mead's milkweed was present within the majority of the Project area. No individuals or populations were identified during surveys. However, these surveys did not cover the entire Project area.

The FWS stated in a letter dated March 6, 2019 that they concur with our determination with the predication that the botanist that completed the surveys is qualified and that if any plants are identified during the 2019 survey that the office is notified prior to the disturbance of plants. Southern Star completed the 2019 surveys from May 28 through May 30. Four occurrences of Mead's milkweed were identified. Two occurrences of these plants were located within the survey corridor but outside of the Project workspaces associated with Line DPA. One of these occurrences consisted of 6 plants and the other of 20 plants. The other two occurrences were located within a proposed temporary workspace for the line DT abandonment activities. These consisted of one plant and two plants.

Southern Star would avoid all impacts to the plants observed during the surveys. Prior to initiating ground-disturbing activities, Southern Star would install temporary

exclusion fencing along the edge of the construction workspace which would extend approximately 50 feet on either side of the Mead's mildewed plants. In addition they would install exclusionary fencing with a five foot buffer around the plants within the Line DT temporary workspace and no work would be performed within this fencing.

Based on the results of the presence/absence surveys and the proposed avoidance measures, we have determined the construction and operation of the Project *may affect, but is not likely to adversely affect* Mead's milkweed. The FWS responded via a letter dated July 11, 2019 that they concur with our determination.

Due to the FWS concurrence with our *may affect but not likely to adversely affect* determinations for Mead's milkweed and the northern long-eared bat, the ESA Section 7 consultation for this Project is complete.

State Listed Species

State designated critical habitat for the eastern spotted skunk (*Spilogale putorius*), hornyhead chub (*Nocomis biguttatus*), northern map turtle (*Graptemys geographica*), mucket mussel (*Actinonaias ligamentina*), rock pocketbook mussel (*Arcidens confragosus*), and sharp hornsnail (*Pleurocera acuta*) is crossed by the Project. For crossing this habitat, Southern Star submitted an Action Permit to the KDWPT.

With the exception of the eastern spotted skunk, the state designated critical habitat for the remaining species would be crossed via the HDDs proposed for Cedar Creek, Pottawatomie Creek, and the Marais des Cygnes River. This would avoid direct impacts on the critical habitat. Southern Star does propose to withdraw water from Cedar Creek and the Marais des Cygnes River for hydrostatic testing and dust control. To avoid impact on the state listed species and designated critical habitat, Southern Star would use floats and mesh screens on intake hoses.

The KDWPT issued its action permit on May 3, 2019. This permit states that the Marais des Cygnes River, Pottawatomie Creek, and Cedar Creek would be crossed via HDD, and that except for the clearing required for drilling no riparian vegetation would be disturbed, and mechanical disturbance of the streams' banks and beds would be avoided. The permit also states no in-water work, including water withdrawal, would occur in Pottawatomie Creek or Cedar Creek between May 1 and July 1. Southern Star agreed to these measures on May 3, 2019.

State designated critical habitat for eastern spotted skunk is also present in the Project area and required an Action Permit from the KDWPT to cross. To minimize impacts on this critical habitat, Southern Star would reseed the area with a seed mix designed for rare and declining habitat and avoid construction of permanent aboveground structures within the designated critical habitat. Southern Star submitted these measures,

along with other minimization measures in a revegetation plan that was reviewed and approved by the KDWPT. The KDWPT Action Permit references this report and states as a special permit condition that no deviations from the approved plan would be allowed without prior concurrence from the KDWPT. The Action Permit also states that to the extent possible all brush and trees removed as part of the construction process would be used to create brush piles adjacent to the rights-of-way to serve as escape cover for the eastern spotted skunk. Southern Star agreed to all measures of the action permit on May 5, 2019.

5.0 Land Use, Recreation, and Visual Resources

5.1 Land Use

Southern Star would affect a total of about 1,081.5 acres of land, including 300.4 acres of permanent impacts associated with the Ottawa CS, Welda CS, Richmond Regulator Station, tie-in facilities. MLVs, other auxiliary facilities, and permanent rights-of-way. Table 13 summarizes the land use impacts associated with construction and operation of the Project.

Agricultural

A majority of the Project area (approximately 67 percent) is agricultural land. This includes areas for improved pasture and actively cultivated row crops. The primary crops in the Project area, are corn, grain sorghum, and soybean. A total of 723 acres of agricultural land would be affected by construction of the Project. Of this total, 175.2 acres would be maintained as permanent easement for the new pipelines and cathodic protection. With the exception of areas in which aboveground facilities and permanent access roads are installed, all agricultural land affected by the Project would be restored to its original use, including the permanent pipeline right-of-way.

Table 11 Summary of Land Use Impacts (acres)																
Facility	**Agriculture**		**Open Land**		**Industrial**		**Forest**		**Residential**		**Wetland**		**Open Water**		**Grand Total**	
	Const. [a]	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b, c]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**
Pipeline Facilities																
Line DPA																
Right-of-Way	253.7	153.5	122.8	77.6	2.9	2.3	31.5	17.52	0.4	0.2	0.4	0.3	0.5	0.51	**412.3**	**251.8**
Additional Temporary Workspace	12.8	0.00	5.7	0.00	0.6	0.00	0.9	0.00	0.10	0.00	0.00	0.00	0.00	0.00	**20.2**	**0.00**
Contractor/Pipe Yards	282	0.00	15.7	0.00	2.10	0.00	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**300**	**0.00**
Access Roads	1.1	0.00	2.8	0.00	0.2	0.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.5**	**0.00**
Cathodic Protection	0.1	0.1	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.1**	**0.1**
Garnett Lateral																
Right-of-Way	5.9	5.9	11.2	11.2	1.4	1.4	0.1	0.1	0.4	0.4	0.00	0.00	0.00	0.00	**18.9**	**18.9**
Additional Temporary Workspace	0.2	0.00	0.1	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.3**	**0.00**
Scipio Lateral																
Right-of-Way	5.4	5.4	8.0	8.0	0.7	0.7	0.00	0.00	0.3	0.3	0.1	0.1	0.00	0.00	**14.6**	**14.6**
Additional Temporary Workspace	0.2	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.2**	**0.00**
Richmond Lateral																
Right-of-Way	10.4	10.4	1.7	1.7	0.3	0.3	1.7	1.7	0.00	0.00	0.07	0.07	0.00	0.00	**14.1**	**14.1**
Line DT Abandonment																
Right-of-Way	134.9	0.00	83.1	0.00	0.9	0.00	2.7	0.00	1.6	0.00	0.7	0.00	0.06	0.00	**223.9**	**0.00**
Additional Temporary Workspace	0.6	0.00	0.05	0.00	0.1	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	**0.8**	**0.00**
Access Roads	2.9	0.00	5.4	0.00	5.3	0.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**13.8**	**0.00**
Line DS Abandonment																
Right-of-Way	12.4	0.00	8.6	0.00	0.3	0.00	1.1	0.00	0.5	0.00	0.00	0.00	0.00	0.00	**23.0**	**0.00**
Pipeline Facilities Subtotal	***722.4***	***175.2***	***265.3***	***98.5***	***14.8***	***4.6***	***38.9***	***19.3***	***3.3***	***0.9***	***1.2***	***0.5***	***0.6***	***0.5***	***1,046.6***	***299.5***

Table 11 Summary of Land Use Impacts (acres)																
Facility	**Agriculture**		**Open Land**		**Industrial**		**Forest**		**Residential**		**Wetland**		**Open Water**		**Grand Total**	
	Const. [a]	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b, c]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**
Aboveground Facilities																
Line DPA																
Welda Compressor Station	0.00	0.00	0.00	0.00	17.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**17.8**	**0.00**
Ottawa Compressor Station	0.00	0.00	0.00	0.00	13.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**13.6**	**0.00**
Launcher/Receiver [d]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Panhandle Tie-in	0.00	0.00	0.7	0.01	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.8**	**0.01**
Princeton Tie-in	0.00	0.00	0.2	0.01	0.00	0.00	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.4**	**0.01**
Mainline Valve	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**	**0.06**
Existing Auxiliary Facilities [e]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Access Roads	0.01	0.01	0.5	0.5	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.5**	**0.5**
Garnett Lateral																
New Tie-in (MP 0.00)	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.1**	**0.01**
New Tie-in (MP 0.85) [f]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Existing Tie-ins	0.19	0.00	0.30	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.5**	**0.00**
Access Roads	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**
Scipio Lateral																
New Tie-in (MP 0.00) [f]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Scipio Sales Tie-in	0.09	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.1**	**0.01**
Access Roads	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**
Richmond Lateral																
New Tie-in (MP 0.01) [f]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
New Richmond Regulator Station	0.20	0.20	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.2**	**0.2**
Line DT Abandonment																
Existing Richmond East Regulator Station [g]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**

Table 11 Summary of Land Use Impacts (acres)																
Facility	**Agriculture**		**Open Land**		**Industrial**		**Forest**		**Residential**		**Wetland**		**Open Water**		**Grand Total**	
	Const. [a]	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b, c]**	**Const. [a]**	**Op. [b]**	**Const. [a]**	**Op. [b]**
Existing Auxiliary Facilities	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	**0.08**	**0.00**
Access Roads	0.00	0.00	0.06	0.00	0.14	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	**0.5**	**0.00**
Aboveground Facilities Subtotal	***0.6***	***0.3***	***2.00***	***0.6***	***31.5***	***0.04***	***0.2***	***0.00***	***0.4***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***34.9***	***0.9***
PROJECT TOTAL	**722.9**	**175.5**	**267.3**	**99.1**	**46.7**	**4.6**	**39.1**	**19.3**	**3.7**	**0.9**	**1.2**	**0.5**	**0.6**	**0.5**	**1,081.5**	**300.4**

[a] Land affected during construction is inclusive of operation impacts (permanent).
[b] Land affected during operation consists only of permanent impacts associated with permanent right-of-way areas along the new pipelines, and new permanent impacts at aboveground facilities and permanent access roads.
[c] Operational land use impacts associated with wetlands have been calculated based on the proposed 66-foot–wide permanent easement. Per the FERC Plan and Procedures, Southern Star would maintain a 10-foot-wide cleared easement in wetlands. For more information on wetland impacts associated with the Project refer to Section B.3.3 of the EA.
[d] Workspace associated with installation of the launcher/receiver is captured within the Welda CS and Ottawa CS impacts.
[e] Workspace associated with the existing auxiliary facilities is captured within the Line DPA right-of-way, ATWS, and access road impacts.
[f] Workspace associated with the three tie-ins with the existing Line DP are included in the construction right-of-way and ATWS for the new laterals in which they are located. There would be no new operational impacts associated with these three tie-ins, as the permanent sites would be constructed in 2019 under Southern Star's blanket certificate.
[g] Workspace associated with the existing Richmond East Regulator Station is captured within the Line DT right-of-way and ATWS impacts.

Open Land

Open Land includes non-forested areas that are not otherwise classified as agriculture and includes existing utility easements and unimproved fields (i.e., fields that are not planted or actively grazed). Open land accounts for approximately 25 percent of the Project area, and construction of the Project would impact a total of 267.3 acres, of which 99.1 acres would be maintained for operation of the pipeline facilities and aboveground facilities.

Industrial

Industrial includes developed land areas that are not characterized as residential. Most of these areas contain impervious surfaces such as pavement, gravel, or bare, compacted land with a hard surface. Industrial land crossed by the Project facilities accounts for approximately 4 percent of the Project area and consists of aboveground facilities, roads, and other oil and gas infrastructure. A total of 46.7 acres of industrial land would be utilized during construction of the Project, of which 4.6 acres would be required for operation of the permanent easements

Forest

Forest lands account for approximately 4 percent of the Project area, and construction of the Project would impact a total of 39.1 acres of forested land, of which 19.3 acres would be used for operation and maintenance of the permanent easements. Segments of Lines DT and DS that occur within large sections of forest would be abandoned in place.

Residential

Residential lands include developed land with both single and multiple family dwellings and may be in developed subdivisions as well as rural areas. This land use also includes landscaped areas associated with residential properties. Residential land accounts for less than 1 percent of the Project area. A total of 3.7 acres of residential land would be used for construction of the Project, of which 0.9 acre would be used during operation of the permanent right-of-way along the new pipelines. A total of 111 structures are located within 100 feet of the Project. Of these, 30 structures are located within 25 feet of the Project area, including 8 residences, 7 barns, 14 sheds, and 1 other unoccupied structure.

Impacts and Mitigation

The impacts on agricultural land during construction would include temporary reductions in agricultural production in areas of cultivated cropland and potential reduced yields of future crops. Agricultural land in the construction area would likely be taken out of production for one growing season; however, depending on the crops, agricultural

activities could resume in the year following the completion of construction. Southern Star would minimize impacts on agricultural land by implementing measures to ensure the proper restoration of affected lands including replacement of topsoil, stone removal, and compliance with reseeding specifications. Southern Star would protect active pastureland during construction through the installation of temporary fencing, the use of alternative locations for livestock to cross the construction corridor, and/or alternate feeding arrangement, as negotiated with the landowner. Southern Star would negotiate with and reimburse landowners for any damages or loss of production as a result of the Project's construction activities. The agricultural land would be returned to its original contour to maintain pre-construction hydrology. Should construction result in any new drainage or ponding issues, Southern Star would work with the landowner to resolve the problem.

Along the new pipeline routes, the permanent right-of-way would be maintained in an herbaceous state and thus, would not result in a change in land use. All disturbed areas that are not permanently converted to industrial land would be returned to pre-construction contours and reseeded following construction.

Since the industrial land is already developed, further impacts on this land type are not anticipated. Temporary workspace areas in the forested land that are cleared for construction would result in long-term impacts due to the time required for trees to reestablish. For the residential areas, site-specific residential construction plans for residences located within 25 feet of the Project construction area are provided in appendix 7.

We have reviewed the site-specific plans and associated workspace justifications, and have found them acceptable. However, we encourage the owners of each of these residences to provide us comments on the plan specific for their property.

Southern Star filed a Residential Construction Implementation Plan. This plan outlines construction procedures that would be implemented for residences within 50 feet and residences within 25 feet of the Project workspace. For residences within 25 feet, Southern Star would implement all of the procedures discussed for residences within 50 feet as well as:

- Southern Star would comply with all workspace limitations and construction techniques that are outlined on the site-specific drawings that are referenced on the construction drawings;

- the trench would not be excavated until the pipe is ready to be removed or installed and would be backfilled within 10 days after installation is complete; and

- access to residences by car would be maintained at all times, or other accommodations would be made with each respective landowners.

If construction in proximity to residences requires the removal of private property features, such as gates or fences, Southern Star would notify the landowner prior to removal. Following the completion of construction activities within the residential property, Southern Star would restore the property, including landscaping, in accordance with Southern Star's procedures as well as any agreements in place with the landowner.

Wetlands are discussed in Section B.3.3. Open water includes major rivers and ponds crossed by the Project.

5.2 Recreation and Special Use Areas

The Project crosses the Flint Hills Trail State Park at Line DPA MP 30.39, Line DT MP 30.46, and Line DS MP 30.09 in Franklin County (KDWPT, 2018a). The Flint Hills Trail State Park is a 117-mile rail trail, offering a walking/biking trail between historic destinations including museums, historic buildings, recreational areas, and monuments. The trail follows the old corridor for the Missouri Pacific Railroad. Flint Hills Trail State Park is deeded to the Kanza Rail-Trails Conservancy; however, it was adopted as a Kansas State Park on July 1, 2018 (McCown, 2018). Line DPA would be installed via HDD and Lines DT and DS would be abandoned in place at the Flint Hills Trail State Park crossings.

The Project also crosses the Prairie Spirit Trail State Park at Line DPA MP 19.59 and MP 0.66 of the new Richmond Lateral in Franklin County. In addition, the existing Line DT crosses the Prairie Spirit Trail State Park at MP 10.67, MP 12.21, and MP 15.47, and the existing Line DS crosses the state park at MP 19.38. A total of three temporary access roads, including DT-TAR-07, DT-TAR-08, and DT-TAR-09, would also cross the Prairie Spirit Trail State Park during construction of the Project. The Prairie Spirit Trail State Park is a 51-mile-long linear park that passes through three counties in Kansas, including Anderson and Franklin counties. The trail offers walking and biking opportunities, traversing rural communities, agricultural lands, tallgrass prairie, and riparian areas. The Prairie Spirit Trail State Park, follows the old corridor for the Leavenworth, Lawrence, and Fort Gibson Railroad, was made a state park in the early 1990s, and is managed by the KDWPT (KDWPT, 2018c). Impacts on the Prairie Spirit Trail State Park at both the Line DPA and Richmond Lateral crossings would be avoided by bore. Sections of the existing Lines DT and DS that cross the Prairie Spirit Trail State Park would be abandoned in place. While construction equipment may temporarily traverse the trails during construction of the Project, no other impacts on the state park trails are anticipated to occur due to the trenchless pipeline installation methods selected for the proposed pipeline crossings and the proposed plans to abandon the existing Lines DT and DS in place at the trail crossings.

Southern Star has consulted with KDWPT in regards to the Flint Hills Trail State Park and the Prairie Spirit Trail State Park crossings for the Project and would provide notification when construction is planned within the vicinity of the trail (McCown, 2018).

No other natural, recreational, or scenic areas would be crossed or otherwise affected by the Project (NPS, 2018a, 2018c, 2016; U.S. Forest Service, 2018; KDWPT, 2018a, 2018b).

5.3 Visual Resources

The Project would result in temporary and long-term impacts on visual resources. Visual impacts would vary based on the vantage point of the viewer and proximity to the activities.

The Project is located in a generally rural landscape laced with narrow forested riparian corridor and flat to gently rolling terrain. Impacts on visual and/or aesthetic resources would occur from the new aboveground facilities and during construction as a result of the presence of construction equipment. During active construction, the impacts would include the removal of vegetation, disturbance and exposure of base soils, the presence of personnel and heavy construction equipment, and storage of construction materials. The majority of impacts on visual resources would be construction related and temporary; however, the creation of the new permanent pipeline easements and the installation of the new aboveground facilities would create some minor permanent impacts on visual resources. Line DPA would be co-located with Southern Star's existing pipelines for a majority of the Project, thereby minimizing the extent of new permanent impacts associated with the permanent right-of-way.

The Project would not be located within any federal, state, or locally designated scenic areas, such as National Wild and Scenic Rivers and scenic roads/highways. The Project would require crossings of recreational trails, including the Flint Hills Trail State Park and the Prairie Spirit Trail State Park. However, impacts on visual resources associated with construction and abandonment of the pipelines at these trail crossing would be minor and temporary.

The Project activities at the Ottawa and Welda compressor stations would occur within the existing aboveground facilities and would not further contribute to visual impacts. The existing Richmond East Regulator Station would be abandoned and removed, restoring natural visual resources to the area. The new Richmond Regulator Station is located approximately 66 feet from the nearest residence. Southern Star would mitigate visual impacts on nearby residences by installing a painted privacy fence around the perimeter of the proposed Richmond Regulator Station. The remaining aboveground Project facilities, including tie-ins and existing auxiliary facilities, are minor and primarily located within existing permanent pipeline rights-of-way. Therefore, visual impacts from construction and operation are expected to be minimal.

6.0 Cultural Resources

Section 106 of the National Historic Preservation Act, as amended, requires the FERC to take into account the effects of its undertakings on properties listed in or eligible for listing in the National Register of Historic Places (NRHP) and afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. Southern Star, as a non-federal party, is assisting the Commission in meeting these obligations under Section 106 and the implementing regulations at 36 CFR 800 by preparing the necessary information, analyses, and recommendations, as authorized by 36 CFR Part 800.2(a)(3).

Southern Star conducted a cultural resources survey of: Line DPA, with a 300-foot-wide survey corridor, 3 new laterals with a 200-foot-wide survey corridor, existing lines DT and DS with a 66-foot-wide survey corridor, 36 access roads with a 50-foot-wide survey corridor, and the foot print of the Welda and Ottawa compressor stations, offline facilities, 11 contractor yards, extra work spaces, auxiliary and appurtenant facilities. All of the Project components identified to date have been surveyed. The actual construction right-of-way, and thus the area of potential effect (APE), for line DPA would range from 85-110 feet wide, the laterals would be 66-feet-wide, and abandonment/removal activities for lines DT and DS would occur within the existing permanent right-of-way, but Southern Star surveyed a wider corridor to allow for minor changes and to define site boundaries.

The survey revisited 6 previously identified archaeological sites and recorded 23 newly identified sites, one standing structure (Welda Compressor Station), 23 isolated finds/features, and a historic cemetery (West Scipio cemetery). Five of the 6 previously recorded sites could not be relocated, the sixth site is recommended not eligible for the NRHP. Of the 23 newly identified archaeological sites, 11 were located in the APE, 12 were outside the APE. Twenty one of the 23 newly identified sites are recommended not eligible for the NRHP, 2 are recommended potentially eligible for the NRHP, but are located outside the APE and would not be affected by the Project. The 23 isolated find/features are not eligible for the NRHP, did not meet the Kansas SHPO's definition of an archaeological site and were not recorded. Southern Star recommended the Welda Compressor Station eligible for the NRHP, however, it would not be affected by the Project. The West Scipio Cemetery is at least 50 feet south of the construction corridor and would not be affected by the Project.

In a January 22, 2019 letter the Kansas State Historic Preservation Office (SHPO) concurred with Southern Star's survey results and recommended that the project would have no adverse effect on historic properties. We also concur.

On November 14, 2018 Southern Star wrote to the Prairie Band Potawatomi Nation, the Sac and Fox of the Mississippi in Iowa, the Sac and Fox Nation of Missouri, the Saginaw Chippewa Indian Tribe of Michigan, the Seneca-Cayuga Nation, the Wichita and Affiliated Tribes, the Citizen Potawatomi Nation, the Kaw Nation, the Osage Nation of Oklahoma, the Ottawa Tribe and the Peoria Tribe of Indians of Oklahoma to request their comments on the Project. Southern Star sent follow-up emails to the tribes on January 4 and 23, 2019. The FERC sent its NOI (issued February 8, 2019) and individual letters (March 25, 2019) to the same tribes to provide them an opportunity to comment on the Project. The Peoria Tribe of Indians responded that they had no objection to the Project. The Sac and Fox of the Mississippi in Iowa, the Kaw Nation, and the Osage Nation requested copies of the cultural survey reports. Southern Star provided these reports to the tribes that requested them in January 2019.

Southern Star has prepared a plan in the event any unanticipated cultural resources or human remains were encountered during construction. We requested revisions to the plan. Southern Star made the requested revisions. We find the revised plan to be acceptable.

Therefore we have determined, in consultation with the SHPO and interested Indian tribes, that the Project as proposed would have no adverse effect on any properties listed in or eligible for listing in the NRHP.

7.0 Air Quality and Noise

7.1 Air Quality

Air quality would be affected by construction and operation of the Project. The Project would result in temporary emissions of regulated air pollutants and other air contaminants during construction. Emissions associated with operation of the Project would result from fugitive equipment leaks for pipeline components as well as natural gas venting associated with pigging activities.

National Ambient Air Quality Standards

The Clean Air Act (CAA) of 1970, as amended in 1977 and 1990, is the basic federal statute governing air quality. The provisions of the CAA that are potentially relevant to the Project include National Ambient Air Quality Standards (NAAQS) and General Conformity.

The CAA designates seven criteria pollutants for which NAAQS are promulgated to protect public health and welfare. They include nitrogen oxides (NOx), carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM10), particulate

matter less than 2.5 microns in diameter (PM2.5), sulfur dioxide (SO2), ozone (O_3), and lead. The NAAQS are codified in 40 CFR 50.

No air quality permits would be required for proposed emission sources associated with the Project. No county or local air quality regulations have been identified as being potentially applicable to the Project.

Attainment Status

Anderson County is located in the Southeast Kansas Intrastate Air Quality Control Region, while Franklin County is located in the Northeast Kansas Intrastate AQCR (EPA, 2018b).

The EPA designates the attainment status of an area for each criteria pollutant based on whether an area meets the NAAQS. Areas that meet the NAAQS are termed "attainment areas." Areas that do not meet the NAAQS are termed "nonattainment areas" (NAA). Areas for which insufficient data are available to determine attainment status are termed "unclassified areas;" these areas are treated as attainment areas for air permitting purposes. Areas formerly designated as NAA that have subsequently reached attainment are termed 'maintenance areas". Anderson and Franklin Counties are currently designated as attainment or unclassifiable (considered attainment) for all criteria pollutants (EPA, 2018c).

Greenhouse Gases

Greenhouse gases (GHGs) occur in the atmosphere both naturally and as a result of human activities, such as the burning of fossil fuels. In general, the most abundant GHGs are water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone. On December 7, 2009, the EPA defined air pollution to include the mix of six long-lived and directly-emitted GHGs, finding that the presence of the following GHGs in the atmosphere may endanger public health and public welfare through climate change: CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

The Project would contribute GHG emissions as a result of construction activity. The principle GHGs that would be produced by the Project are CO_2, CH_4, and N_2O. No fluorinated gases would be emitted by the Project. Emissions of GHGs are quantified and regulated in units of carbon dioxide equivalents (CO_{2e}). The CO_{2e} unit of measure takes into account the global warming potential (GWP) of each GHG. The GWP is a ratio relative to CO_2 that is based on the properties of the GHG's ability to absorb solar radiation as well as the residence time within the atmosphere. Thus, CO_2 has a GWP of one, CH_4 has a GWP of 25, and N_2O has a GWP of 298. To obtain the CO_{2e} quantity, the mass of the particular chemical is multiplied by the corresponding GWP, the product of

which is the CO for that chemical. The CO_{2e} value for each of the GHG chemicals is summed to obtain the total CO_{2e} GHG emissions.

Conformity of Federal Actions

The EPA promulgated the General Conformity Rule on November 30, 1993, to implement the conformity provision of Title I, Section 176(c)(1) of the CAA. Section 176(c)(1) requires that the federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved CAA implementation plan.

The General Conformity Rule is codified in Title 40 CFR 51 Subpart W and Part 93 Subpart B, determining Conformity of General Federal Actions to State or Federal Implementation Plans. A General Conformity Determination must be conducted by the lead federal agency if a federal action's activities are likely to generate direct and indirect emissions that would exceed the conformity threshold levels (*de minimis*) of the pollutant(s) for which an air basin is in nonattainment or maintenance.

Since the Project is in areas classified as attainment/unclassifiable (considered attainment) for all criteria pollutants; therefore, a General Conformity analysis should not be required.

Air Quality Impacts and Mitigation

Construction would result in emissions of fugitive dust from vehicular traffic and soil disturbance, and combustion emissions for diesel and gasoline fired construction equipment. Large earth-moving equipment and other mobile sources are sources of combustion-related emissions, including criteria pollutants and small amounts of hazardous air pollutants (HAP). Construction would generate potential air pollutant emissions of PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, volatile organic compound (VOC), GHG, and HAP emissions. A summary of potential construction emissions is provided in table 12. These emissions would be localized, temporary, and of limited duration, and are not anticipated to significantly increase ambient air pollutant concentrations. Potential impacts would be mitigated and minimized.

Table 12 Summary of Potential Construction Emissions

Year of Project Construction	NO_x (tons)	CO (tons)	SO_2 (tons)	TSP (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	VOC (tons)	CO_2e (tons)	Formaldehyde (tons)	Total HAP (tons)
2020	94.4	59.9	0.1	26.9	13.4	6.3	8.8	12,544.8	0.1	0.3
2021	57.6	38.4	0.1	20.1	9.9	4.0	5.4	8,000.1	0.1	0.2
TOTALS (tons)	**152.0**	**98.3**	**0.2**	**47.0**	**23.3**	**10.3**	**14.2**	**20,544.9**	**0.1**	**0.5**

Exhaust emissions from diesel- and gasoline-fueled construction equipment and vehicle engines would be minimized by federal design standards imposed at the time of manufacture of the vehicles and would comply with EPA mobile and non-road emission regulations (40 CFR Parts 85, 86, and 89). Emissions also would be controlled by purchasing commercial gasoline and diesel fuel products, specifications of which are controlled by federal and state air pollution control regulations applicable to fuel suppliers and distributors.

During construction, Southern Star would implement measures to control fugitive PM (dust) emissions, as outlined in its Fugitive Dust Control Plan. All areas temporarily disturbed by construction would be stabilized and restored to pre-construction conditions to the maximum extent practicable; therefore, fugitive dust emissions during construction of the Project would be minor, of short duration, and insignificant. Dust suppression measures would be proactively implemented as necessary to protect persons (general public and project workforce) and property from air pollution and nuisances caused by the generation of fugitive PM (dust) emissions. Southern Star currently anticipates using a maximum of 10,000 gallons of water per day during construction of the Project to control fugitive dust. Water used for dust control would be acquired from a municipal source or from the surface water withdrawal locations. Vehicle emissions would be controlled through on-site management practices, in accordance with the applicable state requirements, such as state inspection and maintenance program rules.

As indicated above, emissions from operation of the Project would result from fugitive equipment leaks for pipeline components as well as natural gas venting associated with pigging activities. There would also be emission associated with the natural gas purging that must be completed as part of commissioning the new pipelines. The purging would be a one-time activity that would not recur once it has been completed. Table 13 provides a summary of potential operational emissions for the Project. Even though purging is a commissioning activity, rather than an operational activity, the emissions from natural gas purging are included in the estimates summarized in the table below. No blowdowns of the new pipelines would be planned as part of normal operation. The Project's operational emissions would be minor and intermittent, would not exceed any applicable NAAQS standard, and would dissipate within a short distance of each source emission point.

Table 13 Potential Operational Emissions for the Project

Operational Activity	Annual Potential VOC Emissions (tpy)	Annual Potential CH4 Emissions (tpy)	Annual Potential CO_2e Emissions (tpy)
Fugitive Equipment Leaks	0.1	5.0	125.2

Natural Gas Venting During Pigging Activities	0.0	1.9	48.5
Total – Potential Operational Emissions	0.1	7.0	173.8
Initial Pipeline Purging (1-Time Activity)	4.8	279.7	6,992.0
Total	**5.0**	**293.6**	**7339.5**
tpy – tons per year VOC – volatile organic compound CH_4 - methane CO_{2e} – carbon dioxide equivalent			

In conclusion, with Southern Star's commitments to control fugitive dust, minimize construction worker traffic, the Project's construction and operation would have minimal impacts on regional air quality.

7.2 Noise

Noise quality can be affected both during construction and operation of the Project. The ambient sound level of a region is defined by the total noise generated within the specific environment, usually comprised of sounds emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetation cover.

Two measurements used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level in decibels (dB) containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Late night and early morning (10:00 pm to 7:00 am) noise exposures are penalized +10 dB to account for people's greater sensitivity to sound during the nighttime hours.

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an L_{dn} of 55 decibels on the A-weighted scale (dBA) protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impact from the

operation of permanent facilities as well as construction equipment that operates on a continuous (24 hours per day) basis, such as an HDD rig.

Operational Noise Impacts

The equipment proposed for installation at the Ottawa CS, the new Richmond Regulator Station, would be the primary sources of operational noise for the Project.

Ottawa CS

The existing Ottawa CS is located in Franklin County near the City of Ottawa. The area surrounding the existing Ottawa CS is mostly rural, consisting of open land that borders Interstate 35, though there are several residences within 0.25 mile of the existing facility.

The Ottawa CS typically operates at full-load only during the coldest months of the years. Due to the Project schedule and these operational limitations, it was not possible to obtain sound level measurements at the existing Ottawa CS equipment in full-load operation during the sound level survey of the station. Therefore, Southern Star developed a noise model using the most current station designs and manufactures specifications to predict the sound level contribution of the existing Ottawa CS equipment.

Noise Modeling Results

The majority of the proposed modifications at the existing Ottawa CS include piping modifications and the addition of filter/separators, which would have no long-term operational noise impacts. The modification that is expected to cause long-term operational sound level impacts is the addition of another 6-inch flow control valve, with 8-inch diameter piping, to the flow control valve located southeast of the compressor building.

A baseline noise survey was conducted at the existing Ottawa CS to identify nearby noise sensitive areas (NSA). Three NSAs closest to the existing Ottawa CS were identified, all of which are residences. An acoustical analysis was performed to predict the noise impacts after the proposed modifications are made and to develop recommended noise control treatments for the CS equipment. Table 14 provides the predicted noise impacts at the nearest NSAs to the Ottawa CS.

Table 14 Noise Quality Analysis for the Ottawa CS								
NSA	**Approx. Distance and Direction of NSA to Compressor Building**	**Measured Day-Night Average Sound Level (L_{dn} dBA)**	**Modeled Existing Station (Ldn dBA)**	**Modeled Existing Station + Ambient (L_{dn} dBA)**	**Modeled Project Additions (L_{dn} dBA)**	**Modeled Project + Existing Station (L_{dn} dBA)**	**Modeled Project + Existing Station + Ambient (L_{dn} dBA)**	**Increase due to Project (L_{dn} dBA)**
NSA S	780 feet South	70.3	52.2	70.4	38.8	52.4	70.4	0
NSA N	1,660 feet North	67.3	54.4	67.5	42.8	54.7	67.5	0
NSA W	1,070 feet West	68.6	46.6	68.6	26.8	46.7	68.6	0

The noise model results demonstrate that operation of the Ottawa CS with the additional Project modifications would contribute sound levels of less than 55 dBA L_{dn} at all NSAs. There is no change in sound levels at any of the NSAs due to the Project modifications.

Southern Star intends to implement noise control measures to ensure that noise levels from the existing Ottawa CS does not exceed the existing noise level. However, to ensure that the modified Ottawa CS does not exceed the existing noise levels at any nearby NSAs, **we recommend that:**

- **Southern Star should file a noise survey with the Secretary no later than 60 days after placing the modified Ottawa CS in service. If a full horsepower load condition noise survey is not possible, Southern Star should file an interim survey at the maximum possible horsepower load and provide the full load survey within 6 months. If the noise attributable to the operation of all of the equipment at the modified Ottawa CS under interim or full horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSAs, Southern Star should file a report on what changes are needed and should install the additional noise controls to meet the level within 6 months of the in-service date. Southern Star should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

With Southern Star's commitments to install the noise mitigation measures, and our recommended condition to ensure that noise from Ottawa CS does not exceed the

existing noise levels at any nearby NSAs, we conclude that noise impacts resulting from the Ottawa CS's operation would not be significant.

Richmond Regulator Station

The proposed Richmond Regulator Station site is located near the intersection of North Street and Highway 59 in Franklin County. The regulator station would be located in agricultural land and adjacent to a neighborhood in the town of Richmond. A baseline noise survey was conducted at the proposed Richmond Regulator Station to identify nearby NSAs. There are several NSAs (residences) located south of North Street, the closest of which is located approximately 100 feet from the proposed Richmond Regulator Station. An acoustical analysis was performed to predict the noise impacts after the proposed modifications are made and to develop recommended noise control treatments for the proposed Richmond Regulator equipment. A three-dimensional computer noise model was constructed to analyze the noise contributions expected from the proposed meter station equipment. The model concluded that in order to meet the FERC sound level requirements of 55 dBA (L_{dn}) at the closest NSA, the sound levels from the exposed regulator skid piping should be limited to 65 dBA at 3 feet or less. Southern Star indicated that the regulator valve and enclose would be specified to meet this sound level target. If a sufficiently quiet valve is not available, then acoustical insulation would be included in the regulator station design to meet the sound level target.

Table 15 presents the results of the noise quality analysis for the Richmond Regulator Station, including the ambient sound level in the vicinity of the proposed regulator station, the estimated sound level contribution from the proposed regulator station at the nearest NSA, and the potential increase in sound level above the existing sound level during operation.

Table 15 Noise Quality Analysis for the Richmond Regulator Station

NSA	Approximate Distance and Direction of NSA to Site Center	Measured Ambient Day-Night Average (L_{dn} dBA)	Predicted Regulator Station Contribution (L_{dn} dBA) [a]	Modeled Regulator Station + Ambient (L_{dn} dBA) [a]	Potential Increase due to Regulator Station (L_{dn} dBA)
NSA S	100 feet South	52.2	51.0	54.7	2.5

[a] Assumes all piping would be designed to a sound level criterion of 65 dBA at 3 feet.

The results of the acoustical analysis indicate that, with piping that produces a sound level of 65 dBA at three feet, the predicted sound levels at the closest NSA, which

is about 100 feet to the south of the regulator station would be 51 dBA L_{dn}. However, to ensure that the proposed Richmond Regulator Station operates within the predicted sound contribution at the nearest NSA, **we recommend that:**

- **Southern Star should file noise surveys with the Secretary no later than 60 days after placing the Richmond Regulator Station in service. If the noise attributable to the operation of the Richmond Regulator Station exceeds an L_{dn} of 55 dBA at the closest NSA, Southern Star should file a report on what changes are needed and should install the additional noise controls to meet the level within 6 months of the in-service date. Southern Star should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

With Southern Star's commitments to install the noise mitigation measures, and our recommended conditions to ensure that noise from Richmond Regulator Station does not increase the predicted noise levels, we conclude that noise impacts resulting from the Project's construction and operation would not be significant.

Construction Noise Impacts

Noise would be generated during construction of the Project facilities. While individuals in the immediate vicinity of the construction activities would experience an increase in noise, this effect would be temporary and localized. The changing number and type of construction equipment at these sites would result in varying levels of noise. Construction activities associated with the Projects would be performed with standard heavy equipment. The highest level of construction-related noise would occur during site earth work activities, such as site grading and clearing, when the largest amount of construction equipment would be operating. Many construction machines operate intermittently and the types of machines in use at a construction site changes with the construction phase. Construction noise, while varying according to equipment in use, would be mitigated by the attenuating effect of distance and the intermittent and short-lived character of the noise. All construction activities are anticipated to occur between 7:00 a.m. and 7:00 p.m., with the exception of various HDD activities.

Horizontal Directional Drilling Noise Impacts

The HDD method would be used to install the pipeline underneath the Marais des Cygnes River, Pottawatomie Creek, and Cedar Creek in Kansas. One NSA was identified for each of the six HDD entry and exit sites. Table 16 provides a summary of NSAs showing the HDD location, the nearest NSA, and distance and direction from the

HDD site to the NSA. Figures 2, 3, and 4 indicates the locations of the NSAs, the sound levels measurement locations and the HDD locations (entry and exit).

The HDD entry and exit sites would have several equipment sound sources in operation during the temporary construction work. On the entry side, this would include the drilling rig, mud pumps, generators, drilling mud mixers, shale shakers, light plants, and the driving engines associated with this equipment; also, mobile equipment such as cranes, front-end loaders, forklifts, and trucks. On the exit side, there is less equipment required, typically including a backhoe or bulldozer, and possible a generator and light plant. During pullback additional equipment would be relocated to the exit side resulting in noise levels similar to levels at the entry site for a short duration.

Table 16 Summary of HDD Location and Noise Sensitive Areas

HDD Location	Nearest NSA Description	Approximate Distance from Site to NSA (feet)	Direction to NSA
1-E	Residence	1,320	North
1-X	Residence	980	SW
2-E	Residence	870	NW
2-X	Residence	820	SE
3-E	Residence	1,520	NE
3-X	Residence	1,760	SW
Entry = E Exit = X			

A computer noise model was constructed to calculate the expected temporary sound level contributions due to the HDD equipment. The modeled contributions of HDD noise from 12 hours of daytime drilling activities along with measured ambient levels are shown in table 17. The acoustical assessment indicates that the noise of the HDD operations at all HDD sites are below 55 dBA L_{dn}.

Table 17 Predicted Temporary Sound Levels due to 12-Hour HDD Activities

HDD Location	Distance and Direction of the Closest NSA to Site Center	Existing Ambient	Calculated Sound Level due to HDD Activities		Existing Ambient Plus HDD Activities	Temporary Change in Sound Level
		L_{dn} dBA	L_{eq} dBA	L_{dn} dBA	L_{dn} dBA	L_{dn} dBA
HDD1: Marais Des Cygnes River - Entry	1320 Feet, North	65.0	50.9	**47.9**	65.1	0.1
HDD1: Marais Des Cygnes River - Exit	980 feet, SW	64.1	43.0	**40.0**	64.1	0.0
HDD2: Pottawatomie Creek - Entry	870 Feet, NW	50.2	54.8	**51.8**	54.1	3.9
HDD2: Pottawatomie Creek - Exit	820 Feet, SE	50.0	47.7	**44.7**	51.1	1.1

Table 17 Predicted Temporary Sound Levels due to 12-Hour HDD Activities						
HDD Location	**Distance and Direction of the Closest NSA to Site Center**	**Existing Ambient**	**Calculated Sound Level due to HDD Activities**		**Existing Ambient Plus HDD Activities**	**Temporary Change in Sound Level**
		L_{dn} dBA	**L_{eq} dBA**	**L_{dn} dBA**	**L_{dn} dBA**	**L_{dn} dBA**
HDD3: Cedar Creek - Entry	1760 Feet, NE	61.0	49.1	**46.1**	61.1	0.1
HDD3: Cedar Creek - Exit	1510 Feet, NW	61.0	51.5	**38.2**	61.0	0.0

The current drilling operation plan is to perform HDD activities during 12-hour daytime shifts. However, there may be periods, such as during pull-back, where 24-hour HDD activities may be required. Therefore, Southern Star provided sound level calculations performed for 24-hour HDD activities. Table 18 shows the predicted temporary sound levels due to HDD activities for 24-hour, day and night, operations.

Table 18 Predicted Temporary Sound Levels due to 24-Hour HDD Activities						
HDD Location	**Distance and Direction of the Closest NSA to Site Center**	**Existing Ambient***	**Calculated Sound Level due to HDD Activities**		**Existing Ambient Plus HDD Activities**	**Temporary Change in Sound Level**
		L_{dn} dBA	**L_{eq} dBA**	**L_{dn} dBA**	**L_{dn} dBA**	**L_{dn} dBA**
HDD1: Marais Des Cygnes River - Entry	1320 Feet, North	65.0	50.9	**57.4**	65.7	0.7
HDD1: Marais Des Cygnes River - Exit	980 feet, SW	64.1	43.0	**49.4**	64.2	0.1
HDD2: Pottawatomie Creek - Entry	870 Feet, NW	50.2	54.8	**61.2**	61.5	11.3
HDD2: Pottawatomie Creek - Exit	820 Feet, SE	50.0	47.7	**54.1**	55.5	5.5
HDD3: Cedar Creek - Entry	1760 Feet, NE	61.0	49.1	**55.5**	62.1	1.1
HDD3: Cedar Creek - Exit	1510 Feet, NW	61.0	41.2	**47.6**	61.2	0.2

If 24-hour operations are required at the HDD work areas in the case of pullback or emergency work, the acoustical assessment indicates that the sound levels from HDD activities would exceed 55 dBA L_{dn} at the closest NSAs to the Marais Des Cygnes River HDD Entry, Pottawatomie Creek HDD Entry and Cedar Creek HDD Entry sites. However, 24-hour HDD operations are not anticipated and if required, the duration of these activities is not projected to exceed 1-2 days. Based on the analysis above, we

conclude that noise impacts from abandonment, construction, and operation of the Project would not be significant.

To further mitigate potential noise disturbances in the event that 24-hour HDD operations would be required, Southern Star would offer relocation accommodations/negotiated compensation to affected landowners.

Figure 2 Marais Des Cygnes River HDD 1: NSAs and Measurement Locations

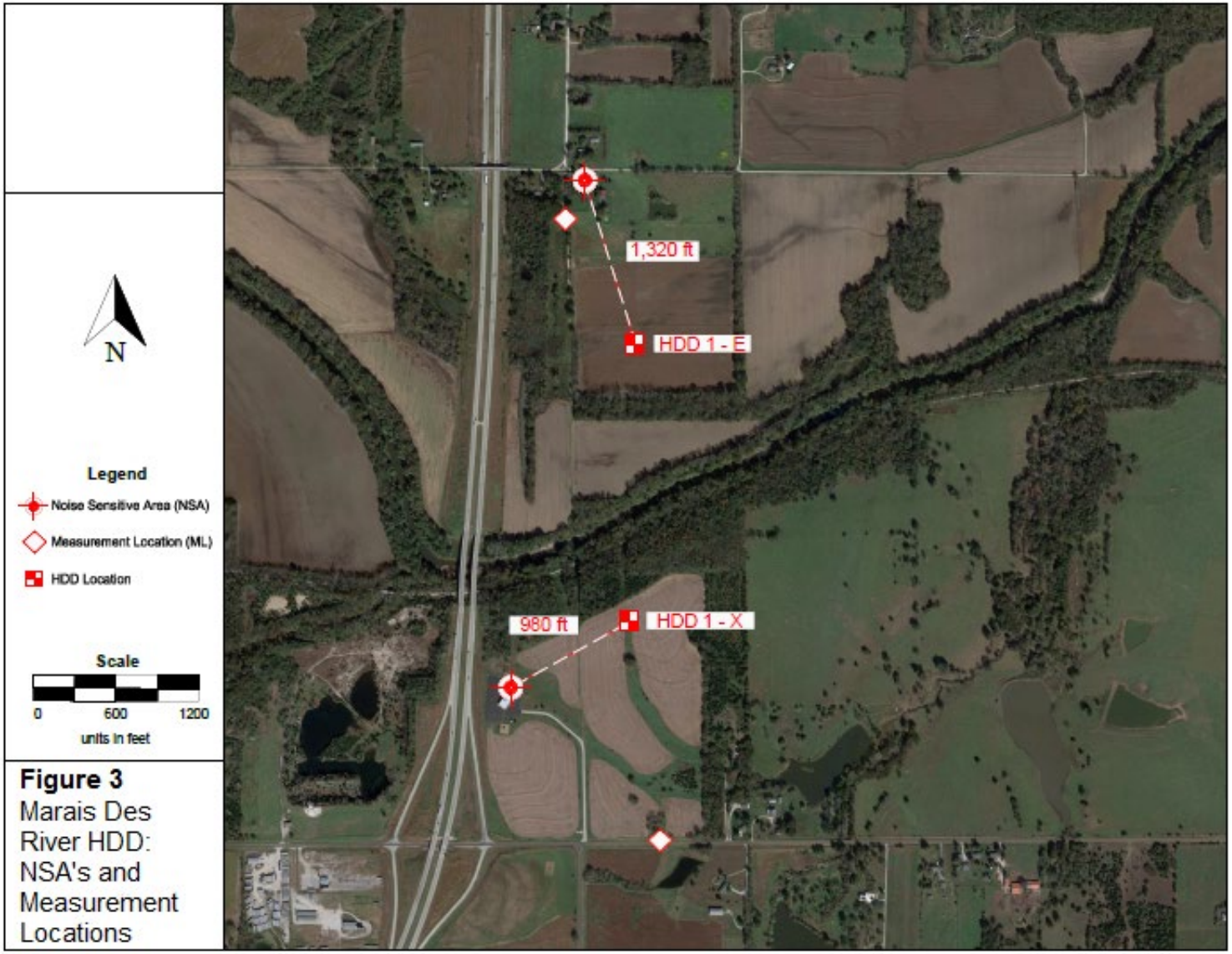


Figure 3 Pottawatomie HDD 2: NSA's and Measurement Locations

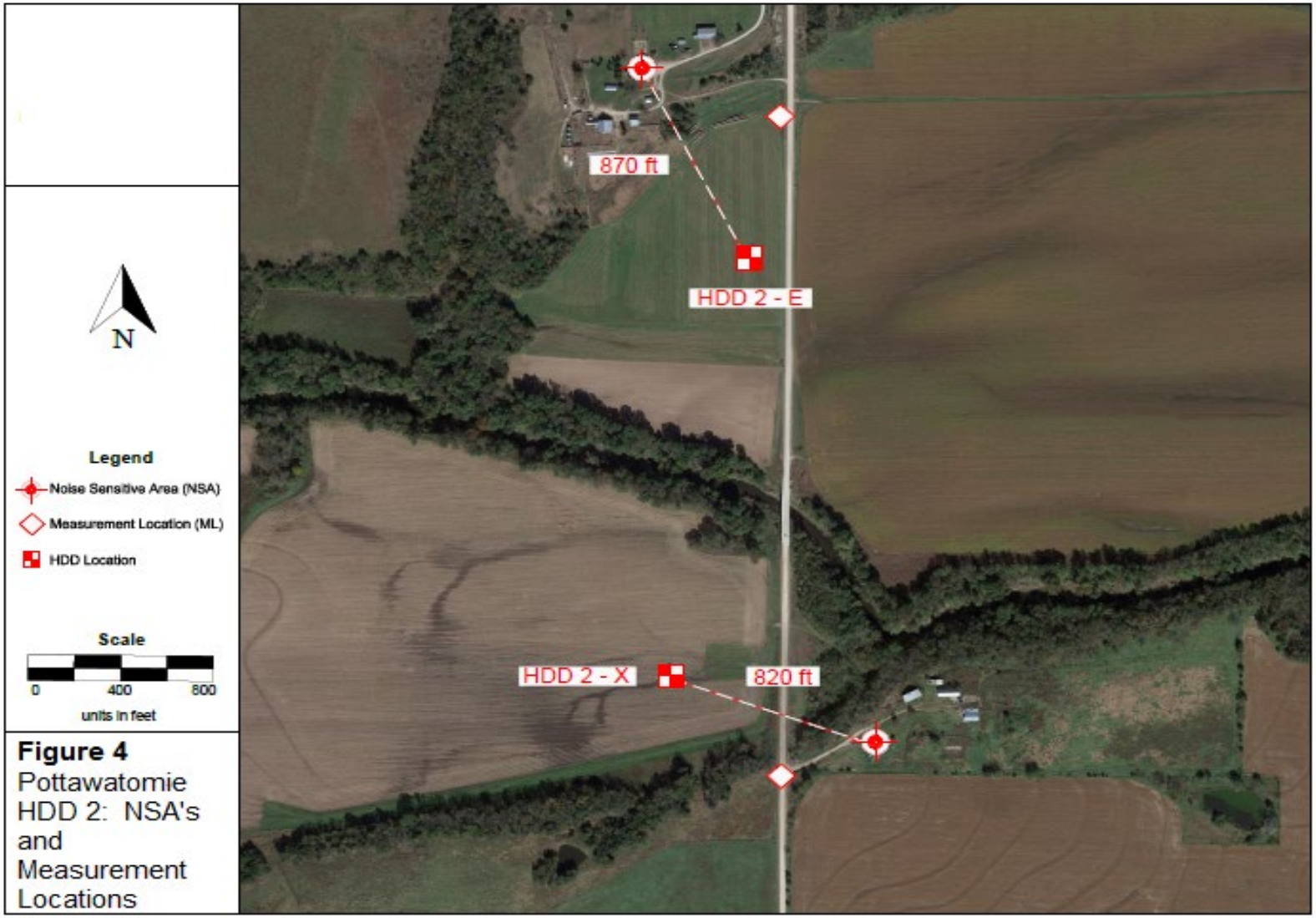
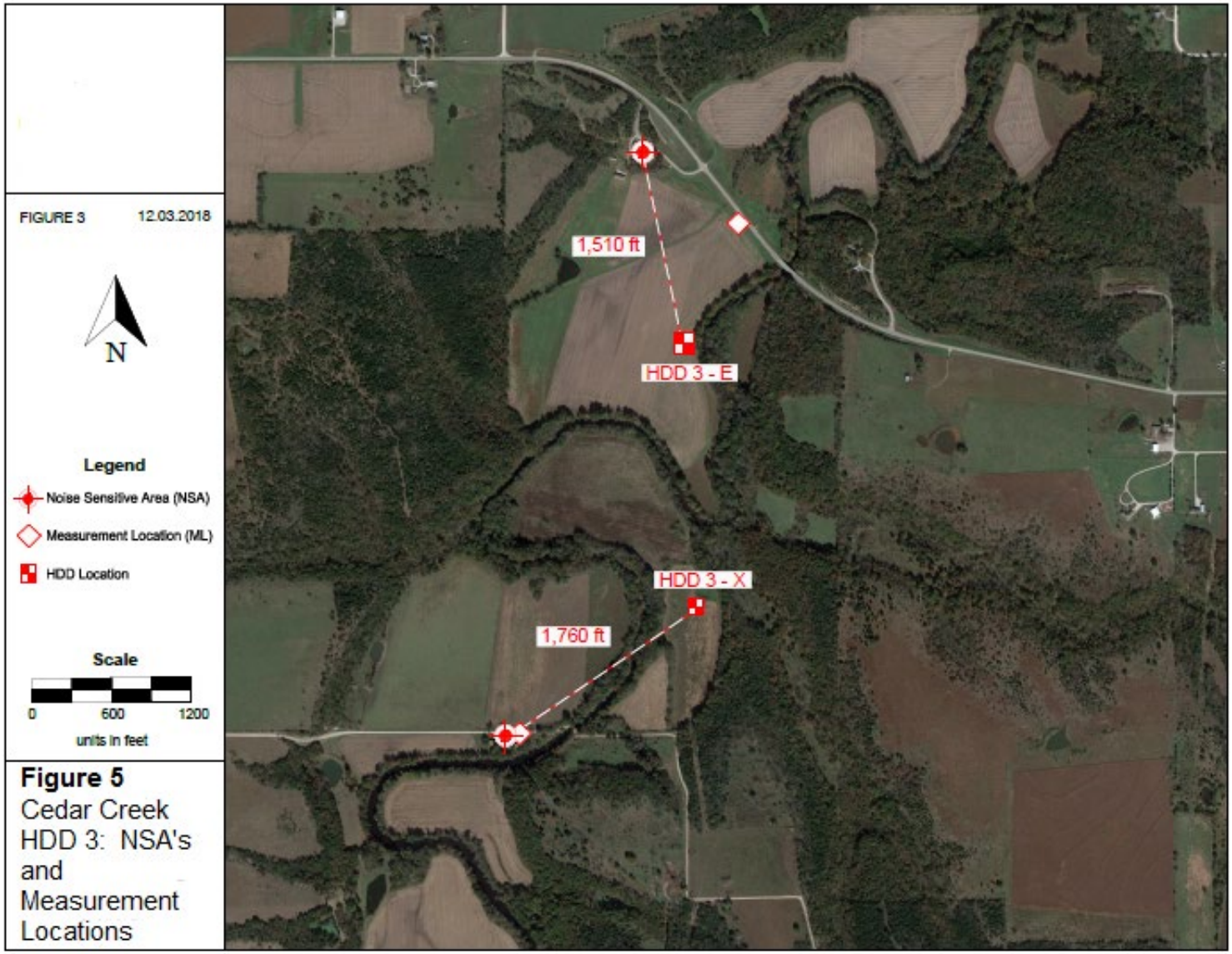


Figure 4 Cedar Creek HDD 3: NSA's and Measurement Locations



8.0 Reliability and Safety

8.1 Reliability

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. For example, Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues, prescribes the minimum standards for operating and maintaining pipeline facilities, and incorporates compressor station design, including emergency shutdowns and safety equipment. Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials.

Facilities associated with Southern Star's Project must be designed, constructed, operated, and maintained in accordance with DOT standards, including the provisions for written emergency plans and emergency shutdowns. Southern Star would provide the appropriate training to local emergency service personnel before the facilities are placed in service.

Southern Star's facilities and pipeline construction, operation and abandonment activities would represent a minimal increase in risk to the public and we are confident that with the options available in the detailed design of Southern Star's facilities, that they would be constructed and operated safely.

8.2 Safety Standards

The DOT is mandated to prescribe minimum safety standards to protect against risks posed by pipeline facilities under Title 49, U.S.C. Chapter 601. The DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards, which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA's safety mission is to ensure that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level.

Title 49, U.S.C. Chapter 601 provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement actions.

The DOT pipeline standards are published in 49 CFR 190-199. Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities dated January 15, 1993, between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert the DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the Lines DT and DS Replacement Project must be designed, constructed, operated, and maintained in

accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. Southern Star's Public Awareness Program has been developed based on 49 CFR Part 192 regulations and guidelines in RP 1162. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The DOT specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications based on population density in the vicinity of the pipeline. A pipeline must adhere to more rigorous safety requirements in areas that are more densely populated. Pipeline design pressures, hydrostatic test pressures, and maximum allowable operating pressure; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas high consequence areas (HCAs). HCAs for the Project are identified in table 19.

Table 19 High Consequences areas Crossed by the Project

Milepost	Distance from Proposed Pipeline Centerline (feet)	Description
Line DPA		
N/A	N/A	N/A
Garnett Lateral		
1.4 – 2.4	375	School Stadium
Scipio Lateral		
N/A	N/A	N/A
Richmond Lateral		
0.8 – 1.8	N/A	More than 20 occupied residences within PIR (585 feet)
N/A – not applicable PIR – Potential Impact Radium, as defined in 49 CFR 192.903		

The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined below:

- Class 1: Location with 10 or fewer buildings intended for human occupancy.
- Class 2: Location with more than 10 but less than 46 buildings intended for human occupancy.
- Class 3: Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period.

Class locations representing more populated areas require higher safety factors for pipeline design, testing, and operation. The minimum depth of cover for pipelines located within each class location, as defined by the DOT, are summarized in table 20.

Table 20 U.S. Department of Transportation Minimum Depth of Cover Standards		
Location	**Depth of Cover (inches)**	
	Normal Soil	**Consolidated Rock**
Class 1	30	18
Classes 2,3, and 4	36	24
Drainage ditches of public roads and railroad crossings	36	24
Source: 49 CFR Part 192.5		

Table 21 provides the class locations by milepost along the proposed pipeline routes. A majority of the Project is located within Class 1 areas, with a total of 35.5 miles of the four new pipelines located in Class 1, one mile located in Class 2, and one mile located in Class 3. The Project is not located in any Class 4 areas. The installed pipe for Line DPA would be designed to meet the current Class 1 location specifications, and the three new pipeline laterals would be designed to meet Class 3 specifications.

Table 21 Class Locations Crossed by the Project			
Class	**Begin Milepost**	**End Milepost**	**Length (miles)**
Line DPA			
1	0.00	31.50	31.50
Garnett Lateral			
1	0.00	1.40	1.40
3	1.40	2.35	0.95
Scipio Lateral			
1	0.00	1.81	1.81
Richmond Lateral			
1	0.00	0.80	0.80
2	0.80	1.78	0.98

Pipeline Accident Data

The transportation of natural gas by pipeline may involve some risk to the public in the event of an incident and subsequent release of natural gas. Previous impacts on public safety from pipeline transport of natural gas have been directly related to leaks or line breaks due to corrosion or equipment malfunctions. Impacts on public safety have also been indirectly related to leaks or line breaks resulting from external forces not associated with pipeline operations, such as damage from third-party digging near buried pipeline sections or damage from natural forces. To minimize the potential for incidents, interstate natural gas pipeline facilities are designed, constructed, operated, and maintained in accordance with the DOT PHMSA 49 Standard, CFR Part 192. Since February 9, 1970, 49 CFR Part 192 requires all operators of transmission and gathering systems to notify the DOT of any reportable incident and to submit a written report on form F7100.2 within 20 days.

Table 22 summarizes incidents and accidents by category for natural gas transmission lines from 1998 to 2017. The category accounting for the highest percentage of significant pipeline incidents is damage caused by external forces (approximately 32 percent). External forces include third party damage from construction equipment, earth movements (e.g., landslides), weather damage, or purposeful damage (deliberate damage to the pipeline). The most likely cause of potential damage to the proposed Project facilities would be external forces. Portions of the proposed Project facilities are located within a 100-year floodplain (A and AE zones), but the Project is not anticipated to adversely impact the function of the floodplains. The probability for seismic hazard in the Project area is characterized as low; therefore, the potential for damage caused by earth movement, weather, or purposeful damage is also considered to be low. The category accounting for another frequent cause of pipeline incidents is corrosion (approximately 24 percent). The *Pipeline Safety Acts* of 1971 and 2003 have introduced federal regulations for corrosion prevention (1971) and for corrosion monitoring (2003) that have begun to reduce the frequency of pipeline product releases due to corrosion.

The reportable incident data summarized in this table includes pipelines failures of significant magnitudes with widely varying causes and consequences.

Table 22 Office of Pipeline Safety – 1998 through 2017 Significant Incident Summary (by cause)

Year	Total Number of Significant Incidences	Corrosion	Construction / Material Failure	Damage by External Forces [a]	Other	Total Fatalities / Injuries
1998	51	13	11	15	12	1/11
1999	37	7	6	14	10	2/8
2000	54	21	3	14	16	15/16
2001	50	10	8	18	14	2/5
2002	56	15	19	16	6	1/4

Table 22 Office of Pipeline Safety – 1998 through 2017 Significant Incident Summary (by cause)						
Year	**Total Number of Significant Incidences**	**Corrosion**	**Construction / Material Failure**	**Damage by External Forces [a]**	**Other**	**Total Fatalities / Injuries**
2003	70	15	20	20	15	1/8
2004	63	15	17	26	5	0/2
2005	111	14	22	62	13	0/5
2006	78	14	28	18	18	3/3
2007	75	29	15	16	15	2/7
2008	73	12	14	37	10	0/5
2009	73	12	25	24	12	0/11
2010	79	25	26	18	10	10/61
2011	84	19	28	28	9	0/1
2012	62	22	22	14	4	0/7
2013	71	16	28	23	4	0/2
2014	77	16	32	22	7	1/1
2015	79	19	29	25	6	6/16
2016	55	14	21	17	3	3/3
2017	66	15	29	8	14	3/3
Total	**1,364**	**323 (23.7%)**	**403 (29.5%)**	**435 (31.9%)**	**203 (14.9%)**	**50/179**

[a] Damage by external forces includes: excavation, natural forces, and other outside forces.
Source: PHMSA, 2018

The nationwide totals of accident fatalities due to various hazards are listed in table 23 provides a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously since individual exposures to hazards are not uniform among all categories. Nevertheless, the average number of fatalities resulting from natural gas transmission and gathering pipelines is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate for pipelines is significantly lower than the annual fatality rate from natural hazards such as lightning, tornadoes, and floods.

Table 23 Nationwide Accidental Deaths for 2015	
Type of Accident	**Fatalities**
Poisoning	47,478
Motor vehicles	37,757

Table 23 Nationwide Accidental Deaths for 2015	
Type of Accident	**Fatalities**
Falls	33,381
Drowning	3,602
Fires and burns	2,646
Aircraft/watercraft	1,634
Tornadoes and floods (NOAA, 2017)	223
Lightning ((National Oceanic and Atmospheric Administration, 2017)	27
Average natural gas transmission and gathering pipeline reportable incidents (PHMSA, 1998-2017)	3
Source: All data, except where noted, reflect 2015 statistics from the Center for Disease Control, "Deaths: Final Data for 2015."	

Polychlorinated Biphenyls and Asbestos Containing Material

For many years, from approximately 1950 to the early 1970s, PCB-containing compounds were used by some interstate natural gas transmission companies as a lubricant, hydraulic fluid, or sealant for turbines and air compressors. As part of normal operation, PCBs could leak or blow by pressure seals and enter the transmission pipeline. PCBs may also be present in natural gas pipelines due to the historical practice of oil fogging, performed in the late 1940s through 1960s (EPA, 2004). Older pipeline segments and associated facilities in operation at the time that PCBs were employed in the natural gas transmission industry may be contaminated with PCBs at levels requiring abandonment and disposal procedures consistent with EPA's regulations found in 40 CFR 761.

Southern Star has no history of PCB contamination on its existing pipeline systems including Lines DP, DS, and DT systems. In 1981, Southern Star's predecessor, Cities Service Gas Company, participated in the EPA and Industry effort to determine the extent of the PCB contamination in U.S. natural gas transmission systems. The EPA concluded that no significant PCB levels were detected in the Cities Service company pipeline system. In the event any PCB contamination is encountered unexpectedly during construction, these materials would be managed in accordance with the EPA's Toxic Substances Control Act regulations found in 40 CFR Part 761, as well as any applicable state regulations. In addition, Southern Star would implement its Plan for the Unanticipated Discovery of Contaminated Environmental Media.

Southern Star has identified Potential Asbestos Containing Material (PACM), which was utilized for pipeline coating on the existing pipelines proposed for removal. Therefore, removal of Lines DT and DS has the potential to contaminate Project workspaces with PACM. Southern Star assumes that the entire lengths of the existing Lines DT and DS are coated in PACM, and would implement its *Operational Safety Procedure - Asbestos Operations Plan* to control worker exposure to hazards associated

with asbestos. The removal of pipe coated with PACM would be managed in accordance with the applicable requirements defined in 40 CFR 763 and the Occupational Safety and Health Administration rules specified under 29 CFR 1926.1101 to avoid the potential for site contamination. Contractors would be required to have an asbestos removal certification, and containment procedures would be followed when PACM coating is removed from the pipe as well as during pipe transportation and storage.

9.0 Cumulative Impacts

In accordance with NEPA, we identified other actions in the vicinity of the Project facilities and evaluated the potential for a cumulative impact on the environment. As defined by the Council on Environmental Quality (CEQ), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. The CEQ guidance states that an adequate cumulative effects analysis may be conducted by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions. In this analysis, we consider the impacts of past projects to have become part of the affected environment (environmental baseline), which is described and evaluated in the preceding environmental analyses; however, ongoing effects of past actions that are relevant to the analysis are also considered.

The potential cumulative impacts associated with the Project may result from the impacts of construction and operation of the Project facilities combined with the impacts of other proposed developments occurring within the vicinity of the Project. In this analysis, we consider the impacts of past projects within the region as part of the affected environmental analysis. We also considered potential cumulative impacts associated with other concurrent projects including recently constructed projects, or proposed projects for which a definitive project scope has been developed and necessary facilities have been identified.

The Project is expected to have no impact or a negligible impact on geologic resources and groundwater. Therefore, we conclude that the impacts from this Project, when considered cumulatively with past, present, and reasonably foreseeable projects, would not contribute to significant cumulative impacts on these resources, and these resources would not be discussed further in this section.

The geographic scope on cultural resources would be overlapping impacts within the area of potential effects. Impacts on cultural resources would be largely contained within or adjacent to proposed Project workspaces. As previously discussed in the EA, the Project would have no adverse effect on historic properties. In addition, no Native American tribes have expressed concerns about potential impacts on tribal lands or properties as a result of the Project. We evaluated other project/actions that overlapped with known areas of potential effects for cultural features potentially affected by the

Project. No projects were identified within or adjacent to the Project resources, therefore, cumulative impacts on cultural resources would not occur and are not discussed further.

The Project would not generate emissions during operation; therefore, only cumulative impacts related to construction emissions were considered.

Table 24 lists the resource-specific geographic scopes that are appropriate to assess cumulative impacts, based on the impacts of the Project as identified and described in the EA and consistent with CEQ guidance.

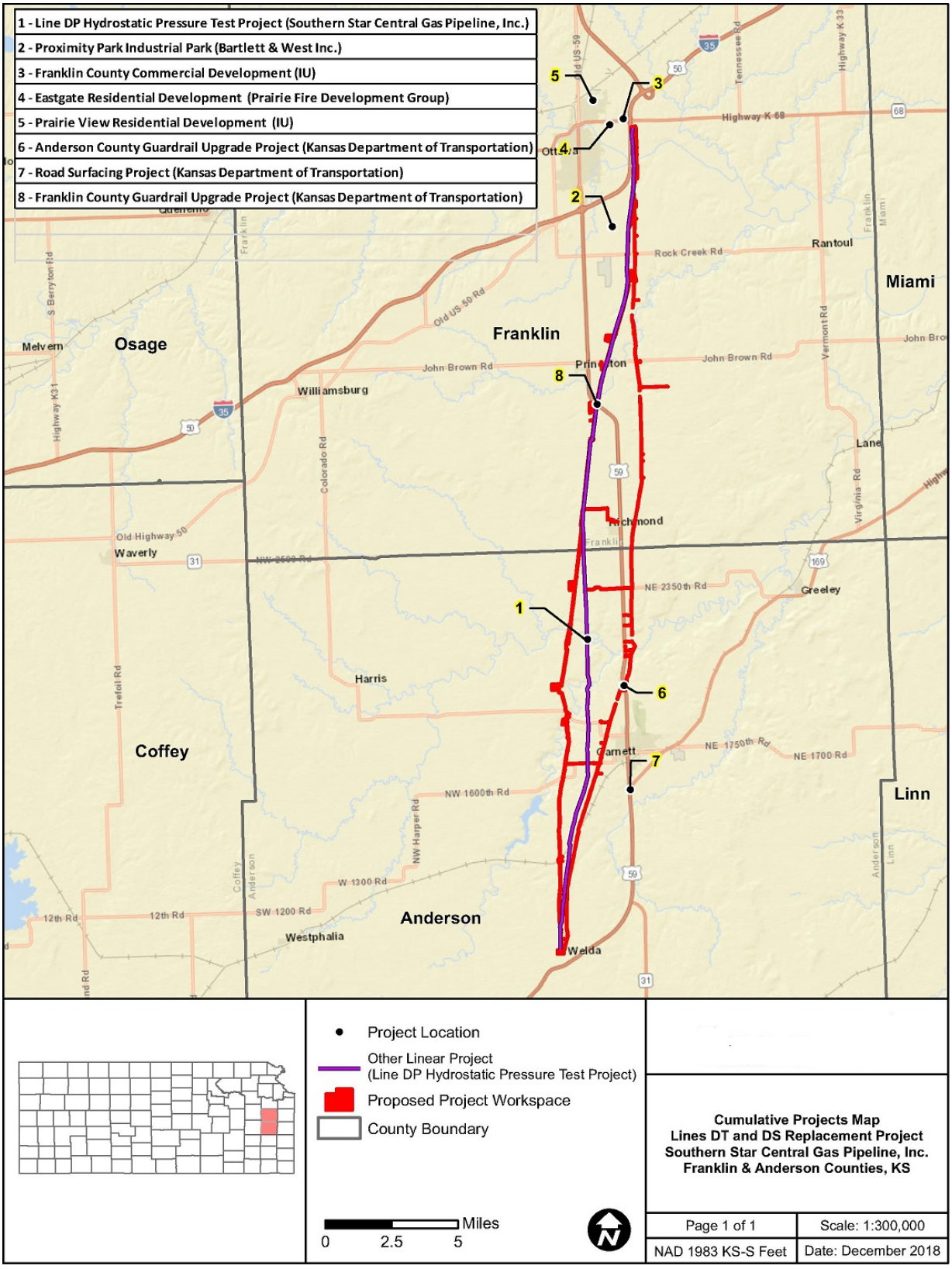
We identified projects within the vicinity of the proposed Project by contacting the city and county planning and development departments, reviewing the FERC Docket, and reviewing publicly available online resources. Appendix 8 summarizes the projects identified within proximity of the proposed Project having the potential to contribute to cumulative impacts. This includes the name and proponent, scope, construction schedule, and the resources that would be cumulatively affected by the Project. The location of these projects are shown on figure 5.

Table 24 Geographic Scope for Cumulative Impacts

Environmental Resources	Geographic Scope	Rationale
Soils	Construction workspaces	Soil resources occur within site-specific locations and are usually not affected by activities occurring outside the designated work areas.
Surface Water, Wetlands, Vegetation, and Wildlife	Hydrologic Unit Code (HUC) 12 Watershed	Watersheds are natural, well-defined boundaries for surface water flow, and commonly contribute to the recharge of groundwater resources. Vegetation and wildlife possess an interconnected relationship to surface water resources; therefore, these resources are evaluated utilizing the HUC 12 watershed.
Land Use	1-mile radius	Land use is considered cumulative if it occurs within the vicinity of the Project
Visual Resources	0.25 mile from pipeline segments and road crossings; 1-mile radius from new aboveground facilities	Surrounding terrain, vegetation, and existing development are common factors that impact visual resources. The pipeline right-of-way is less visible due to its size; therefore, a smaller geographic scope is utilized.
Noise – Operations	1-mile from permanent, noise-emitting aboveground resources	FERC guidance suggests that noise impacts from aboveground facilities be evaluated at all noise sensitive areas within 1-mile.
Noise – Construction	0.25-mile radius	Construction noise is limited in duration and is considered over a smaller area.

Table 24 Geographic Scope for Cumulative Impacts		
Environmental Resources	**Geographic Scope**	**Rationale**
Air Quality – Construction	0.25-mile radius	Construction equipment is the primary source of emissions during construction; however, these emissions would be minimal and would quickly dissipate to ambient levels as distance increases from the site.

Figure 5 Cumulative Projects Map



Soils

The Line DP Hydrostatic Pressure Test Project, Anderson County Guardrail Upgrade Project, and Franklin County Guardrail Upgrade Project occur within the geographic scope for soil resources and were considered in the cumulative impacts analysis.

Concurrent or consecutive construction schedules could prolong the duration that soils would be disturbed and thus susceptible to erosion and invasive species establishment. Construction of the Line DP Hydrostatic Pressure Test Project is scheduled to begin in May 2019 and was completed in July 2019; therefore, construction activities are not anticipated to overlap with the proposed Project. The Anderson County and Franklin County Guardrail Upgrade Projects are anticipated to be completed in December 2019, immediately prior to commencement of the Project.

To minimize impacts on soils, Southern Star would implement best management practices outlined in the Southern Star's Plan and Procedures regarding erosion control measures, revegetation, and soil stabilization. The Anderson County and Franklin County Guardrail Upgrade Projects would also be required to implement similar best management practices. Upon completion of the projects, all areas not converted to impermeable surfaces would be revegetated and maintained in an herbaceous state or otherwise stabilized with gravel cover. By implementing these measures, the potential cumulative impact on soils as a result of construction of the proposed Project, Line DP Hydrostatic Pressure Test Project, and Anderson County and Franklin County Guardrail Upgrade Projects would be short-term, minor, and not significant.

Surface Water and Wetland Resources

As identified in appendix 8, the following other projects occur within the HUC 12 watersheds in which the Project is located:

- Line DP Hydrostatic Pressure Test Project
- Proximity Park Industrial Park
- Franklin County Commercial Development
- Eastgate Residential Development
- Prairie View Residential Development
- Anderson County Guardrail Upgrade Project
- Kansas Department of Transportation Road Surfacing Project
- Franklin County Guardrail Upgrade Project

The Project, in addition to the other projects within the geographic scope, may have cumulative impacts on surface water. According to Southern Star, none of the projects within the HUC 12s would have direct impacts on wetland resources. In addition, the Anderson County Guardrail Upgrade Project, the Road Resurfacing

Project, and the Franklin County Guardrail Upgrade Project will all take place on existing roadways and rights-of-way and are not expected to impact surface water or wetlands. These projects would need to adhere to the KDHE regulations in regards to test water, construction water, and industrial storm water and wastewater discharges. As such, these projects would minimally contribute to cumulative impacts on surface waters and wetlands within the geographic scope.

In addition, based on a review of publicly available information the Franklin County Commercial Development Project and the Prairie View Residential Development Project are not anticipated to impact wetlands or open water features. However these projects may impact other surface water features. No specific information on the Eastgate Residential Development is publicly available but it is assumed that it may impact surface water features. These three projects are located 0.44 mile, 1.7 miles, and 8.2 miles, respectively, to the northwest of Project Yard 11 and as such are not anticipated to directly impact the same waterbodies and wetlands as crossed by the Project. However, the construction schedules for the Franklin County Commercial Development and Eastgate Residential Development projects are expected to overlap with the Project.

The Proximity Park Industrial Park project is located approximately 0.62 mile west of the Project but may impact some of the same ephemeral and intermittent waterbodies crossed by the Project. As the construction date for this project is not publicly available, it is assumed that construction may overlap with the Project.

Southern Star's Line DP Hydrostatic Pressure Test Project would overlap with the Project workspace at several locations and is expected to result in impacts on some of the same waterbodies as the Project. However, the Line DP Hydrostatic Pressure Test Project would only impact unnamed tributaries and manmade ponds and all impacts would be temporary. Lastly this project was completed in July 2019. Southern Star would adhere to all federal and state permits and authorizations as well as all measures of the FERC Procedures during the construction of the Line DP Hydrostatic Pressure Test Project.

Increased construction and industrial operation activities in and around surface waterbodies could result in an increased potential for spills of hazardous materials. Similar to the proposed Project, other projects would be expected to adhere to regulations associated with the use and storage of hazardous materials to minimize the potential for spills of hazardous materials to reach surface waters. We conclude the potential for cumulative impacts as a result of spills of hazardous materials is considered to be negligible, as spills are not anticipated.

Concurrent construction of projects involving clearing, grading, or other earthwork may also increase the potential for cumulative impacts on water quality

from increased storm water runoff. If revegetation associated with these other projects is not complete, and the work areas stabilized, at the start of construction of the proposed Project, there could be increased soil exposure within the watershed. This may increase the potential for sedimentation in surface waterbodies as a result of soil erosion, which could adversely impact water quality in the Project watershed. However, each these projects are also expected to implement best management practices to ensure avoidance, minimization, and/or mitigation of potential impacts on surface water resources. Although workspace associated with Southern Star's Line DP Hydrostatic Pressure Test Project would overlap with the Project workspace, construction activities would not overlap with the Project construction schedule and therefore, is not expected to contribute to cumulative impacts on surface water and wetland resources within the geographic scope for the proposed Project.

While surface water impacts associated with the Project could contribute to a cumulative effect when combined with other projects located within the geographic scope considered, based on the incremental impacts on surface water, this cumulative effect is not anticipated to be significant. Overall, cumulative impacts on surface water resources are anticipated to be minor and short-term.

As mentioned above, the eight projects within the HUC 12 watersheds shared by the Project are not expected to directly impact wetland resources. However increased construction and industrial operation activities in and around wetlands could result in an increase in sedimentation and spills of hazardous materials. Similar to the proposed Project, other projects are expected to adhere to regulations associated with the use and storage of hazardous materials to minimize the potential for spills of hazardous materials to reach wetlands. We conclude the potential for cumulative impacts as a result of storm water runoff and spills of hazardous materials is considered to be minimal.

Wildlife and Vegetation

The majority of impacts on wildlife and vegetation would be associated with the temporary and permanent conversion of vegetation/wildlife habitat association with the construction and operation of the Project. Increased development and loss of habitat within the geographic scope could cause wildlife to adapt to new conditions or to relocate to undisturbed habitat. This may lead to increased competition. In addition, direct mortality of less mobile species may occur as a result of development activities. However, the majority of the Project's impacts are expected to be short term and minor.

The Anderson County Guardrail Upgrade Project, the Kansas Department of Transportation Road Surfacing Project, and the Franklin County Guardrail Upgrade Projects are expected to occur completely within existing roadways and rights-of-way and are not expected to add significantly to cumulative impacts on vegetation and wildlife.

The remaining projects may have overlapping construction schedules with the Project which would result in a greater area and duration of vegetation disturbance in the geographic scope. Increased noise, lighting, and human activity may disturb wildlife in the area. However wildlife is anticipated to return to those areas temporarily affected following the completion of construction activities.

Forested impacts, however, do not need to be concurrent to be cumulative. The Proximity Park Industrial Park is anticipated to impact 33.5 acres of forested land. The Franklin County Commercial Development project is not anticipated to impact forested land. The Eastgate Residential Development project may also impact forested land however this information is unavailable. However, the total acreage impact for this project is anticipated to be 10 to 12 acres. Lastly the Line DP Hydrostatic Pressure Test Project would impact 0.83 acre of forested land. As such, cumulatively, the Project and the other projects within the geographic scope are expected to impact approximately 85.4 acres of forested land if the entire Eastgate Residential Development project is forested. Anderson and Franklin counties have an estimated 81,129 acres of forested land. Based on the minimal permanent impact of the Project and the abundance of similar habitat in the Project vicinity, we conclude that construction and operation of the Project and other projects in the same watershed would result in non-significant cumulative impacts on vegetation and wildlife.

Land Use

As identified in appendix 8, the following other projects occur within the geographic scope for cumulative impacts on land use:

- Line DP Hydrostatic Pressure Test Project;
- Proximity Park Industrial Park;
- Franklin County Commercial Development;
- Eastgate Residential Development;
- Anderson County Guardrail Upgrade Project; and
- Franklin County Guardrail Upgrade Project

The Project would result in minor land use impacts resulting from the conversion of open land and agricultural land to industrial for operation of the tie-ins, Richmond Regulator Station, and new permanent access roads. The Anderson County Guardrail Upgrade Project and the Franklin County Guardrail Upgrade Project involve modifications to the existing Highway 59 and would not result in the permanent conversion of existing land use. Therefore, these upgrade projects are not anticipated to contribute to cumulative impacts on land use. The remaining projects listed above would result in a conversion of the current land uses to industrial or residential.

Due to the abundance of land use types similar to those affected by the proposed Project and other projects within the geographic scope and the negligible amount of land

use conversion resulting from operation of the Project, cumulative impacts on land use are anticipated to be minor.

Visual Resources

As identified in appendix 8, the following other projects occur within the geographic scope for cumulative impacts on visual resources and were considered in the cumulative impact analysis:

- Line DP Hydrostatic Pressure Test Project;
- Anderson County Guardrail Upgrade Project; and
- Franklin County Guardrail Upgrade Project.

Visual impacts associated with the other projects listed above would be negligible due to their locations within existing developed areas and proximity to several other commercial and residential developments in the area. Therefore, the overall cumulative impact on visual resources associated with the construction and operation of the projects would be minor due to the lack of new, large aboveground facilities proposed for the Project and the existing developed nature of the areas surrounding each of the projects.

Air Quality

As identified in appendix 8, the following other projects occur within the geographic scope for air quality impacts from construction activities and were considered in the cumulative impacts analysis:

- Line DP Hydrostatic Pressure Test Project;
- Anderson County Guardrail Upgrade Project; and
- Franklin County Guardrail Upgrade Project.

Due to the temporary and localized nature of construction activities and associated emissions, construction would have to occur within the same general timeframe to result in a cumulative impact on air quality. All of the projects identified above are anticipated to be completed prior to the commencement of the Project. Therefore, cumulative impacts on air quality during construction are not anticipated to occur.

Noise

Noise impacts are highly localized and attenuate quickly as the distance from the source increases. No adverse cumulative impacts on noise would occur as a result of operation of the proposed modifications at the existing Welda CS, as no new noise generating equipment would be installed.

As identified in appendix 8, the following other projects occur within the geographic scope for construction and/or operational noise and were considered in the cumulative impacts analysis:

- Line DP Hydrostatic Pressure Test Project
- Anderson County Guardrail Upgrade Project
- Franklin County Guardrail Upgrade Project
- Eastgate Residential Development Project
- Franklin County Commercial Development Project

Cumulative construction noise impacts depend on the overall timing of construction for each of the identified projects and the type of daily construction activities occurring at each facility. Construction of the proposed Project and the other projects listed above are not anticipated to be concurrent, with the exception of the Eastgate Residential Development Project, which is scheduled to be completed during construction of the proposed Project. However, the Eastgate Residential Development Project is located more than 0.25 mile from the proposed Project and therefore, is not within the geographic scope considered for construction related noise. Because construction of the proposed Project and the other identified projects would not overlap, there would be no cumulative impact on construction-related noise as a result of this Project.

The other projects identified within 1 mile of the Ottawa CS and Richmond Regulator Station, which include the Eastgate Residential Development, Franklin County Commercial Development, and Line DP Hydrostatic Pressure Test projects, would not result in operational sources of noise. Therefore, the overall cumulative impact associated with operational noise would be negligible.

Conclusion on Cumulative Impacts

The Project would have a minimal impact on the resources discussed. We identified past, ongoing, and planned projects (appendix 8) in the Project's cumulative impact geographic scope identified in table 24.

Southern Star would minimize impacts by utilizing previous cleared/developed land whenever possible. Furthermore, the new Line DPA would be co-located with Southern Star's existing pipelines for a majority of the Project. As previously concluded in this EA, impacts with the Project would be minor and mostly temporary and therefore, when considered with past, present, and reasonably foreseeable projects with the geographic scope, we conclude that cumulative impacts on resources would not be significant.

SECTION C – ALTERNATIVES

In accordance with NEPA and Commission policy, we consider and evaluate alternatives to the proposed action, including the no-action alternative, system alternatives, pipeline route alternative, and aboveground facility alternatives. These alternatives are evaluated using a specific set of criteria. The evaluation criteria applied to each alternative include a determination whether the alternative:

- meets the objective of the proposed Project;
- is technically and economically feasible and practical; and
- offers a significant environmental advantage over the proposed Project.

Through environmental comparison and application of our professional judgment, each alternative is considered (in the sequence identified above) to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. An alternative that cannot achieve the purpose for the Project cannot be considered as an acceptable replacement for the Project. All of the alternatives considered here are able to meet the Project purpose stated in section 2.0 of this EA.

Many alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique or experimental method may not be technically practical because the required technology is not available or is unproven. Economically practical alternatives would result in an action that generally maintains the price competitive nature of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render the project economically impractical.

Alternatives that would not meet the Project's objective or were not feasible were not brought forward to the next level of review (i.e., the third evaluation criterion). Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery) and assume the same right-of-way

widths and general workspace requirements. Where appropriate, we also use site-specific information (e.g., field surveys or detailed designs). Our environmental analysis and this evaluation consider quantitative data (e.g., acreage or mileage) and uses common comparative factors such as total length, amount of collocation, and land requirements. Our evaluation also considers impacts on both the natural and human environments.

The impacts associated with the Project were described in detail in section B of this EA. Because the alternatives represent mostly alternative locations for natural gas facilities, the specific nature of these impacts on the natural and human environments would generally be similar to the impacts described in section B. In recognition of the competing interests and the different nature of impacts resulting from an alternative that sometimes exist (i.e. impacts on the natural environment versus impacts on the human environment), we also consider other factors that are relevant to a particular alternative and discount or eliminate factors that are not relevant or may have less weight or significance.

No significant site alternatives were considered for the Project aboveground facilities, as these sites are either existing aboveground facilities or were chosen based on their proximity to Southern Star's existing pipeline system.

1.0 No-Action Alternative

Implementing the No-Active Alternative would result in the proposed Project not being constructed. Not constructing the Project would avoid affecting the environment as described previously in this document. However, the purpose and need of the Project would not be met as Southern Star would not be able to abandon the existing Lines DT and DS and replace them with the new Line DPA. If the Project is not constructed, Southern Star will not have the ability to provide the natural gas currently transported by the existing Lines DT and DS to its northeast markets. Furthermore, if Lines DT and DS are not replaced, corrosion of these lines would continue, repair costs would likely increase, and the integrity of these lines would be less than optimal. We conclude that the no-action alternative would not meet the objectives of the Project. If the purpose and need of the Project are not met, than other projects and activities would be required and these projects would result in their own environmental impacts and likely have larger construction efforts including new pipelines. We conclude that the no-action alternative would not meet the objectives of the Project and may also not provide a significant environmental advantage over the Project.

2.0 System Alternatives

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed natural gas systems that would meet the stated purpose of the proposed Project. A viable system alternative would make it unnecessary to construct all or part of the Project, although some modifications or additions to another

existing pipeline system may be required to increase its capacity, or another entirely new system may need to be constructed. Such modification or additions would result in environmental impacts that could be less than, similar to, or potentially greater than those associated with the Project.

Southern Star's Line DP is located between the Weld and Ottawa compressor stations and would remain in service during and following construction of the Project. However, Line DP is currently operating at the maximum allowable operating pressure and thus, cannot feasibly accommodate the natural gas supplies which are currently transported by Lines DT and DS. Therefore, we conclude the use of this line would not be a reasonable alternative to the Project. We identified no other existing systems that could satisfy the Project objective.

3.0 Pipeline Route Alternatives – Abandonment Alternatives

We evaluated two Line DPA alternative routes (Alternative 1 and Alternative 2). Table 25 provides a comparison of the routes and the location of the pipeline route alternatives are provided in figure 6.

Figure 6 Location of the Pipeline Route Alternatives

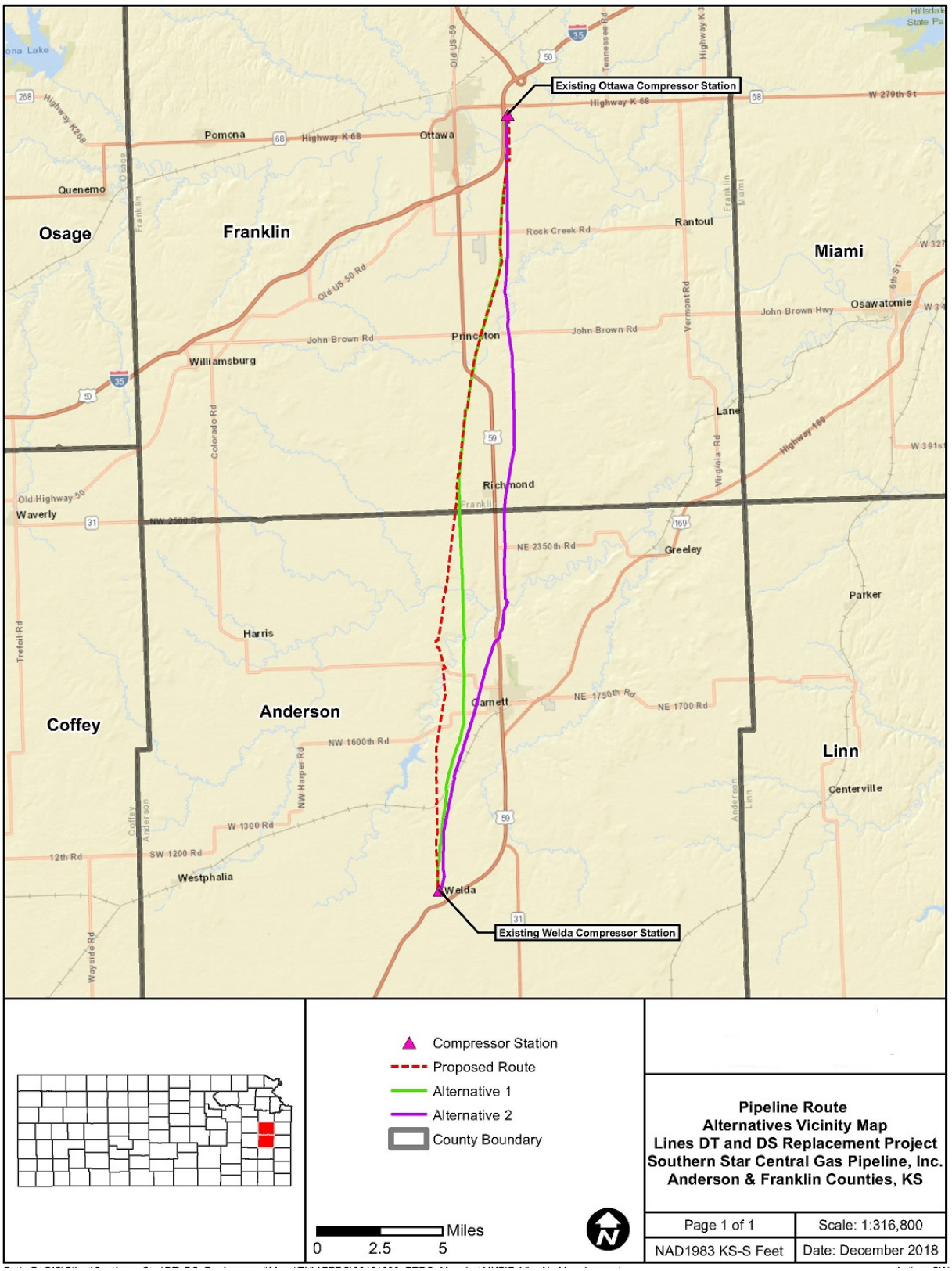


Table 25 Pipeline Route Alternatives Comparison

Category	Proposed Route	Alternative 1	Alternative 2
Route Length (miles)	31.5	31.1	31.6
Total Land Disturbance (acres) [a]	419.9	415.2	421.4
Percent Adjacent to Existing right-of-way	81	100	100
Residences within 100 feet [b]	0	14	16
Public Lands Crossed [c]	2	2	2
Land Use (acres) [a, d]			
Agriculture	332.3	332.0	343.6
Forest	39.1	32.2	20.4
Open Land	31.1	35.1	40.3
Industrial	15.0	12.1	13.3
Total Waterbody Crossings	23	28	27
Wetland Impact (acres) [a, i]			
Non-forested (PEM/PSS) Wetland	0.77	1.3	1.7
Forested (PFO) Wetland	0.28	0.44	0.57
Total Wetland Impact	1.1	1.7	2.2

[a] Impacts for the proposed and alternative routes are based on a 110-foot-wide construction corridor. Impacts for the Proposed Route and alternative routes do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities in order to provide a reasonable comparison of workspace requirements between alternatives.
[b] Distance is measured from the pipeline centerline.
[c] Public lands were considered to be defined areas that are owned or managed by federal, state, or local agencies.
[d] Land use impacts for the proposed and alternative routes are based on aerial imagery, NWI data, and the National Land Cover Database (2011).
[i] Wetland impact acreages for the proposed and alternative routes are based on NWI data to provide a reasonable comparison.

Alternative 1

Alternative 1 begins at the Welda CS and follows the Line DP pipeline route (offset 25 feet) before terminating at the Ottawa CS. Alternative 1 is 0.37 mile shorter than the proposed route and would disturb 4.7 acres less land. It would also be collocated with exiting corridors for 100 percent of its length, versus 81 percent for the proposed route and would impact 8.3 acres less forest than the proposed route. However, it would require five more waterbody crossings than the proposed route and 0.68 acre of additional wetland impacts. In addition, there are 14 residences located within 100 feet of alternative 1, as compared to the proposed route which does not have any residences within 100 feet of the centerline. Therefore, we conclude that Alternative 1 does not offer a significant environmental advantage over the proposed route.

Alternative 2

Alternative 2 begins at the existing Welda CS and follows the Line DT pipeline route (offset 25 feet) before terminating at the Ottawa CS. It would be collocated with exiting corridors for 100 percent of its length, versus 81 percent for the proposed route and would impact 20 acres less forest than the proposed route. Alternative 2 is 0.1 mile longer that the proposed route and would require 1.5 acres of additional land disturbance. Alternative 2 would require impacts on 2.2 acres of wetlands, which is more than twice the 1.1 acres of wetland impacts associated with the proposed route. In addition, Alternative 2 has 16 residences within 100 feet of the centerline and would require 4 more waterbody crossings than the proposed route. Therefore, we conclude that Alternative 2 does not offer a significant environmental advantage over the proposed Project.

Conclusion

After reviewing the alternatives to the proposed Project, we concluded that none of the system alternatives and pipeline route alternatives would satisfy the evaluation criteria. In summary, we have determined that the proposed action, as modified by our recommended mitigation measures, is the preferred alternative that can meet the Project's objectives.

SECTION D – STAFF'S CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis in this EA, we have determined that if Southern Star abandons, constructs, and operates the proposed facilities in accordance with its application and supplements, and the staff's recommended mitigation measures below, approval of the Project would not constitute a major federal action significantly affecting the quality of the human environment. We recommend that the Commission Order contain a finding of no significant impact and include the measures listed below as conditions in any authorization the Commission may issue to Southern Star.

1. Southern Star shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. Southern Star must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
    b. justify each modification relative to site-specific conditions;
    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
    d. receive approval in writing from the Director of the OEP **before using that modification.**

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the Project, and abandonment activities. This authority shall allow:

    a. the modification of conditions of the Order;
    b. stop-work authority; and
    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from Project construction and operation / abandonment activities.

3. **Prior to any construction**, Southern Star shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel would be informed of the EI's authority and have been or would be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Southern Star shall file with the Secretary any revised detailed survey maps/sheets at a scale not smaller than 1:6,000 with station positions for the facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Southern Star's exercise of eminent domain authority granted under NGA section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Southern Star's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Southern Star shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of the OEP **before construction in or near that area**.

   This requirement does not apply to extra workspaces allowed by the Commission's Plan and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resource mitigation measures;
   b. implementation of endangered, threatened, or special concern species mitigation measures;
   c. recommendations by state regulatory authorities; and
   d. agreements with individual's landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the Order and before construction or abandonment by removal begins**, Southern Star shall file an Implementation Plan with the Secretary for review and written approval by the Director of the OEP. Southern Star must file revisions to the plan as schedules change. The plan shall identify:

    a. how Southern Star would implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;
    b. how Southern Star would incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
    c. the number of EIs assigned per spread, and how the company would ensure that sufficient personnel are available to implement the environmental mitigation;
    d. company personnel, including EIs and contractors, who would receive copies of the appropriate material;
    e. the location and dates of the environmental compliance training and instruction Southern Star would give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change);
    f. the company personnel (if known) and specific portion of Southern Star's organizations having responsibility for compliance;
    g. the procedures (including use of contract penalties) Southern Star would follow if noncompliance occurs; and
    h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
        i. the completion of all required surveys and reports;
        j. the environmental compliance training of onsite personnel;
        k. the start of construction; and
        l. the start and completion of restoration.

7. Southern Star shall employ at least one EI for the Project. The EI(s) shall be:

    a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;
    b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
d. a full-time position, separate from all other activity inspectors;
e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Southern Star shall file updated status reports with the Secretary on a **biweekly** basis until all construction, abandonment, and restoration activities are complete. On request, these status reports would also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on Southern Star's efforts to obtain the necessary federal authorizations;
b. the construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;
c. a listing of all problems encountered and each instance of noncompliance observed by the EI during the reporting period both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies;
d. a description of the corrective actions implemented in response to all instances of noncompliance;
e. the effectiveness of all corrective actions implemented;
f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
g. copies of any correspondence received by Southern Star from other federal, state, or local permitting agencies concerning instances of noncompliance, and Southern Star's response.

9. Southern Star must receive written authorization from the Director of OEP **before commencing construction or abandonment of any Project facilities**. To obtain such authorization, Southern Star must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

10. Southern Star must receive written authorization from the Director of OEP **before placing the Project into service.** Such authorization will only be granted

following a determination that rehabilitation and restoration of the areas affected by the Project are proceeding satisfactorily.

11. **Within 30 days of placing the authorized facilities in service**, Southern Star shall file an affirmative statement with the Secretary, certified by a senior company official:

    a. that the facilities have been constructed/abandoned in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or
    b. identifying which of the conditions in the Order Southern Star has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. **Prior to construction**, Southern Star shall file with the Secretary, for review and written approval by the Director of OEP, field-verified locations of active oil and gas wells within 100 feet Project workspaces and site-specific measures to protect these wells from damage.

13. **Prior to construction**, Southern Star shall file with the Secretary, for review and written approval by the Director of OEP:

    a. results of testing that show that atrazine levels within the sediments at the Middle Creek crossing location are within the acceptable range; or

    b. a revised crossing plan for Middle Creek that includes the use of a trenchless crossing method (i.e. conventional bore or HDD).

14. Southern Star shall file a noise survey with the Secretary **no later than 60 days** after placing the modified Ottawa CS in service. If a full horsepower load condition noise survey is not possible, Southern Star shall file an interim survey at the maximum possible horsepower load and provide the full load survey **within 6 months.** If the noise attributable to the operation of all the equipment at the modified Ottawa CS under interim or full horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSAs, Southern Star shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 6 months** of the in-service date. Southern Star shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

15. Southern Star shall file noise surveys with the Secretary **no later than 60 days** after placing the Richmond Regulator Station in service. If the noise attributable to the operation of the Richmond Regulator Station exceeds an L_{dn} of 55 dBA at the closest NSA, Southern Star shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 6 months** of the in-service date. Southern Star shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

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APPENDIX 1

Segments of Existing Lines DT and DS Proposed for Abandonment In Place

Appendix 1 Segments of Existing Lines DT and DS Proposed for Abandonment In Place			
Milepost		Length (miles)	Justification
Begin	End		
Line DT			
0.29	0.31	0.02	SW Maryland Road Crossing
3.08	3.09	0.01	E 1300 Road Crossing
4.83	4.85	0.02	Railroad Crossing
5.16	5.17	0.01	1500 Road Crossing
5.96	5.97	0.01	1570 Road Crossing
6.12	6.16	0.04	SW Missouri Road Crossing
6.44	6.46	0.02	1600 Road Crossing
6.98	6.99	0.01	1650 Road Crossing
7.52	7.53	0.01	1700 Road Crossing
7.76	7.79	0.03	NW Mitchell Road Crossing
8.04	8.05	0.01	1750 Road Crossing
8.57	8.58	0.01	KS-31 Crossing
9.83	10.03	0.20	Pond and Wetland Crossings
10.47	10.48	0.01	NW 1980th Road Crossing
10.59	10.73	0.14	Highway 59, Prairie Spirit Rail Trail, and Forest Crossings
11.94	11.97	0.03	Pottawatomie Creek Crossing
12.19	12.23	0.04	Prairie Spirit Rail Trail and Wetland Crossings
12.40	12.63	0.23	Waterbody and Wetland Crossings
14.39	14.40	0.01	Scipio Road Crossing
15.45	15.48	0.03	Prairie Spirit Rail Trail Crossing
15.90	15.91	0.01	Allen Road Crossing
16.91	16.92	0.01	Butler Road Crossing
17.94	17.95	0.01	Clark Road Crossing
18.94	18.96	0.02	Cloud Road Crossing
19.95	19.96	0.01	Douglas Road Crossing
20.96	20.97	0.01	Ellis Road Crossing
21.64	21.86	0.22	Waterbody Crossings
22.97	22.99	0.02	John Brown Road Crossing
23.45	23.54	0.09	Middle Creek Crossing
23.99	24.00	0.01	Hamilton Road Crossing
24.71	25.01	0.30	Waterbody and Forest Crossings
26.00	26.01	0.01	Jackson Road Crossing
27.02	27.03	0.01	Rock Creek Road Crossing
28.02	28.03	0.01	Kingman Road Crossing
29.03	29.04	0.01	Labette Road Crossing
29.30	29.94	0.64	Waterbody and Labette Terrace Crossings
30.05	30.06	0.01	Marshall Road Crossing
30.36	30.52	0.16	Flint Hills Nature Trail and Marais des Cygnes River Crossings

Appendix 1 Segments of Existing Lines DT and DS Proposed for Abandonment In Place			
Milepost		**Length (miles)**	**Justification**
Begin	**End**		
30.70	31.06	0.36	Waterbody, Wetland, and Neosho Road Crossings
Line DT Total		***2.81***	--
Line DS			
0.74	0.75	0.01	1100 Road Crossing
2.75	2.76	0.01	E 1300 Road Crossing
3.36	3.39	0.03	Waterbody and Railroad Crossings
3.75	3.76	0.01	1400 Road Crossing
4.76	4.77	0.01	1500 Road Crossing
5.21	5.27	0.06	Wetland and 1550 Road Crossings
6.49	6.50	0.01	1650 Road Crossing
7.00	7.01	0.01	1700 Road Crossing
7.51	7.52	0.01	1750 Road Crossing
7.77	7.78	0.01	Maryland Road Crossing
8.39	8.60	0.21	Cedar Creek Crossing
8.86	8.98	0.12	Private Road and KS-31 Crossings
9.76	10.05	0.29	Pond Crossing and Residence Avoidance
10.63	10.64	0.01	NW 2050 Road Crossing
11.42	11.63	0.21	Wetland and Pond Crossings
11.65	11.66	0.01	2150 Road Crossing
12.07	12.15	0.08	Pottawatomie Creek Crossing
12.25	12.33	0.08	Maryland Road Crossing
13.16	13.17	0.01	NW 2300 Road Crossing
14.17	14.18	0.01	NW 2400 Road Crossing
15.19	15.20	0.01	Allen Road Crossing
16.20	16.21	0.01	Butler Road Crossing
17.21	17.22	0.01	Clark Road Crossing
18.23	18.24	0.01	Cloud Road Crossing
19.31	19.41	0.10	Douglas Road, Missouri Road, and Prairie Spirit Rail Trail Crossings
20.52	20.53	0.01	Wetland Crossing
20.72	20.75	0.03	Highway 59 Crossing
21.10	21.12	0.02	Middle Creek Crossing
21.31	21.32	0.01	Finney Road Crossing
22.36	22.41	0.05	Waterbody and John Brown Road Crossings
23.24	23.32	0.08	Montana Road Crossing
23.43	23.44	0.01	Hamilton Road Crossing
25.52	25.53	0.01	Jackson Road Crossing
26.53	26.54	0.01	Rock Creek Road Crossing
27.54	27.55	0.01	Kingman Road Crossing

Appendix 1 Segments of Existing Lines DT and DS Proposed for Abandonment In Place			
Milepost		**Length (miles)**	**Justification**
Begin	**End**		
28.56	28.57	0.01	Labette Road Crossing
29.06	29.07	0.01	Labette Terrace Crossing
29.42	29.43	0.01	Nebraska Road Crossing
29.64	29.65	0.01	Marshall Road Crossing
29.97	30.36	0.39	Flint Hills Nature Trail and Marais des Cygnes River Crossings
30.63	30.64	0.01	Neosho Road Crossing
Line DS Total		***2.02***	
TOTAL		**4.83**	

APPENDIX 2

Surface Waterbodies Crossed or Otherwise Affected by the Project

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
Milepost / Facility	**Feature ID**	**Waterbody Name**	**State Water Quality Classification[a]**	**Fisheries Classification**	**Flow Regime**	**FERC Classification**	**Approximate Waterbody Width (feet)**	**Pipeline Crossing Length (feet)**	**Proposed Crossing Method**
Pipeline Facilities									
Line DPA									
Anderson County, Kansas									
0.02	SP3AN005 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
0.39	SP1AN001 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2	Open-cut
0.40	SP1AN002	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	0 [c]	Workspace Only
1.25	SP1AN003 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	25	32	Open-cut
1.82	SP1AN005 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
2.03	SP1AN006 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
4.45	SP1AN007 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
4.76	SP1AN008 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2	Open-cut
4.81	SP1AN009 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	4	Open-cut
5.17	SP1AN010 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
5.68	SP1AN011 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
6.04	SP1AN012 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Intermediate	6	12	Open-cut

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
6.19	SP1AN014 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6	Open-cut
6.21	SP1AN013 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	15	22	Open-cut
6.74	SP1AN036	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Intermediate	18	0 [c]	Workspace Only
6.74	SP1AN030 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4.5	5	Open-cut
7.19	SP1AN022 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	8	10	Open-cut
7.26	SP1AN023 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	7	Open-cut
7.70	SP1AN024 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5	Open-cut
8.31	SP1AN021_C	Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Major	110	230	HDD
8.72	SP1AN020 b	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	9	10	Open-cut
8.87	SP1AN019	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5	Open-cut
8.88	SP1AN020	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	9	0 [c]	Workspace Only
9.42	SP1AN017 [b]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	4	5	Open-cut
9.68	SP1AN016	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2.5	0 [c]	Workspace Only
9.69	SP1AN015	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	5	5	Open-cut

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
11.99	SP1AN025	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	9	Open-cut
12.02	SP1AN025	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	0 [c]	Workspace Only
12.22	SP1AN027	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6	HDD
12.26	SP1AN026	Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Intermediate	75	76	HDD
14.22	SP1AN028 [b]	Unnamed Tributary of Sac Creek	AL-E, CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	4	Open-cut
15.31	SP1AN037 [b]	Unnamed Tributary of Sac Creek	AL-E, CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	5	Open-cut
Franklin County, Kansas									
16.43	SP1FR038	Unnamed Tributary of Sac Creek	AL-E, CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	7	Open-cut
18.91	SP1FR039 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5	Open-cut
18.94	SP1FR039	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	0 [c]	Workspace Only
19.12	SP1FR040 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6	Open-cut
19.70	SP1FR041	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	0 [c]	Workspace Only
20.23	SP1FR042 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
21.32	SP1FR047 [b]	Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Intermediate	70	75	Open-cut

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
21.87	SP1FR048 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2	Open-cut
22.58	SP1FR049 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	20	24	Open-cut
22.62	OWP1FR015	Manmade Pond	N/A	Warmwater	Open Water	N/A	15 [d]	0 [c]	Workspace Only
22.86	SP1FR051 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	5	Open-cut
24.59	SP2FR002 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Intermediate	20	22	Open-cut
24.98	SP2FR003 [b]	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	6	Open-cut
27.39	SP2FR005 [b]	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-B or C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	4	Open-cut
27.88	SP2FR006	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6	Open-cut
28.10	SP2FR008	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut
28.15	SP2FR009	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1	1	Open-cut
28.48	SP2FR010 [b]	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1	1	Open-cut
29.14	SP3FR001 [b]	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6	Open-cut

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
29.26	SP3FR002 [b]	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	17	18	Open-cut
29.89	SP3FR003 [b]	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	7	Open-cut
30.43	SP2FR013	Marais Des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Major	105	105	HDD
30.60	SP2FR014	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1.5	2	HDD
30.61	SP2FR015	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5	HDD
Garnett Lateral									
Anderson County, Kansas									
1.93	SP2AN011 [e]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1	1	Open-cut
1.97	SP2AN012 [e]	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2.5	3	Open-cut
Scipio Lateral									
Anderson County, Kansas									
0.27	OWP1AN011	Manmade Pond	N/A	Warmwater	Open Water	N/A	7 [d]	0 [c]	Workspace Only
1.05	SP1AN043	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	40	26	Open-cut
Richmond Lateral									
Franklin County, Kansas									
0.60	SP1FR046	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3	Open-cut

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
1.69	SP1FR045	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1	2	Open-cut
Existing Line DS Abandonment									
Anderson County, Kansas									
3.31	SP3AN006	Unnamed Tributary of Skunk Branch	CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5 [f]	Timber Mat
Franklin County, Kansas									
16.32	SP1FR038	Unnamed Tributary of Sac Creek	AL-E, CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	0 [c, f]	Timber Mat
16.39	SP1FR038	Unnamed Tributary of Sac Creek	AL-E, CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Intermediate	3	14 [f]	Timber Mat
27.65	SP2FR006	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6 [f]	Timber Mat
27.84	SP2FR008	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3 [f]	Timber Mat
27.89	SP2FR009	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1	1 [f]	Timber Mat
Existing Line DT Abandonment									
Anderson County, Kansas									
1.12	SP4AN001	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	4 [f]	Timber Mat
1.15	SP4AN002	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	5	5 [f]	Timber Mat
3.42	SP5AN001	Unnamed Tributary of Skunk Branch	CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3.5	4 [f]	Timber Mat
3.55	SP5AN002	Unnamed Tributary of Skunk Branch	CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2 [f]	Timber Mat

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
4.07	SP5AN004	Unnamed Tributary of Skunk Branch	CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2 [f]	Timber Mat
4.90	OWP5AN002	Manmade Pond	N/A	Warmwater	Open Water	N/A	6 [d]	0 [c, f]	Timber Mat
5.74	SP5AN005	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Intermediate	4.5	15 [f]	Timber Mat
6.08	SP5AN006	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2 [f]	Timber Mat
6.84	SP5AN007	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2 [f]	Timber Mat
9.40	SP4AN003	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	2 [f]	Timber Mat
10.81	SP4AN004	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1.5	2 [f]	Timber Mat
10.96	SP4AN005	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	7 [f]	Timber Mat
11.33	SP5AN010	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Intermediate	12	18 [f]	Timber Mat
11.37	SP5AN009	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	9	9 [f]	Timber Mat
13.51	OWP5AN003	Manmade Pond	N/A	Warmwater	Open Water	N/A	33 [d]	0 [c, f]	Timber Mat
14.07	SP5AN012	Unnamed Tributary of Pottawatomie Creek	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	3 [f]	Timber Mat
Franklin County, Kansas									

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
18.81	SP4FR007	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	6	6 [f]	Timber Mat
19.60	SP4FR008	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	5 [f]	Timber Mat
20.32	SP5FR013	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	7	7 [f]	Timber Mat
21.05	SP5FR014	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Intermittent	Minor	6	6 [f]	Timber Mat
22.79	SP4FR009	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5.5	6 [f]	Timber Mat
23.00	SP5FR018	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	0 [c, f]	Timber Mat
24.14	SP4FR010	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	0 [c, f]	Timber Mat
24.18	SP4FR011	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	4 [f]	Timber Mat
24.46	SP4FR012	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	5 [f]	Timber Mat
24.60	SP4FR013	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	1.5	2 [f]	Timber Mat
27.47	SP5FR021	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	4 [f]	Timber Mat
28.36	SP4FR015	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Perennial	Minor	5	5 [f]	Timber Mat
31.43	SP5FR024	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	3	0 [c, f]	Timber Mat
Aboveground Facilities									
Line DPA									

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project									
Franklin County, Kansas									
Ottawa CS (31.50)	SP3FR013	Unnamed Tributary of Marais des Cygnes River	AL-S, CR-C or b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2	N/A	Timber Mat
Existing Line DT Abandonment									
Franklin County, Kansas									
Existing Auxiliary Facility (29.03)	SP5FR025	Roadside Ditch	CR-C or b, IR	Warmwater	Ephemeral	Minor	2	N/A	Timber Mat
Contractor/Pipe Yards									
Line DPA									
Anderson County, Kansas									
Yard 1 (MP 0.00)	SP3AN010	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	2.5	N/A	Timber Mat
Access Roads									
Line DPA									
Anderson County, Kansas									
DPA-TAR-02 (MP 3.21)	SP3AN006	Unnamed Tributary of Skunk Branch	CR-C, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	N/A	Timber Mat
DPA-TAR-06 (MP 8.91)	SP1AN019	Unnamed Tributary of Cedar Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	5	N/A	Existing Culvert / Timber Mat
Existing Line DT Abandonment									
Franklin County, Kansas									
(DT-TAR-17) 24.18	SP4FR011	Unnamed Tributary of Middle Creek	AL-E, CR-b, DS, FP, GR, IW, IR, L	Warmwater	Ephemeral	Minor	4	N/A	Timber Mat

Appendix 2 Surface Waterbodies Crossed or Otherwise Affected by the Project

N/A = not applicable

HDD = horizontal directional drill

[a] State Water Quality Classifications:

AL - Aquatic Life Support Use (S - Special Aquatic Life Use [also denoted as SALU in Resource Report 3], E – Expected Aquatic Life Use) CR - Contact Recreational Use (C – Primary Contact: Not Open to Public, b – Secondary Contact: Not Open to Public)

DS - Domestic Water Supply Use FP - Food Procurement Use

GR - Groundwater Recharge Use IW - Industrial Water Supply Use IR - Irrigation Use

L - Livestock Watering Use

[b] Waterbody impacts associated with Line DS are captured in Line DPA impacts, as the construction corridor is shared Project workspace for the installation of Line DPA and abandonment of Line DS in areas where the Lines DPA and DS are co-located.

[c] Waterbody would not be crossed by the pipeline centerline, but is located within the Project footprint.

[d] Waterbody width provided for ponds represents the maximum width of the pond within the Project footprint.

[e] Waterbody impacts associated with Line DT are captured in the Garnett Lateral impacts, as the construction corridor is shared Project workspace for the abandonment of Line DT and installation of the Garnett Lateral in areas where the Garnett Lateral and Line DT are co-located.

[f] Segments of the existing Lines DT and DS would be abandoned in place at waterbody crossings, with no trenching impacts proposed.

APPENDIX 3
Wetland Resources Crossed or Otherwise Affected by the Project

Appendix 3 Wetland Resources Crossed or Otherwise Affected by the Project							
Milepost / Facility	**Feature ID**	**Wetland Type [a]**	**Jurisdictional Status**	**Proposed Crossing Method**	**Pipeline Crossing Length (feet)**	**Construction Impacts (acres)**	**Operation Impacts (acres) [b]**
Pipeline Facilities							
Line DPA							
Anderson County, Kansas							
4.46	WP1AN003	PEM	§ 404	Workspace Only	0 [d]	0.02	0.00
5.18	WP1AN004 [c]	PEM	§ 404	Open-cut	50	0.07	0.00
11.62	WP1AN005	PEM	§ 404	Open-cut	33	0.06	0.00
14.12	WP1AN006 [c]	PEM	§ 404	Open-cut	17	0.07	0.00
14.80	WP1AN008	PEM	§ 404	Workspace Only	0 [d]	0.04	0.00
Franklin County, Kansas							
16.23	WP1FR010	PEM	§ 404	Workspace Only	0 [d]	<0.01	0.00
20.72	WP1FR012 [c]	PEM	§ 404	Open-cut	83	0.09	0.00
28.08	WP2FR001	PFO	§ 404	Open-cut	11	0.03	0.01
Line DPA Total					**194**	**0.38**	**0.01**
Scipio Lateral							
Anderson County, Kansas							
0.25	WP1AN014	PEM	§ 404	Open-cut	82	0.09	0.00
1.79	WP1AN013	PEM	§ 404	Open-cut	12	0.04	0.00
Scipio Lateral Total					**94**	**0.13**	**0.00**
Richmond Lateral							
Franklin County, Kansas							
1.70	WP1FR015	PEM	§ 404	Open-cut	37	0.07	0.00
Richmond Lateral Total					**37**	**0.07**	**0.00**
Existing Line DT Abandonment							
Anderson County, Kansas							
1.45	WP4AN001	PEM	§ 404	Timber Mat	3 [e]	<0.01	0.00
4.34	WP5AN001	PEM	§ 404	Timber Mat	13 [e]	0.09	0.00
6.40	WP5AN002	PEM	§ 404	Timber Mat	0 d, [e]	0.02	0.00
8.73	WP4AN002	PEM	§ 404	Timber Mat	8 [e]	0.01	0.00
14.33	WP5AN007	PEM	§ 404	Timber Mat	101 [e]	0.19	0.00
Franklin County, Kansas							
22.12	WP4FR005	PEM	§ 404	Timber Mat	40 [e]	0.05	0.00
22.77	WP4FR006	PEM	§ 404	Timber Mat	65 [e]	0.08	0.00
28.02	WP5FR008	PEM	§ 404	Timber Mat	44 [e]	0.07	0.00

Appendix 3 Wetland Resources Crossed or Otherwise Affected by the Project							
28.03	WP4FR007	PEM	§ 404	Timber Mat	22 [e]	0.04	0.00
28.35	WP4FR008	PEM	§ 404	Timber Mat	82 [e]	0.11	0.00
Line DT Abandonment Total					**378 [e]**	**0.66**	**0.00**
PROJECT TOTAL					**703 [e]**	**1.2**	**0.01**

28.02	WP5FR008	PEM	§ 404	Timber Mat	44 [e]	0.07	0.00
28.03	WP4FR007	PEM	§ 404	Timber Mat	22 [e]	0.04	0.00
28.35	WP4FR008	PEM	§ 404	Timber Mat	82 [e]	0.11	0.00
Line DT Abandonment Total					**378 [e]**	**0.66**	**0.00**
PROJECT TOTAL					**703 [e]**	**1.2**	**0.01**

[a] Cowardin Wetland Types: PEM - palustrine emergent; PFO – palustrine forested

[b] There would be no operational impacts on PEM wetlands, as these wetlands would revert back to the same type following construction.

[c] In areas where the new Line DPA is co-located with the existing Line DS, wetland impacts associated with the abandonment of Line DS are captured in the wetland impacts for Line DPA, as the construction corridor is shared Project workspace for the installation of Line DPA and abandonment of Line DS.

[d] Wetland would not be crossed by the pipeline centerline, but is located within the Project footprint.

[e] Segments of the existing Lines DT and DS would be abandoned in place at wetland crossings, with no trenching impacts proposed.

APPENDIX 4
Summary of Habitat Impacts

Appendix 4 Summary of Habitat Impacts (acres)														
Facility	Agriculture		Open Land		Developed		Forest		Wetland		Open Water		Grand Total	
	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b, c]	Const. [a]	Op. [b]	Const. [a]	Op. [b]
Pipeline Facilities														
Line DPA														
Right-of-Way	253.7	153.5	122.9	77.6	3.3	2.5	31.5	17.5	0.38	0.29	0.52	0.51	**412.3**	**251.9**
Additional Temporary Workspace	12.9	0.00	5.7	0.00	0.68	0.00	0.93	0.00	0.00	0.00	0.00	0.00	**20.2**	**0.00**
Contractor/ Pipe Yards	282.0	0.00	15.7	0.00	2.1	0.00	0.22	0.00	0.00	0.00	0.00	0.00	**300.0**	**0.00**
Access Roads	1.11	0.00	2.8	0.00	0.24	0.00	0.32	0.00	0.00	0.00	0.00	0.00	**4.5**	**0.00**
Cathodic Protection	0.05	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**	**0.06**
Garnett Lateral														
Right-of-Way	5.86	5.86	11.2	11.2	1.8	1.8	0.12	0.12	0.00	0.00	0.00	0.00	**18.9**	**18.9**
Additional Temporary Workspace	0.17	0.00	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.31**	**0.00**
Scipio Lateral														
Right-of-Way	5.4	5.4	8.0	8.0	0.99	0.99	0.00	0.00	0.13	0.13	0.00	0.00	**14.6**	**14.56**
Additional Temporary Workspace	0.15	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.23**	**0.00**
Richmond Lateral														
Right-of-Way	10.4	10.4	1.7	1.7	0.26	0.26	1.7	1.7	0.07	0.07	0.00	0.00	**14.1**	**14.1**
Line DT Abandonment														
Right-of-Way	134.9	0.00	83.1	0.00	2.5	0.00	2.7	0.00	0.66	0.00	0.06	0.00	**223.9**	**0.00**
Additional Temporary Workspace	0.57	0.00	0.05	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.78**	**0.00**
Access Roads	2.8	0.00	5.4	0.00	5.3	0.00	0.33	0.00	0.00	0.00	0.00	0.00	**13.8**	**0.00**
Line DS Abandonment														
Right-of-Way	12.4	0.00	8.6	0.00	0.9	0.00	1.1	0.00	0.00	0.00	0.00	0.00	**23.0**	**0.00**
Pipeline Facilities Subtotal	***722.4***	***175.2***	***265.3***	***98.5***	***18.1***	***5.5***	***38.9***	***19.3***	***1.2***	***0.49***	***0.58***	***0.51***	**1,046.6**	**299.5**

Appendix 4 Summary of Habitat Impacts (acres)														
Facility	Agriculture		Open Land		Developed		Forest		Wetland		Open Water		Grand Total	
	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b, c]	Const. [a]	Op. [b]	Const. [a]	Op. [b]
Aboveground Facilities														
Line DPA														
Welda Compressor Station	0.00	0.00	0.00	0.00	17.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**17.8**	**0.00**
Ottawa Compressor Station	0.00	0.00	0.00	0.00	13.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**13.6**	**0.00**
Launcher/ Receiver [d]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Panhandle Tie-in	0.00	0.00	0.66	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.79**	**0.01**
Princeton Tie-in	0.00	0.00	0.21	0.01	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	**0.42**	**0.01**
Mainline Valve	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**	**0.06**
Existing Auxiliary Facilities [e]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Access Roads	0.01	0.01	0.52	0.52	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.54**	**0.54**
Garnett Lateral														
New Tie-in (MP 0.00)	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.10**	**0.01**
New Tie-in (MP 0.85) [f]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Existing Tie-ins	0.19	0.00	0.30	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.55**	**0.00**
Access Roads	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**
Scipio Lateral														
New Tie-in (MP 0.00) [f]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Scipio Sales Tie-in	0.09	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.13**	**0.01**
Access Roads	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**
Richmond Lateral														
New Tie-in (MP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**

Appendix 4 Summary of Habitat Impacts (acres)

Facility	Agriculture		Open Land		Developed		Forest		Wetland		Open Water		Grand Total	
	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b]	Const. [a]	Op. [b, c]	Const. [a]	Op. [b]	Const. [a]	Op. [b]
0.01) [f]														
New Richmond Regulator Station	0.20	0.20	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	**0.23**	**0.23**
Line DT Abandonment														
Richmond East Regulator Station [g]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Existing Auxiliary Facilities	0.00	0.00	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.08**	**0.00**
Access Roads	0.00	0.00	0.06	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.54**	**0.00**
Aboveground Facilities Subtotal	***0.55***	***0.27***	***1.96***	***0.58***	***32.21***	***0.04***	***0.21***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	**34.9**	**0.89**
PROJECT TOTAL	**723.0**	**175.5**	**267.3**	**99.1**	**50.4**	**5.5**	**39.1**	**19.3**	**1.2**	**0.49**	**0.58**	**0.51**	**1,081.5**	**300.4**

[a] Land affected during construction is inclusive of operation impacts (permanent).

[b] Land affected during operation consists only of permanent impacts associated with permanent right-of-way areas along the new pipelines, new permanent impacts at aboveground facilities, and permanent access roads.

[c] Operational land use impacts associated with wetlands have been calculated based on the proposed 66-foot-wide permanent easement. Per the FERC Plan and Procedures, Southern Star would maintain a 10-foot-wide cleared easement in wetlands.

[d] Workspace associated with installation of the launcher/receiver is captured within the Welda CS and Ottawa CS impacts.

[e] Workspace associated with the existing auxiliary facilities is captured within the Line DPA right-of-way, additional temporary workspace (ATWS), and access road impacts.

[f] Workspace associated with the three new tie-ins located along the existing Line DP are included in the construction right-of-way and ATWS for the new laterals on which they are located. There would be no new operational impacts associated with these three tie-ins, as the permanent sites would be constructed in 2019 under Southern Star's blanket certificate.

[g] Workspace associated with the existing Richmond East Regulator Station is captured within the Line DT right-of-way and ATWS impacts.

APPENDIX 5
Birds of Conservation Concern with Potential to Occur in the Project Area

Appendix 5 Birds of Conservation Concern with Potential to Occur in the Project Area			
Species	**Season Present**	**Preferred Habitat**	**Potential Impact Assessment**
Bald Eagle *Haliaeetus leucocephalus*	Year-round	Occurs along coasts, rivers, lakes, reservoirs, and marshes. During migration, occurs in mountains and open country as well. Prefers conifers for nesting and roosting and tends to avoid areas with high human traffic.	Suitable habitat exists in Project area; however, the species is highly mobile and would most likely relocate to adjacent suitable habitat. Additionally, no nests were observed during surveys. Further, if nests are observed prior to clearing activities, Southern Star would consult with FWS.
Eastern Whip-poor-will *Antrostomus vociferus*	Breeding	Occurs in open woodlands that include pine-oak with juniper, pine plantations, pine flatwoods, northern hardwood forests, low-elevation white pine, scrub oak, and hickory. Avoid large tracts of uninterrupted forest with dense canopy. Breed in dry deciduous or evergreen-deciduous forest with little or no underbrush, close to open areas. Their migration habitat is similar to their breeding habitat.	Suitable breeding habitat exists in the Project area; however, Southern Star anticipates that clearing activities would occur outside of the general migratory bird nesting season.
Henslow's Sparrow *Ammodramus henslowii*	Year-round	Occurs in large, flat fields with no woody plants, and with tall, dense grasses, a dense litter layer and standing dead vegetation.	Suitable habitat exists in Project area; however, the species is highly mobile and would most likely relocate to adjacent suitable habitat. Additionally, Southern Star anticipates that clearing activities would occur outside of the general migratory bird nesting season
Kentucky Warbler *Oporornis formosus*	Breeding	Occurs in deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous woods, and edges of swamps. Breeds in deciduous forest with dense, moist understory. Requires dense lowland forests and second growth, mostly in lowlands but also in foothills during the winter. Nests on the ground or on the lowest fork of a tree.	Suitable breeding habitat exists in the Project area; however, Southern Star anticipates that clearing activities would occur outside of the general migratory bird nesting season.
Lesser Yellowlegs *Tringa flavipes*	Wintering	Breeds in open boreal forest with shallow wetlands and winters in a variety of shallow fresh and saltwater habitats.	Suitable wintering habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats
Prothonotary Warbler *Prothonotaria citrea*	Breeding	Breed in flooded bottomland forests, wooded swamps, and forests near lakes and streams. Avoid forest patches smaller than 250 acres or forest borders less than 100 feet wide. During migration stop in coastal areas, marshes, citrus groves, and scrub to refuel. During the winter, they are most common in mangrove swamps, but they also use tropical dry forest and wooded areas near streams.	Suitable breeding habitat exists in the Project area; however, Southern Star anticipates that clearing activities would occur outside of the general migratory bird nesting season.

Appendix 5 Birds of Conservation Concern with Potential to Occur in the Project Area			
Red-headed Woodpecker *Melanerpes erythrocephalus*	Year-round	Occurs in pine savannas and other open forests with clear understories, forest edges, open pine plantations, standing timber, groves, farm country, orchards, shade trees in towns, large scattered trees. Avoids unbroken forest, favoring open country or forest clearings.	Suitable habitat exists in Project area; however, the species is highly mobile and would most likely relocate to adjacent suitable habitat. Southern Star anticipates that clearing activities would occur outside of the general migratory bird nesting season
Rusty Blackbird *Euphagus carolinus*	Wintering	Occurs in forests. Breeds in wet forests, including areas with fens, bogs, muskeg, and beaver ponds. Winters in swamps, wet woodlands, and pond edges.	Suitable wintering habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats
Sources: FWS, 2018, 2008; National Audubon Society, 2017; Cornell Lab of Ornithology, 2011			

APPENDIX 6

State Listed Threatened and Endangered Species with Potential to Occur in the Project Area

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Birds						
Piping Plover [a]	*Charadrius melodus*	T	Anderson and Franklin, KS	Rare migrants through Kansas. Preferred habitat is sparsely vegetated shallow wetlands and open beaches, sandbars in river beds, and shores of impoundments.	Preferred habitat is not present within the Project area. In addition, there are no documented occurrences within the Project area.	*No Effect*
Interior Least Tern [a]	*Sterna antillarum*	E	Anderson and Franklin, KS	Summer residents in Kansas. Preferred habitat are barren areas near water, such as sand bars in river beds and shores of large impoundments.	Preferred habitat is not present within the Project area. In addition, there are no documented occurrences within the Project area	*No Effect*
Snowy Plover	*Charadrius nivosus*	E	Anderson and Franklin, KS	Regular but uncommon migrant and summer resident in Kansas. Preferred habitat is open salt flats, beaches, sand bars in river beds, and wetlands.	Suitable habitat is present; however, wetland habitat within the Project area, is not preferred, and unlikely to be utilized over more suitable habitat in neighboring counties. There are no documented occurrences within Franklin or Anderson counties.	*Not likely to adversely affect*
Mammals						

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Eastern Spotted Skunk	*Spilogale putorius*	T	Anderson and Franklin, KS	Preferred habitat is forest edges and upland prairie grasslands, where rock outcrops and shrub clumps are present, and riparian corridors with shrubs and woodland edges. Abandoned farm buildings, fencerows, and other odd areas are also suitable habitat.	Suitable habitat is present within the Project area, and suitable habitat within Anderson County is state- designated as critical habitat. Southern Star would implement construction BMPs to the extent practicable to minimize impacts on this species.	*Not likely to adversely affect*

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Fish						
Hornyhead Chub	*Nocomis biguttatus*	T	Anderson and Franklin, KS	Historically occurred in small to medium sized, clear gravelly streams throughout Marais des Cygnes River basin. Preferred habitat is pools and slow to moderate runs. Associated with aquatic plants; however, this species requires silt-free gravel areas for spawning. Spawning occurs late April through early July.	State-designated critical habitat is present in the Project area at Cedar Creek and Pottawatomie Creek. Both creeks would be crossed via HDD; however, the critical habitat unit at Cedar Creek may be affected during temporary water withdrawals for the Project. Impacts would be minimized through BMPs and adherence to KDWPT-recommended timing restrictions.	*Not likely to adversely affect*
Insects						
American Burying Beetle [a]	*Nicrophorus americanus*	E	Anderson and Franklin, KS	Historically found in eastern third of Kansas. Preferred habitat is upland grasslands or near the edge of grassland and forest. Dependent on sandy/clay loam soils and carrion availability, preferring loose soil where carrion can be easily buried.	Although suitable habitat is present, the Project is outside the current range of the species. In addition, there are no documented occurrences within Project area.	*No Effect*

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Amphibians						
Eastern Newt	*Platygobio gracilis*	T	Franklin, KS	Preferred habitat differs with each life stage. Larvae and adults are aquatic and live in small ponds, small lakes, marshes and water-filled ditches. The juvenile eft stage is terrestrial, preferring moist debris in flooded woodlands.	Suitable habitat is present within the Project area; however, there are no documented occurrences within the Marais des Cygnes River basin within Anderson or Franklin counties.	*Not Likely to Adversely Affect*
Reptiles						
Broadhead Skink	*Plestiodon laticeps*	T	Franklin, KS	Preferred habitat is mature oak woodlands with dead and decaying timber. Rock outcrops, brush piles, and large deciduous trees are also used as cover.	Suitable habitat is present within the Project area; however, there are no documented occurrences within Anderson or Franklin counties.	*Not Likely to Adversely Affect*
Northern Map Turtle	*Graptemys geographica*	T	Anderson and Franklin, KS	Preferred habitat includes creeks, rivers, oxbows, and lakes with soft substrate, vegetation, and tree-lined banks.	This species is known to occur within Franklin and Anderson counties. State-designated critical habitat is present at Cedar Creek, which would be crossed by the Project via HDD; however, the critical habitat unit may be affected during temporary water withdrawals. Impacts would be minimized through BMPs.	*Not Likely to Adversely Affect*

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Mollusks						
Flat Floater Mussel	*Anodonta suborbiculata*	E	Franklin, KS	Preferred habitat is shallow areas of permanent oxbow lakes with rich mud bottoms. Currently, restricted to the lower reaches of Neosho and Marais des Cygnes rivers.	No suitable habitat is present within the Project area.	*No Effect*
Neosho Mucket Mussel [a]	*Lampsilis rafinesqueana*	E	Franklin, KS	Obligate riverine species, with preferred habitat consisting of clean flowing water with fine to medium gravel substrate. Historically known to occur in the Marais des Cygnes River basin.	Suitable habitat is present within the Project area; however, no recently documented occurrences occur within the Project area or river basin.	*No Effect*
Mucket Mussel	*Actinonaias ligamentina*	E	Franklin, KS	Preferred habitat is large creeks and small to medium rivers with gravel, gravel-sand, and gravel- silt substrates. Currently known to occur only two locales along the Marais des Cygnes River.	The portion of the Marais des Cygnes River crossed by the Project contains one of the two known populations of mussels. State- designated critical habitat is present in the portion of the river crossed by the Project; however, the Project would cross the Marais des Cygnes River via HDD. The critical habitat unit may be affected during temporary water withdrawals at the Marais des Cygnes River. Impacts would be minimized through BMPs.	*Not Likely to Adversely Affect*

Appendix 6 State Listed Threatened and Endangered Species with Potential to Occur in the Project Area						
Common Name	**Scientific Name**	**State Status**	**Counties Listed**	**Habitat Description**	**Potential Impact Assessment**	**Determination of Effect**
Rock Pocketbook Mussel	*Arcidens confragosus*	T	Franklin, KS	Obligate riverine species, with preferred habitat in mud, silt and silty gravel substrates.	State-designated critical habitat is present in the portion of the Marais des Cygnes River crossed by the Project. The Project would cross the river HDD; however, the critical habitat unit may be affected during temporary water withdrawals at the Marais des Cygnes River. Impacts would be minimized through BMPs.	*Not Likely to Adversely Affect*
Flutedshell Mussel	*Lasmigona costata*	T	Franklin, KS	Obligate riverine species, with preferred habitat in medium to small sized gravel substrate. Historically occurred in Marais des Cygnes river.	Preferred habitat is present within the Project area; however, there are no documented occurrences within the Project area.	*No Effect*
Sharp Hornsnail	*Pleurocera acuta*	T	Franklin, KS	Preferred habitat is shallow sheltered reaches or larger lakes and streams. Occurs within the Marais des Cygnes River.	State-designated critical habitat is present in the portion of the Marais des Cygnes River crossed by the Project. While the Project would cross the river HDD, the critical habitat unit may be affected during temporary water withdrawals. Impacts would be minimized through BMPs.	*Not Likely to Adversely Affect*

Sources: eBird, 2018; Kansas Biological Survey, 2018; KDWPT, 2018e

[a] Species is also federally listed however FWS IPaC range for the species does not include Anderson or Franklin counties. Additionally, the species is not expected to be present in the Project area.
E – Endangered
T – Threatened

APPENDIX 7

Site-Specific Residential Construction Plans

Appendix 7 Site-Specific Residential Construction Plans

NOTES FOR ADDITIONAL CONSTRUCTION SPECIFICATIONS
APPLICABLE FOR RESIDENCES WITHIN 25 FEET

DESCRIPTION

THIS DRAWING DOCUMENTS A RESIDENTIAL BUILDING NEAR THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION.

CONSTRUCTION REQUIREMENTS

1. CONTRACTOR SHALL ERECT AND MAINTAIN A TEMPORARY CONSTRUCTION BARRIER FENCE BETWEEN CONSTRUCTION ZONE AND THE ADJACENT STRUCTURE. TEMPORARY CONSTRUCTION BARRIER FENCE WOULD EXTEND 100 FEET BEYOND THE END OF THE RESIDENCE OR TO EXISTING ROAD RIGHT-OF-WAY, DURING THE CONSTRUCTION PERIOD.

2. VEHICLE ACCESS SHALL BE MAINTAINED TO THE RESIDENCE DURING THE CONSTRUCTION PERIOD.

3. DISTRUBED ITEMS SUCH AS DRIVEWAYS LAWNS AND LANDSCAPED AREAS SHALL BE RESTORED AS SOON AS PRACTICAL AFTER CONSTRUCTION.

4. OTHER EXISTING PHYSICAL FEATURES THAT NEED TO BE PROTECTED WOULD BE ENCLOSED BY SAFETY FENCE TO AVOID DISTRUBANCE DURING CONSTRUCTION.

5. ALL OPEN EXCAVATION FOR ROAD BORING OPERATION IN THE AREA NEAR THE RESIDENCE SHALL BE BARRICADED/FENCED OFF WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.

6. THE EXCAVATED PIPELINE TRENCH IN THE AREA NEAR THE RESIDENCE SHALL BE BARRICARED/FENCED OFF WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.

7. CONTRACTOR SHALL UTILIZE WATER TRUCKS TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDNECE.

KEY NOTE:

SOUTHERN STAR CENTRAL GAS PIPELINE WOULD NOTIFY LANDOWNER/OCCUPANT OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.


STRUCTURE ID-50
STRUCTURE ID-48
STRUCTURE ID-51
STRUCTURE ID-49
SW MISSOURI ROAD
BEGIN TEMPORARY CONSTRUCTION FENCING
50'
161'
ENVIRONMENTAL SURVEY AREA
END TEMPORARY CONSTRUCTION FENCING
DT-TAR-05
REFERENCE ALIGNMENT KAN-372
SEE SHEET KAN-376B SHEET 02 OF 02 FOR DESCRIPTION & CONSTRUCTION REQUIREMENT NOTES
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
LINES DT AND DS REPLACEMENT PROJECT
DT-TAR-05 - RESIDENTIAL DETAIL
S24-T20S-R19E
ANDERSON COUNTY, KANSAS
KAN-376A
A


NW 1980TH ROAD
STRUCTURE ID-56
STRUCTURE ID-57
STRUCTURE ID-53
BEGIN TEMPORARY CONSTRUCTION FENCING
DT-TAR-06
END TEMPORARY CONSTRUCTION FENCING
ENVIRONMENTAL SURVEY AREA
22'
33'
STRUCTURE ID-54
STRUCTURE ID-55
STRUCTURE ID-58
REFERENCE ALIGNMENT
KAN-367
SEE SHEET KAN-377B
SHEET 02 OF 02
FOR DESCRIPTION & CONSTRUCTION
REQUIREMENT NOTES
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
CENTRAL GAS PIPELINE
LINES DT AND DS REPLACEMENT PROJECT
DT-TAR-06 - RESIDENTIAL DETAIL
S13-T20S-R19E
ANDERSON COUNTY, KANSAS
KAN-377A
A


NEBRASKA ROAD
STRUCTURE ID-85
WORKSPACE TO REMOVE EXISTING AUXILLIARY FACILITIES
ENVIRONMENTAL SURVEY AREA
ROCK CREEK ROAD
BEGIN TEMPORARY CONSTRUCTION FENCING
END TEMPORARY CONSTRUCTION FENCING
REFERENCE ALIGNMENT KFK-145
SEE SHEET KFK-152B SHEET 02 OF 02 FOR DESCRIPTION & CONSTRUCTION REQUIREMENT NOTES
STRUCTURE ID-84
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
CENTRAL GAS PIPELINE
LINES DT AND DS REPLACEMENT PROJECT
EXISTING ANCILLARY FACILITIES - RESIDENTIAL DETAIL
S19-T17S-R20E
FRANKLIN COUNTY, KANSAS
KFK-152A
A


BEGIN TEMPORARY CONSTRUCTION FENCING
ENVIRONMENTAL SURVEY AREA
NEBRASKA ROAD
24'
58'
STRUCTURE ID-94
EXISTING DP 30" PIPELINE
EXISTING DT PIPELINE
END TEMPORARY CONSTRUCTION FENCING
REFERENCE ALIGNMENT KFK-149
SEE SHEET KFK-153B SHEET 02 OF 02 FOR DESCRIPTION & CONSTRUCTION REQUIREMENT NOTES
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
LINES DT AND DS REPLACEMENT PROJECT
MP 31.36 - RESIDENTIAL DETAIL
S31-T16S-R20E
FRANKLIN COUNTY, KANSAS
KFK-153A
A


BEGIN TEMPORARY CONSTRUCTION FENCING
ENVIRONMENTAL SURVEY AREA
NEBRASKA ROAD
24'
61'
STRUCTURE ID-95
EXISTING DP 30" PIPELINE
EXISTING DT PIPELINE
END TEMPORARY CONSTRUCTION FENCING
REFERENCE ALIGNMENT KFK-149
SEE SHEET KFK-154B SHEET 02 OF 02 FOR DESCRIPTION & CONSTRUCTION REQUIREMENT NOTES
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
CENTRAL GAS PIPELINE
LINES DT AND DS REPLACEMENT PROJECT
MP 31.32 - RESIDENTIAL DETAIL
S31-T16S-R20E
FRANKLIN COUNTY, KANSAS
KFK-154A
A


EXISTING DP
30" PIPELINE
NEBRASKA ROAD
STORAGE
YARD 11
STRUCTURE ID-96
BEGIN TEMPORARY
CONSTRUCTION
FENCING
15'
51'
STRUCTURE ID-97
ENVIRONMENTAL
SURVEY AREA
END TEMPORARY
CONSTRUCTION
FENCING
REFERENCE ALIGNMENT
KFK-149
SEE SHEET KFK-155B
SHEET 02 OF 02
FOR DESCRIPTION & CONSTRUCTION
REQUIREMENT NOTES
EXISTING DT
PIPELINE
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
CENTRAL GAS PIPELINE
LINES DT AND DS REPLACEMENT PROJECT
MP 31.54 - RESIDENTIAL DETAIL
S31-T16S-R20E
FRANKLIN COUNTY, KANSAS
KFK-155A
A


EXISTING DP
30" PIPELINE
EXISTING DS
26" PIPELINE
STRUCTURE ID-100
BEGIN TEMPORARY
CONSTRUCTION
FENCING
PROPOSED DPA
36" PIPELINE
56'
20'
STRUCTURE ID-99
STRUCTURE
ID-98
END TEMPORARY
CONSTRUCTION
FENCING
ENVIRONMENTAL
SURVEY AREA
REFERENCE ALIGNMENT
KFK-121
SEE SHEET KFK-156B
SHEET 02 OF 02
FOR DESCRIPTION & CONSTRUCTION
REQUIREMENT NOTES
0
50
100
150
SCALE IN FEET
SOUTHERN STAR
CENTRAL GAS PIPELINE
LINES DT AND DS REPLACEMENT PROJECT
MP 27.70 - RESIDENTIAL DETAIL
518-T175-820E
FRANKLIN COUNTY, KANSAS
KFK-156A
A

APPENDIX 8

Past, Present, and Reasonably Foreseeable Projects Considered in the Cumulative Impacts Analysis for the Project

Appendix 8 Past, Present, and Reasonably Foreseeable Projects Considered in the Cumulative Impacts Analysis for the Project						
Project (Project Proponent) (Map No.)	**Project Description**	**County**	**Estimated Construction Timeframe**	**Project Size [a]**	**Closest Distance from Project**	**Resources Potentially Affected within the proposed Project's Geographic Scope**
Pipeline Projects						
Line DP Hydrostatic Pressure Test Project (Southern Star Central Gas Pipeline, Inc.) (1)	Conduct hydrostatic testing for 31.40 miles of Southern Star's existing Line DP as well as construct minor appurtenances including a new mainline valve, tie-in sties, and side valves at various locations along Line DP.	Anderson and Franklin	Construction Start: May 2019 Construction End: June 2019	31.40 miles	Overlaps with Project workspace at the compressor stations and numerous locations along Line DPA and the new pipeline laterals.	Groundwater, Surface Water, Vegetation, and Wildlife; Soils; Geology; Land Use; Visual Resources; Noise; Air Quality
Commercial Developments						
Proximity Park Industrial Park (Bartlett & West Inc.) (2)	Construction of an industrial park, including road, bridge, and utility line upgrades to accommodate the development.	Franklin	Construction Start: September 2018 Construction End: IU [b]	360 acres	0.62 mile W of Line DS MP 27.6	Groundwater, Surface Water, Vegetation, and Wildlife; Land Use
Franklin County Commercial Development (IU) (3)	Construction of a commercial development consisting of a hotel, travel center, and restaurants.	Franklin	Construction Start: IU Construction End: November 2020	26 acres	0.44 mile NW of Yard 11	Groundwater, Surface Water, Vegetation, and Wildlife; Land Use; Noise

Appendix 8 Past, Present, and Reasonably Foreseeable Projects Considered in the Cumulative Impacts Analysis for the Project						
Residential Developments						
Eastgate Residential Development (Prairie Fire Development Group) (4)	Construction of multi-family duplexes totaling 56 units.	Franklin	Construction Start: 2019 Construction End: November 2020	IU	0.82 mile NW of Yard 11	Groundwater, Surface Water, Vegetation, and Wildlife; Land Use; Noise
Prairie View Residential Development (IU) (5)	Construction of a 36-unit residential development.	Franklin	Construction Start: November 2018 Construction End: November 2019	10 to 12 acres	1.69 miles NW of Yard 11	Groundwater, Surface Water, Vegetation, and Wildlife
Road Projects						
Anderson County Guardrail Upgrade Project (Kansas Department of Transportation) (6)	Guardrail upgrades along US-59 from the northern limits of the City of Garnett to the Anderson / Franklin county line.	Anderson	Construction Start: May 30,2019 Construction End: December 2, 2019	7 miles	Intersects with Scipio Lateral MP 1.45 and Line DT MP 10.60 [b]	Groundwater, Surface water, Vegetation, and Wildlife; Land Use; Visual Resources; Noise; Air Quality
Road Surfacing Project (Kansas Department of Transportation) (7)	Road surfacing on US-59 from the Allen / Anderson county line, north to the south junction of US-169/US-59.	Anderson	Construction Start: March 4, 2019 Construction End: December 5, 2019	15 miles	1.4 miles SE of existing Line DT	Groundwater, Surface water, Vegetation, and Wildlife; Land Use
Franklin County Guardrail Upgrade Project (Kansas Department of Transportation) (8)	Guardrail upgrades along US-59 from the Anderson / Franklin county line, north to the City of Ottawa.	Franklin	Construction Start: May 30, 2019 Construction End: December 2, 2019	13 miles	Intersects with Line DPA MP 20.94 and Line DS MP 20.73	Groundwater, Surface water, Vegetation, and Wildlife; Soils; Geology; Land Use; Visual Resources; Noise; Air Quality

Appendix 8 Past, Present, and Reasonably Foreseeable Projects Considered in the Cumulative Impacts Analysis for the Project
[a] Project size was identified based on publicly available documentation including reported acreages or review of mapping exhibits. [b] Identified segment of existing Line DT to be abandoned in place, with no Project impacts. IU – information unavailable