

Appendix 4-2

Segment Route Comparison Matrices

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way	Weighting					
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW	
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%	
Fairbanks Exits (all end at common location along Parks Highway outside of Fairbanks)	Denali	Begins at the North Pole Metering Station (approximately 10-miles east of town along TAPS). Route generally travels west along the south side of the Richardson Hwy and south of Fairbanks, following the north edge of the Tanana River. The route eventually skirts between the south end of Fairbanks Int'l Airport, crosses the Chena River, and then proceeds along a powerline ROW up and over Chena Ridge, across the Cripple Creek valley and into the Parks Highway ROW.	This segment is located primarily in the Tanana Flats. The subsurface probably consists of thick, fine-grained soils, locally thick deposits of organics, over coarse-grained alluvial deposits. Where frozen these soils are probably not thaw stable. Soils are discontinuous permafrost (80 to 95 percent frozen) with areas close to lakes and streams are commonly unfrozen.	24	Chena River Crossing	25	1	66072	0			1.0	This route has a large number of stream crossings and a very large amount of potentially impacted wetlands. However, overall permitting issues and concerns generally are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	1.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense; City of North Pole; University of Alaska; Fairbanks International Airport; Ft. Wainwright; Alaska Railroad; Fairbanks Chamber of Commerce & Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	1.5	1.6				
	ANGDA	Begins just north of Chatanika River (east side of TAPS) and travels south and south east (cross country). Eventually the route crosses over Old Murphy Dome Road and joins with Goldstream/Sheep Creek Road (near Jctn w/ Ester Dome Road). Route continues from Ester Dome Road due south approximately 5-miles before joining the Parks Hwy.	In the northern portion of this segment, the subsurface consists of thick re-transported fine-grained soils deposits over alluvial deposits and bedrock. South of the Chatanika River, lay locally thick deposits of organics and silts with re-transported fine-grained soils on lower valley slopes. The soil thermal state is highly variable. Soils are generally frozen, warm, discontinuous permafrost (70 to 95 percent frozen.) Fine-grained soils and north facing slopes are predominantly frozen. However, areas with south facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	23.9		8	0	13853.3	2	1		2.5	Stream crossings are above average and potentially impacted wetlands are significant. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense; City of North Pole; University of Alaska; Fairbanks International Airport; Ft. Wainwright; Alaska Railroad; Fairbanks Chamber of Commerce & Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	1.5	2.3				
	Alternate #1				27.6		7	0	27342.8	0	1		3.5	Stream crossings are below average and potentially impacted wetlands are slightly above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense; City of North Pole; University of Alaska; Fairbanks International Airport; Ft. Wainwright; Alaska Railroad; Fairbanks Chamber of Commerce & Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	4.0	3.1			
	Alternate #2				25.7		17	0	11513.1	0	1		3.0	Stream crossings are above average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense; City of North Pole; University of Alaska; Fairbanks International Airport; Ft. Wainwright; Alaska Railroad; Fairbanks Chamber of Commerce & Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	2.5	2.6			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way		Weighting			
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
Ester to Nenana	Denali	Denali Pipeline Route (1992, MP 15-61): Route crosses the Chena river and ascends the Chena Ridge and then descends into the Cripple Creek drainage. Route climbs west out of the Cripple Creek drainage and joins the Parks Highway and continues south through the Bonanza Creek Experimental Forest. After approximately 20-miles the route deviates to the GVEA powerline to the east of the Parks and follows it into Nenana. The final leg into Nenana requires a crossing of the Tanana River just upstream of the Parks Highway Bridge.	Soils primarily consist of fine-grained soils overlying alluvial deposits and bedrock throughout the floodplains (near Tanana at both FBX and Nenana). Silts overlying bedrock in the elevated portions between Ester and Nenana. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	38.6	Tanana River Crossing	24	1	4639.2 (Partial Wetlands)	12	4	55%	3.5	Stream crossings are above average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; two anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, Berg, Nenana, AK Fish & Game Dept., Forest Service, FNSB Area Community Councils, Nenana Native Association, FAI Int'l Airport,	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added Value Business in West of Fairbanks Area; 2. Construction Impacts & Power Use for FAI Int'l Airport; 3. Nenana Native Association Mitigation Strategy Needed	3.0	2.0			2.8	
	ANGDA	ANGDA Route (2005) - The route travels south to Nenana within the Parks Hwy ROW. The route would deviate SW from the Parks just north of Nenana and cross the Tanana River, then east and cross the Nenana River before rejoining the Parks Hwy ROW just south of Nenana.	In northern portion of segment, subsurface consists of thick, re-transported, fine-grained soils over alluvial deposits and bedrock. South of Chatsanka River are thick deposits of organics and silts with fine-grained soils on lower valley slopes. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	39.4	Tanana River Crossing, Nenana River Crossing	8	1	2666.5 (Partial Wetlands)	12	3	5%	3.5	Stream crossings are below average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; two anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, Ester, Berg, Nenana, AK Fish & Game Dept., Forest Service, FNSB Area Community Councils, Nenana Native Association	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added Value Business West of Fairbanks Area; 2. Nenana Native Association Mitigation Strategy Needed; 3. Permitting Challenges Through US Forest Service Land	3.5	3.0			3.4	
	Parks Hwy	The Parks Highway leaving Fairbanks travels west from town, passing through Ester before climbing up into the hills southwest of town. The highway follows the gently rolling hills approximately 50-miles in a southwestern direction before reaching the banks of the Tanana River. The Parks then follows the bank of the Tanana upstream until just past the mouth of the Nenana River (on the opposite bank), then crosses over an old trussel bridge and alongside the western edge of Nenana.	Soils primarily consist of fine-grained soils overlying alluvial deposits and bedrock throughout the floodplains (near Tanana at both FBX and Nenana) Silts overlying bedrock in the elevated portions between Ester and Nenana. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	40.1	Tanana River Crossing	4	1	0 (Partial Wetlands)	0	2	0%	3.5	Stream crossings are well below average and there seem to be no impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, Ester, Berg, Nenana, AK Fish & Game Dept., Forest Service, FNSB Area Community Councils, Nenana Native Association	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added Value Business West of Fairbanks Area; 2. Nenana Native Association Mitigation Strategy Needed	3.5	3.0			3.4	
	AEAI (GVEA) Northern 138 KV	Leaving the center of Fairbanks the northern intertie route goes immediately south, crosses the Tanana River and then follows it slightly inland from its south bank to near Nenana. Upon crossing the Tanana the route is located on Federally owned military land until it reaches the Wood River, approximately half the distance to Nenana. Thereafter the route traverses State lands.	Soils primarily consist of fine-grained soils overlying alluvial deposits and bedrock throughout the floodplains (near Tanana at both FBX and Nenana) Silts overlying bedrock in the elevated portions between Ester and Nenana. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	37.7	Tanana River Crossing	16	1	5319.2 (Partial Wetlands)	14	4	100%	3.5	Stream crossings are average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added value Business West of Fairbanks Area; 2. Permitting Challenges Through DoD Land;	2.0	2.0			2.6	
	AEAI (GVEA) Southern 230 KV (from FBX to Nenana area where line turns south)	Leaving the center of Fairbanks the northern intertie route goes immediately south, crosses the Tanana River and then follows it slightly inland from its south bank to near Nenana. Upon crossing the Tanana the route is located on Federally owned military land until it reaches the Wood River, approximately half the distance to Nenana. Thereafter the route traverses State lands.	Soils primarily consist of fine-grained soils overlying alluvial deposits and bedrock throughout the floodplains (near Tanana at both FBX and Nenana) Silts overlying bedrock in the elevated portions between Ester and Nenana. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	46		43	2	41428.7 (Partial Wetlands)	0	0	100%	1.0	Stream crossings are well above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, US Department of Defense	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added value Business West of Fairbanks Area; 2. Permitting Challenges Through DoD Land;	2.0	2.0			1.8	
	ARRC	The railroad leaves Fairbanks to the northwest and joins the Goldstream Valley. The railroad then follows the Goldstream Valley southwest until it enters the Minto Flats (near the Tanana River) which it follows until rejoining the Highway about 5-miles north of Nenana. The last leg into Nenana includes a crossing of the Tanana River just upstream of town and of the Parks Highway Tanana Bridge.	Soils primarily consist of fine-grained soils overlying alluvial deposits and bedrock throughout the floodplains. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	38	Tanana River Crossing	14	1		1	0	0%	3.0	Stream crossings are well above average and potentially impacted wetlands are unfrozen. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; no anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, Murphy Dome AFS, Dunbar, Berg, Nenana, FNSB Area Community Councils, Nenana Native Association,	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Expansion of Related & Added value Business West of Fairbanks Area; 2. Permitting Challenges Through DoD Land;	2.5	1.5			2.4	

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						Total Number	Anadromou s Fish												25.00%	25.00%	25.00%	25.00%
Nenana to Healy	Denali	Denali Pipeline Route (1992, MP 61-120): At Nenana, route turns south following a combination of the Parks Hwy and the GVEA ROW along the east side of the Nenana River. It skirts the east side of Clear Air Force Base and then turns southwest across the Nenana River. It continues south southeast paralleling the Nenana River, the Alaska Railroad, and the Parks Highway to Healy. Most of the route follows the GVEA ROW, with some alignment along the Parks.	Nearly level floodplain and cross-slopes less than 5 percent throughout route. Soils consist of moderately thick loess overlying relatively fine-grained alluvial deposits. Near the Nenana River Crossing, soils are assumed to consist of silts overlying sands and silty gravels (alluvial deposits). Permafrost between Nenana and Anderson is discontinuous, with thaw-unstable soils, then sporadic permafrost is expected with thaw-stable soils between Anderson and Healy.	57.3	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	26	5	34738.5 (Partial Wetlands)	12	2		3.5	Stream crossings are slightly above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Denali Borough; Alaska RR & Other Related Business; Anderson; Clear EMW Station (USAF); Mining Industry (Placer Dome, Liberty Bell, Usibelli); Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption for Area Mining Projects; 3. Boom/Bust Impacts on Transportation-Related Business	3.0	2.0			2.8	
	ANGDA	ANGDA Route (2005): After departing Nenana the route joins the Alaska Railroad ROW. Route crosses the Railroad and proceeds south. It skirts the east side of Clear Air Force Base and proceeds south along the railroad until rejoining the Parks Hwy ROW just prior to the Nenana River crossing. Route proceeds south-southeast following the Parks through the Nenana River Valley until it deviates to partway between the RR and the Parks Hwy on into Healy.	Relatively flat terrain on east side of Nenana River. Soils in the northern part of the route are fine-grained with locally thick deposits of organics over coarse-grained alluvial deposits. Soils in southern portion are thin deposits of silts over coarse-grained alluvial deposits. Discontinuous to sporadic permafrost through most of route with mostly thaw stable soils.	56.2	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	24	4	38230.0 (Partial Wetlands)	3	2		3.5	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Denali Borough; Alaska RR & Other Related Business; Anderson; Clear EMW Station (USAF); Mining Industry (Placer Dome, Liberty Bell, Usibelli); Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption for Area Mining Projects; 3. Boom/Bust Impacts on Transportation-Related Business	3.5	2.5			3.0	
	Parks Hwy	The Parks Highway leaves Nenana to the south paralleling the Nenana River, Railroad and GVEA ROWs. About halfway to Healy the Parks crosses over to the west side of Nenana and continues into Healy.	Nearly level floodplain and cross-slopes less than 5 percent throughout route. Soils consist of moderately thick loess overlying relatively fine-grained alluvial deposits. Near the Nenana River Crossing, soils are assumed to consist of silts overlying sands and silty gravels (alluvial deposits). Permafrost between Nenana and Anderson is discontinuous, with thaw-unstable soils, then sporadic permafrost is expected with thaw-stable soils between Anderson and Healy.	57.1	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	18	3	5877.8 (Partial Wetlands)	0	1		3.5	Stream crossings are below average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Denali Borough; Alaska RR & Other Related Business; Anderson; Clear EMW Station (USAF); Mining Industry (Placer Dome, Liberty Bell, Usibelli); Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption for Area Mining Projects; 3. Boom/Bust Impacts on Transportation-Related Business	3.0	3.0			3.1	
	AEAI (GVEA)	The northern intertie (230kV) heads south from Nenana continuing along its remote path off to the east of the highway. The intertie maintains its distance to the east of the highway, eventually jogging in to the eastern bank of the Nenana River just north of Healy, then following the eastern bank of the river for the last few miles into Healy. Nearly all of the route in this segment is not accessible by road.	Between Nenana and the area east of the Parks Highway Crossing at Nenana, the soils are fine-grained with locally thick deposits of organics over coarse-grained alluvial deposits. The southern portion of the route consists of silts overlying bedrock in the elevated portions with silt overlying alluvial deposits in the stream bed valleys. Soils are thin where the route crosses steep mountainous terrain. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	57.6	Denali Fault - Healy Creek Strand Crossing	23	3	36008.0 (Partial Wetlands)	19	4		3.5	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Blair Lake Air Force Range (USAF); Sled Road; Rex Dome Mine; Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Production and Socio-cultural changes in Healy.	3.0	2.0			2.8	
	AEAI (GVEA) Southern 230 KV (from Nenana area where line turns south to Healy)	The northern intertie (230kV) heads south from Nenana continuing along its remote path off to the east of the highway. The intertie maintains its distance to the east of the highway, eventually jogging in to the eastern bank of the Nenana River just north of Healy, then following the eastern bank of the river for the last few miles into Healy. Nearly all of the route in this segment is not accessible by road.	Between Nenana and the area east of the Parks Highway Crossing at Nenana, the soils are fine-grained with locally thick deposits of organics over coarse-grained alluvial deposits. The southern portion of the route consists of silts overlying bedrock in the elevated portions with silt overlying alluvial deposits in the stream bed valleys. Soils are thin where the route crosses steep mountainous terrain. Discontinuous permafrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. Fine-grained soils and north-facing slopes are mostly frozen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	50.8	Denali Fault - Healy Creek Strand Crossing	26	0	11354.3 (Partial Wetlands)	0	0		1.0	Stream crossings are slightly above average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Blair Lake Air Force Range (USAF); Sled Road; Rex Dome Mine; Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Production Impacts on Rex Dome Mine; 3. Population and Socio-cultural changes in Healy.	2.0	2.0			1.9	
	ARRC	The railroad generally follows a similar route as the highway though its Nenana crossing occurs closer to Healy.	Nearly level floodplain and cross-slopes less than 5 percent throughout route. Soils consist of moderately thick loess overlying relatively fine-grained alluvial deposits. Near the Nenana River Crossing, soils are assumed to consist of silts overlying sands and silty gravels (alluvial deposits). Permafrost between Nenana and Anderson is discontinuous, with thaw-unstable soils, then sporadic permafrost is expected with thaw-stable soils between Anderson and Healy.	55.2	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	20	7		2	8		3.0	Stream crossings are average and potentially impacted wetlands are unknown. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Denali Borough; Alaska RR & Other Related Business; Anderson; Clear EMW Station (USAF); Mining Industry (Placer Dome, Liberty Bell, Usibelli); Healy	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption for Area Mining Projects; 3. Boom/Bust Impacts on Transportation-Related Business	3.0	1.5			2.6	

Segment	Route Option	General Route Description	Terrain Description	Engineering										Permitting		Socio Economic		Right-of-Way		Weighting			
				Segment Length (miles)	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW	
						Total Number	Anadromous Fish																
Healy to Cantwell	Denali	Denali Pipeline Route (1992, MP 120-161): Continues southeast, leaving the ROW of the Parks Highway and Alaska Railroad, and crosses the Nenana River at Healy. It follows the AEAI powerline route through the bottom of the Moody Creek Valley, turns south	Cross-slopes range from 15 percent to 40 percent and back to rolling hills toward Cantwell. Soils are relatively loess-free. Much of route crosses steep, mountainous terrain where thin deposit of coarse soils overlie weathered bedrock. Finer-grained so	42.7	Nenana River Crossing (X2), Moody Creek Alternate, Denali Fault - Dry Crk Strand, Moody Crk Strand (x2), Hines Crk Strand (x3), McKinley Strand (x2) Fault Crossings	41	0	75205.3	0	1		1.5	Stream crossings and wetlands are significant. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Ioworm Gulch; McKinley Park, Denali National Park & Preserve; Tourism Industry (Transportation & Lodging companies); Cantwell; Moody & Montana Creeks; Sport Fisherman's Association; Caribou Concentration Areas	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical & archeological property protection; Impacts to transportation and power for tourism industry; Population and workforce factors in Healy and Cantwell; Recreational use disturbance near creeks	2.5	2.5	2.1				
	ANGDA	ANGDA Route (2005): Route follows the Parks Highway ROW through the Nenana Canyon and the Denali Park commercial tourist facilities. Route crosses the deeply incised Nenana River Canyon at the north end and continues along the east side of the Nenana R	Soils in the northern portion of segment are mostly bedrock and man-made fill through the Nenana River Canyon with alluvial material over bedrock near Montana Creek. After Montana Creek, the soils consist of silt deposits over glacial till and coarse-gra	44.7	Nenana River Crossing (X2), Nenana Canyon, Denali Fault - Dry Crk Strand (x2), McKinley Strand (x2) Fault Crossings	36	0	60914.5	0	1		1.5	Stream crossings are slightly above average and potentially impacted wetlands are well above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Ioworm Gulch; McKinley Park, Denali National Park & Preserve; Tourism Industry (Transportation & Lodging companies); Cantwell; Moody & Montana Creeks; Sport Fisherman's Association; Caribou Concentration Areas	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical & archeological property protection; Impacts to transportation and power for tourism industry; Population and workforce factors in Healy and Cantwell; Recreational use disturbance near creeks	2.5	2.5	2.1				
	Parks Hwy	South of Healy the Parks Highway enters the Nenana River Canyon and crosses the Nenana River once. This crossing of the Nenana is one of the most difficult crossings in this corridor as the terrain in this area is generally bedrock, eliminating the possi	Soils in the northern portion of segment are mostly bedrock and man-made fill through the Nenana River Canyon with alluvial material over bedrock near Montana Creek. After Montana Creek, the soils consist of silt deposits over glacial till and coarse-gra	39	Nenana River Crossing (X2), Nenana Canyon, Denali Fault - Dry Crk Strand, Hines Crk Strand (x3), McKinley Strand (x2) Fault Crossings	39	0	19874	0	3		3.5	Stream crossings are average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Ioworm Gulch; McKinley Park, Denali National Park & Preserve; Tourism Industry (Transportation & Lodging companies); Cantwell; Caribou Concentration Areas	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Permitting challenges along Denali National Park, Historical & archeological property protection; Impacts to transportation and power for tourism industry; Population and workforce factors in Healy and Cantwell; Recreational use disturbance near creeks	2.5	4.0	3.4				
	AEAI	The powerline crosses the Nenana River in Healy and travels up the Moody Creek drainage to the southeast. This is a departure from the alignment that both the railroad and highway follow (passing through Nenana Canyon, aka Glitter Gulch). The powerline tr	Cross-slopes range from 15 percent to 40 percent and back to rolling hills toward Cantwell. Soils are relatively loess-free. Much of route crosses steep, mountainous terrain where coarse soils are thin and overlie weathered bedrock. Finer-grained soils	42.2	Nenana River Crossing (X2), Nenana Canyon, Denali Fault - Dry Crk Strand, Hines Crk Strand (x3), McKinley Strand (x2) Fault Crossings	26	0	64022.2 (Partial Wetlands)	0	0		1.5	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Ioworm Gulch; McKinley Park, Denali National Park & Preserve; Tourism Industry (Transportation & Lodging companies); Cantwell; Moody & Montana Creeks; Sport Fisherman's Association; Caribou Concentration Areas	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical & archeological property protection; Impacts to transportation and power for tourism industry; Population and workforce factors in Healy and Cantwell; Recreational use disturbance near creeks	2.5	3.0	2.3				
	ARRC	The railroad follows the same canyon as the highway south from Healy and past the entrance to the National park. Because the railroad was built prior to the road, it usually follows the better route of the two. However, for most of the canyon the railroa	Soils in the northern portion of segment are mostly bedrock and man-made fill through the Nenana River Canyon with alluvial material over bedrock near Montana Creek. After Montana Creek, the soils consist of silt deposits over glacial till and coarse-gra	39.6	Nenana River Crossing (X2), Nenana Canyon, Denali Fault - Dry Crk Strand, Hines Crk Strand (x3), McKinley Strand (x2) Fault Crossings	19	0		3	0		2.5	Stream crossings are below average and potentially impacted wetlands are sufficient. Overall permitting issues and concerns are not substantially different between the route options although this route may pose challenges due to crossing into Denali National park & Preserve. A full matrix of potential permits required for the project can be found in Appendix 4-1.	1.5	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Ioworm Gulch; McKinley Park, Denali National Park & Preserve; Tourism Industry (Transportation & Lodging companies); Cantwell; Caribou Concentration Areas	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Permitting challenges along Denali National Park, Historical & archeological property protection; Impacts to transportation and power for tourism industry; Population and workforce factors in Healy and Cantwell; Recreational use disturbance near creeks	2.5	1.0	1.9				

Segment	Route Option	General Route Description	Terrain Description	Engineering										Permitting		Socio Economic		Right-of-Way		Weighting			
				Segment Length (miles)	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW	
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%	
																			25.00%	25.00%	25.00%	25.00%	
Cantwell to Hurricane Gulch	Denali	Denali Pipeline Route (1992, MP 161-195): Crosses the Jack River and proceeds south from Cantwell, following the Parks Highway, through Broad Pass and down the eastern side of the northern end of the Mat-Su Valley. Eventually the route joins the powerline ROW (for approximately 6-miles) and then moves farther to the east in preparation for the approaching Hurricane Gulch Crossing (the Gulch dwindles in size to the east).	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	37.4	Hurricane Gulch	20	3	57177.7 (All Wetlands except approx. 1.5 miles)	2	2		3.5	Stream crossings are slightly above average and potentially impacted wetlands are significant. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Mat-Su Borough; Summit; Summit, Mirror, & Edes Lakes Campgrounds; Broad Pass; Dunkle Mine; Fork Campground; Hurricane Gulch;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas, moose rutting and winter concentration areas, Trumpeter Swan spring concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Disturbance to Recreational Areas; Population and sociocultural impacts to Cantwell and Hurricane Regions; Power to related transportation and natural resource businesses	2.5	2.0	2.6				
	ANGDA	ANGDA Route (2005, MP 160-196): Route continues south from Cantwell through Broad Pass to Hurricane, following the Parks Highway. About 11 miles from Hurricane, the route diverges to the east and crosses Honolulu Creek and Hurricane Gulch (similar to the Denali Pipeline Route).	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	37.5	Hurricane Gulch	15	4	32202.7 (All Wetlands except approx. 1.5 miles)	4	1		4.0	Stream crossings are average and potentially impacted wetlands are average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Mat-Su Borough; Summit; Summit, Mirror, & Edes Lakes Campgrounds; Broad Pass; Dunkle Mine; Fork Campground; Hurricane Gulch;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas, moose rutting and winter concentration areas, Trumpeter Swan spring concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Disturbance to Recreational Areas; Population and sociocultural impacts to Cantwell and Hurricane Regions; Power to related transportation and natural resource businesses	2.5	2.5	3.1				
	Parks Hwy	South of Cantwell the Parks Highway enters the northern end of the wide open Matanuska Susitna Valley which is bordered to the west by Denali National Park and on the east by the northern reaches of the Talkeetna Mountains. After crossing over Broad Pass the highway meanders somewhat toosely along the valley crisscrossing the railroad and many streams that feed into the upper Chulitna River. Eventually the highway encounters Hurricane Gulch which is a deeply carved drainage that flows east to west and into the Chulitna in the area where the Chulitna is within a deep canyon. The highway crosses Hurricane Gulch on an impressive trussel style bridge.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	37.2	Hurricane Gulch	13	4	5299.8 (All Wetlands except approx. 1.5 miles)	0	2		3.0	Stream crossings are average and potentially impacted wetlands are significantly below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Mat-Su Borough; Summit; Summit, Mirror, & Edes Lakes Campgrounds; Broad Pass; Dunkle Mine; Fork Campground; Hurricane Gulch;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas, moose rutting and winter concentration areas, Trumpeter Swan spring concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Disturbance to Recreational Areas; Population and sociocultural impacts to Cantwell and Hurricane Regions; Power to related transportation and natural resource businesses	2.5	3.0	2.9				
	AEAI	The powerline follows the Mat-Su Valley south in much the same manner as the highway and railroad. However, the powerline generally hugs the eastern limits of the valley and is usually not visible from the highway as it is 1 to 2 miles east of the highway most of the time.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	35.3	Hurricane Gulch	23	3	42650.2 (All Wetlands except approx. 1.5 miles)	2	2		2.0	Stream crossings are slightly above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Mat-Su Borough; Summit; Hurricane Gulch;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas, moose rutting and winter concentration areas, Trumpeter Swan spring concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Disturbance to Recreational Areas; Population and sociocultural impacts to Cantwell and Hurricane Regions; Power to related transportation and natural resource businesses	2.5	2.0	2.3				
	ARRC	The railroad follows a similar path that the highway follows from Cantwell to Hurricane. The road and railroad cross each other twice in this segment and generally cross all the same rivers and creeks. More often than not the railroad is visible from the highway.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	36.2	Hurricane Gulch	0	4		2	0		2.0	Stream crossings are below average and potentially impacted wetlands are not a factor. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; Denali fault; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Mat-Su Borough; Summit; Summit, Mirror, & Edes Lakes Campgrounds; Broad Pass; Dunkle Mine; Fork Campground; Hurricane Gulch;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas, moose rutting and winter concentration areas, Trumpeter Swan spring concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Disturbance to Recreational Areas; Population and sociocultural impacts to Cantwell and Hurricane Regions; Power to related transportation and natural resource businesses	2.5	1.5	2.3				

Segment	Route Option	General Route Description	Terrain Description	Engineering										Permitting		Socio Economic			Right-of-Way		Weighting			
				Segment Length (miles)	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permittign Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW		
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%		
Hurricane Gulch to Talkeetna Jctn	Denali	Denali Pipeline Route (1992, MP 196-272): Route turns southwest to the lower valley of the Chulitna River at Hurricane Station. It follows the Parks Highway along the east side of the Chulitna River Valley and crosses the river approximately 40 miles from Hurricane. The route continues along the west side of the Chulitna River and follows the Parks Highway to Talkeetna Spur Road Jctn	Hills are gentle to rolling except where river crossings occur. Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is discontinuous or sporadic with mostly thaw unstable soils. After the Chulitna River crossing, areas of permafrost are absent or isolated.	72	Chulitna River Crossing, Susitna River Crossing	64	28	36749.2 (Partial Wetlands)	20	2	90%	4.0	Stream crossings are slightly above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	<u>Physical</u> : Transition zone climate; some discontinuous permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Denali State Park; M.F. & E.F. Chulitna Fishing Areas; Byers Lake Campground; Trapper Creek Mine; Troublesome Creek Campground; Talkeetna; Related Service and Tourism Business Along Highway	<u>Physical</u> : engineering issues related to extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpeter Swan dispersed nesting, brooding, rearing areas; black bear denning concentration areas, black and brown bear berry concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	2.5	2.5	2.9					
	ANGDA	ANGDA Route (2005, MP 196-255): The route turns southwest and follows east side of the Parks Highway through Hurricane. The route follows the east side of the Parks Highway, until the Chulitna River, where it crosses to the west side of the highway, crosses the Chulitna River, and returns to the east side of the highway. The route continues along the east side of the Parks Highway to just before Trapper Creek where it changes sides and follows the Parks to the Talkeetna Junction, crossing the Susitna River on the way.	Hills are gentle to rolling except where river crossings occur. Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is discontinuous or sporadic with mostly thaw unstable soils. After the Chulitna River crossing, areas of permafrost are absent or isolated.	71.8	Chulitna River Crossing, Susitna River Crossing	36	18	36868.8 (Partial Wetlands)	15	2	85%	4.0	Stream crossings are slightly above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	<u>Physical</u> : Transition zone climate; some discontinuous permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Denali State Park; M.F. & E.F. Chulitna Fishing Areas; Byers Lake Campground; Trapper Creek Mine; Troublesome Creek Campground; Talkeetna; Related Service and Tourism Business Along Highway	<u>Physical</u> : engineering issues related to extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpeter Swan dispersed nesting, brooding, rearing areas; black bear denning concentration areas, black and brown bear berry concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	3.0	3.0	3.1					
	Parks Hwy	South of Hurricane the Parks Highway enters into Denali State Park and follows the west side of Curry Ridge while the Chulitna River is to the West. Eventually the Chulitna crosses the highway and the road continues south through Trapper Creek. South of Trapper Creek about 10-miles the road crosses the Susitna River, then the railroad before intersecting with the Talkeetna Spur Road.	Hills are gentle to rolling except where river crossings occur. Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is discontinuous or sporadic with mostly thaw unstable soils. After the Chulitna River crossing, areas of permafrost are absent or isolated.	72.6	Chulitna River Crossing, Susitna River Crossing	32	17	9696.6 (Partial Wetlands)	0	2	100%	4.0	Stream crossings are below average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	<u>Physical</u> : Transition zone climate; some discontinuous permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Denali State Park; M.F. & E.F. Chulitna Fishing Areas; Byers Lake Campground; Trapper Creek Mine; Troublesome Creek Campground; Talkeetna; Related Service and Tourism Business Along Highway	<u>Physical</u> : engineering issues related to extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpeter Swan dispersed nesting, brooding, rearing areas; black bear denning concentration areas, black and brown bear berry concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	2.5	3.0	3.1					
	AEAI	A few miles south of Hurricane the Intertie moves west and joins the Susitna River drainage, crossing the Susitna, climbing to atop the ridge just east of the river and following into Talkeetna. Just before Talkeetna the Intertie must cross the Talkeetna River, and skirts to the east of town (between Bald Mountain and town). Eventually the powerline pairs back up with the Parks Highway near the Talkeetna Spur Road/Parks Highway Jctn.	The majority of the route contains soils that consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Between the Susitna River and Talkeetna River Crossings, the route travels through a region containing both mountains and river valleys. In areas with mountainous terrain, thin deposit of coarse soils overlie weathered bedrock. Finer-grained soils will be found only when crossing the valley bottoms of the Talkeetna River tributaries. After the Chulitna River crossing, areas of permafrost are absent or isolated.	65.9	Susitna River Crossing, Talkeetna River Crossing	42	10	No Data	0	0	0%	1.0	Stream crossings are average and potentially impacted wetlands were unknown. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	<u>Physical</u> : Transition zone climate; some discontinuous permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Susitna River Campgrounds; Trapper Creek Mine; Talkeetna	<u>Physical</u> : engineering issues related to extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpeter Swan dispersed nesting, brooding, rearing areas; black bear denning concentration areas, black and brown bear berry concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	2.5	2.5	2.0					
	AKRC	South of Hurricane the railroad turns to the east and joins the Susitna River drainage. After crossing to the east side of the Susitna the railroad follows along the river all the way into Talkeetna (crossing the Talkeetna River just before entering town). From Talkeetna the railroad travels between the Spur Road and the Susitna River, crosses over the Parks Hwy and returns between the Parks and the River as it passes by the Talkeetna Spur Road Jctn.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the Susitna River floodplain. Permafrost is discontinuous or sporadic with mostly thaw unstable soils. South of the Chulitna Creek crossing, areas of permafrost are absent or isolated.	68.5	Susitna River Crossing, Talkeetna River Crossing	51	26		2	0	100%	1.0	Stream crossings are slightly above average and potentially impacted wetlands are unknown. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	<u>Physical</u> : Transition zone climate; some discontinuous permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Susitna River Campgrounds; Trapper Creek Mine; Talkeetna	<u>Physical</u> : engineering issues related to extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpeter Swan dispersed nesting, brooding, rearing areas; black bear denning concentration areas, black and brown bear berry concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	2.5	1.5	1.8					

Segment	Route Option	General Route Description	Terrain Description	Engineering										Permitting		Socio Economic			Right-of-Way		Weighting			
				Segment Length (miles)	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW			
						Total Number	Anadromous Fish																	
																				25.00%	25.00%	25.00%	25.00%	
Talkeetna Jctn to Willow	Denali	Denali Pipeline Route (1992, MP 272-317): Route continues south along the Parks Hwy ROW to Willow, crossing Montana, Sheep, (No Suggestions) and other smaller creeks.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	28.7	None	13	8	32311.2	0	1		2.5	Stream crossings are below average and potentially impacted wetlands are slightly below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana & Montana Creek; Caswell; Sheep Creek; Susitna Landing; Deception Creek & Secluded Lake Campgrounds; Kashwitna Lake; Willow Creek State Recreational Area; Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological land impact mitigation; Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses	2.5	3.0			2.8			
	ANGDA	ANGDA Route (2005): Route crosses to the west side of the Parks Highway to avoid the Trapper Creek area. The route stays on the west side of the highway to the north side of the Susitna River Crossing. Route crosses the Susitna River downstream of the existing Parks Highway Bridge and parallels the highway on the south and west for approximately 7 miles, then crosses to the east of the highway proceeding south for approximately 5 more miles. At this point, the route leaves the highway toward the east and follows the Matanuska Electric Association (MEA) power line ROW, intersecting the Alaska Energy Authority (AEA) Intertie alignment. The route turns south, following the Intertie, parallel to the Parks Highway and the Alaska Railroad to the southern terminus of the Intertie at Willow.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	27.3	None	21	15	81738.8	1	0		3.5	Stream crossings are average and potentially impacted wetlands are well above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana & Montana Creek; Caswell; Sheep Creek; Susitna Landing; Deception Creek & Secluded Lake Campgrounds; Kashwitna Lake; Willow Creek State Recreational Area; Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological land impact mitigation; Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses	3.0	2.5			2.9			
	Parks Hwy	The Parks Highway leaves Trapper Creek to the south and crosses the Susitna River approximately 10-miles from Trapper Creek. The route continues along the east side of the Susitna River to Willow.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	28.8	None	11	9	3996.9	0	1		2.5	Stream crossings are below average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana & Montana Creek; Caswell; Sheep Creek; Susitna Landing; Deception Creek & Secluded Lake Campgrounds; Kashwitna Lake; Willow Creek State Recreational Area; Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological land impact mitigation; Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses	2.5	3.0			2.8			
	AEAI	The route leaves from the east side of Talkeetna, heads in a southwest direction, roughly paralleling the Susitna River.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	27.1	None	25	18	71810.7 (Partial Wetlands)	0	0		3.5	Stream crossings are above average and potentially impacted wetlands are well above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana & Montana Creek; Caswell; Sheep Creek; Susitna Landing; Deception Creek & Secluded Lake Campgrounds; Kashwitna Lake; Willow Creek State Recreational Area; Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological land impact mitigation; Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses	2.5	1.5			2.4			
	ARRC	The route leaves from Talkeetna, heads south, along the east side of the Susitna River into Willow.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	28.4	None	26	18		1	6		3.0	Stream crossings are above average and potentially impacted wetlands are unknown. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana & Montana Creek; Caswell; Sheep Creek; Susitna Landing; Deception Creek & Secluded Lake Campgrounds; Kashwitna Lake; Willow Creek State Recreational Area; Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological land impact mitigation; Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses	2.5	1.0			2.3			

Segment	Route Option	General Route Description	Terrain Description	Engineering										Permitting		Socio Economic		Right-of-Way		Weighting			
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW	
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%	
																			25.00%	25.00%	25.00%	25.00%	
Willow to ENSTAR line (Wasilla)	Denali	Denali Pipeline Route (1992): Proceeds along the Parks Highway through Houston. At Houston, the route follows the powerline ROW, west of Wasilla, crosses Lucile Creek and Fish Creek to Point Mackenzie Road.	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	15.9	Castle Mountain Fault	8	5	4.7	2	2		2.5	Stream crossings are slightly above average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for this project can be found in Appendix 4-1.	2.5	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Nancy Lack State Recreation Area, Houston, Wasilla; Palmer Hay Flats State Game Refuge; Big Lake Recreation Area; Sustina; Area Community Councils; MEA; CEA; Goose Bay State Game Refuge; Iditarod National Historic Trail; Mat-Su Chamber of Commerce & Local Businesses;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Mitigation of impacts on recreational fishing and hunting activities; Communications with community councils; Historical and archeological properties; Population impacts on sociocultural norms; Visual and noise impacts of construction; Boom-bust impacts on local businesses	2.5	2.0			2.4		
	ANGDA	ANGDA Route (2005): The route continues south through Willow along the MEA power line to approximately 4 miles northwest of Houston. From this point, the route follows the east side of the Parks Highway minimizing conflicts with populated areas north of	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	35.4(Willow to Jct of Parks and Glenn)	Castle Mountain Fault	13	13	40380.6	3	2		2.5	Stream crossings are above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Nancy Lack State Recreation Area, Houston, Wasilla; Palmer Hay Flats State Game Refuge; Big Lake Recreation Area; Sustina; Area Community Councils; MEA; CEA; Goose Bay State Game Refuge; Iditarod National Historic Trail; Mat-Su Chamber of Commerce & Local Businesses;	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Mitigation of impacts on recreational fishing and hunting activities; Communications with community councils; Historical and archeological properties; Population impacts on sociocultural norms; Visual and noise impacts of construction; Boom-bust impacts on local businesses	2.5	2.0			2.3		
	AEAI	The route leaves from the east side of Talkeetna, heads in a southwest direction, roughly paralleling the Sustina River.	Soils consist of silts over glaciofluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost soils ar	23.7	Parks Highway	9	10	48609.5	1	1		N/A	N/A	N/A	N/A	N/A	N/A				N/A		
	Alt 1	At Willow, the alignment continues to follow the Sustina River, through the Castle Mountain Fault Zone and near the Nancy Lake State Recreation Area, terminating at the existing ENSTAR 20-in pipeline near MP 39.	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	29.9	Castle Mountain Fault	9	6	21982.9	0	0		4.5	Stream crossings are slightly above average and potentially impacted wetlands are average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Nancy Lake State Recreation Area, Sustina River, Red Shirt Lake, Hock Lake, My Lake	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Mitigation of impacts on recreational fishing and hunting activities	3.0	4.5			3.8		
	Alt 2	The route continues along the Parks Highway and crosses the Castle Mountain Fault near Houston. The alignment then turns west and follows Big Lake Road, terminating at the existing ENSTAR 20-in pipeline near MP 39.	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	36.0	Castle Mountain Fault	4	3	4952.6	0	0		3.5	Stream crossings are below average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Big Lake & Campgrounds, Big Lake Recreational Businesses, Diamond Lake, Jewel Lake, Carpenter Lake	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of impacts on recreational fishing and hunting activities, Boom-bust impacts on recreational business in Big Lake area, Population impacts during summer construction in Big Lake area	2.5	3.0			3.0		
	Alt 3	The route continues along the Parks Highway and crosses the Castle Mountain Fault near Houston. It turns southwest at the junction of the highway and the AEAJ powerline and follows the powerline to Knick Goose Bay Road, where the route terminates at the	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	24.6	Castle Mountain Fault	2	3	3988	0	0		3.5	Stream crossings are below average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Lucile Creek, AEAJ Interlie Right-of-Way, Houston, MEA	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Population impacts on sociocultural norms of Houston area, Construction disturbances to AEAJ Interlie	2.5	2.5			2.9		
Alt 4	The route continues along Parks Highway from Willow, crosses the Castle Mountain Fault near Houston and terminates at the junction of the Parks Highway and the existing ENSTAR 4-in pipeline.	Through Houston, soils are silts over glaciofluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	25.4	Castle Mountain Fault	4	1	0	0	0		3.0	Stream crossings are below average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Transition zone climate; some discontinuous permafrost present; wetlands present; Biological: alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Lucile Creek, Houston, Knik Goose Bay Road	Physical: engineering issues related to extreme cold, permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; moose rutting, winter and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Population impacts on sociocultural norms of Houston area, Construction disturbances to road access	2.5	2.0			2.5			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way	Weighting				
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)		Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
DJ to Paxson	ANGDA/ TAPS	ANGDA Route (2005): Follows the existing TAPS ROW. Begins at TAPS milepost 541.1, near Delta Junction, and continues to TAPS milepost 511.6, approximately 5 miles north of Paxson and Denali Highway intersection.	From Delta Jct. to Donnelly the terrain is fairly flat with soils consisting of glacial tills with thin silt cover. South of Donnelly the terrain steepens as the route ascends into the mountainous terrain of the Alaska Range. Soils exhibit conditions that alternate from floodplain deposits to coarse fan deposits to glacial deposits (till) over shallow bedrock. The soils in this segment are generally unfrozen in the active floodplain areas and discontinuously frozen in the upland areas. Frozen soils are thaw unstable.	76.5	Five Pipeline Crossings, Donnelly Dome Fault Crossing, Denali/Hinz/McGinness Fault Crossings, Delta River Floodplain Crossing	46	3	N/A in existing reports	6	0		2.0	Stream crossings are average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; no documented wetlands; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; two anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Delta Junction; TAPS; Ft. Greely (Missile Defense Development Site); Allen Air Field (Army); Black Rapids (Training Site); Sargent & Ruby Creek Mines; Gulkana Glacier Training Site (Army); Summit Lake Recreational Area	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Quality-of-Life/Population Impacts on Delta Junction; 2. Potential Permitting Challenges Through/Adjacent to DoD Property; 3. Power Generation to Area Mines; 4. View & Noise Impacts to Recreational Areas	2.5	1.5	2.1			
	TAGS	TAGS Route: Skirts the community of Delta Junction, and crosses the Alaska Highway and Jarvis Creek. The route continues south, paralleling TAPS and the Richardson Highway. The route alternates crossing the highway and TAPS until it crosses the Donnelley Dome Fault Zone. The route continues to follow TAPS and the highway, through the Black Rapids Military Reservation to Trims Creek. The alignment crosses the McGinnis Glacier and Denali Faults on a shelf above the river valley. The route returns to the east side of the Richardson Highway, crosses Phelan Creek, then crosses back to the east side of the highway. Approximately 20 miles from Paxon Lake, the route follows the below ground TAPS to avoid steep slopes, and continues to Paxson Lake.	From Delta Jct. to Donnelly the terrain is fairly flat with soils consisting of glacial tills with thin silt cover. South of Donnelly the terrain steepens as the route ascends into the mountainous terrain of the Alaska Range. Soils exhibit conditions that alternate from floodplain deposits to coarse fan deposits to glacial deposits (till) over shallow bedrock. The soils in this segment are generally unfrozen in the active floodplain areas and discontinuously frozen in the upland areas. Frozen soils are thaw unstable.	77	Donnelly Dome Fault Zone Crossing, McGinnis Glacier Crossing, Denali Fault Crossing	42	0	N/A in existing reports	9	0		4.0	Stream crossings are below average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; no documented wetlands; Biological: Bog/muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; no anadromous streams crossed; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Delta Junction; TAPS; Ft. Greely (Missile Defense Development Site); Allen Air Field (Army); Black Rapids (Training Site); Sargent & Ruby Creek Mines; Gulkana Glacier Training Site (Army); Summit Lake Recreational Area	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Quality-of-Life/Population Impacts on Delta Junction; 2. Potential Permitting Challenges Through/Adjacent to DoD Property; 3. Power Generation to Area Mines; 4. View & Noise Impacts to Recreational Areas	2.5	2.5	2.9			
	Rich Hwy	Route begins at the junction of the Alaska and Richardson Highways and travels south. It crosses the TAPS approximately 10 miles from Delta Junction, turns east, traveling around the Donnelly Dome, meeting the TAPS again approximately 9-miles south of turn-off around Donnelly Dome. Route continues along the east side of the Delta River, crossing the TAPS twice just north of Darling Creek. It continues along the east side of the Delta River until Phelan Creek, where it follows along the east side of the creek until it meets TAPS again, crosses the TAPS one more time before reaching Paxson.	From Delta Jct. to Donnelly the terrain is fairly flat with soils consisting of glacial tills with thin silt cover. South of Donnelly the terrain steepens as the route ascends into the mountainous terrain of the Alaska Range. Soils exhibit conditions that alternate from floodplain deposits to coarse fan deposits to glacial deposits (till) over shallow bedrock. The soils in this segment are generally unfrozen in the active floodplain areas and discontinuously frozen in the upland areas. Frozen soils are thaw unstable.	79.9	Donnelly Dome Fault Zone Crossing, McGinnis Glacier Crossing, Denali Fault Crossing, TAPS Crossing x 3	53	7	N/A in existing reports	0	0		3.0	Stream crossings are slightly above average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; no documented wetlands; Biological: Bog/muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; no anadromous streams crossed; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Delta Junction; TAPS; Ft. Greely (Missile Defense Development Site); Allen Air Field (Army); Black Rapids (Training Site); Sargent & Ruby Creek Mines; Gulkana Glacier Training Site (Army); Summit Lake Recreational Area	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Quality-of-Life/Population Impacts on Delta Junction; 2. Potential Permitting Challenges Through/Adjacent to DoD Property; 3. Power Generation to Area Mines; 4. View & Noise Impacts to Recreational Areas	2.5	2.5	2.6			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic		Right-of-Way	Weighting					
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
Paxson to Glennallen	ANGDA/ TAPS	ANGDA Route (2005): Follows the existing TAPS ROW. Begins at TAPS milepost 611.6, approximately 5 miles north of Paxson and Denali Highway intersection, and continues to TAPS milepost 684.5, in Copper River Valley, near Glennallen.	Terrain in the northern portion of this segment (Paxson to Hogan Hill) is rolling with steep cross-slopes. Soils are primarily glacial till overlying shallow bedrock. The northern segment lies in thaw unstable continuous to discontinuous permafrost where areas of outcropping bedrock, south facing slopes and stream crossings may be unfrozen to sporadically frozen. The southern segment contains gently rolling to moderately level terrain that are comprised of the "GL" landform of the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are complex with the permafrost being particularly sensitive to even minor surface disturbances because of the presence of warm permafrost. Permafrost is generally more widespread and continuous near Hogan Hill and more discontinuous near Glennallen.	65.4	Gulkana River Crossing, Refrigerated Workpad	18	2	90359.9 (Partial Wetlands)	1	0		2.0	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: City of Paxson; Paxson Lake Campgrounds; Sourdough Campgrounds; Glennallen; Wrangell-St. Elias National Park; AHTNA, Inc.; TAPS	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Subsistence Area Disturbances; 2. Recreational Fishing Impacts; 3. Needed cooperation with AHTNA on shareholder outreach and employment; 4.Socio-cultural (crime & quality of life) impacts along route	2.5	1.5	2.1			
	TAGS	TAGS Route: The route continues along the west side of TAPS, and the east side of the Richardson Highway, and crosses the TAPS north of Hogan Hill. From Hogan Hill, the route continues on the east side of the Richardson Highway, to avoid the Gulkana Wild and Scenic Rivers Conservation Unit. The route heads southwest to the Gulkana River, where it crosses approximately 22 miles from Glennallen. The route continues south and follows along the east side of the aboveground TAPS to Glennallen.	Terrain in the northern portion of this segment (Paxson to Hogan Hill) is rolling with steep cross-slopes. Soils are primarily glacial till overlying shallow bedrock. The northern segment lies in thaw unstable continuous to discontinuous permafrost where areas of outcropping bedrock, south facing slopes and stream crossings may be unfrozen to sporadically frozen. The southern segment contains gently rolling to moderately level terrain that are comprised of the "GL" landform of the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are complex with the permafrost being particularly sensitive to even minor surface disturbances because of the presence of warm permafrost. Permafrost is generally more widespread and continuous near Hogan Hill and more discontinuous near Glennallen.	64.2	Gulkana River Crossing	19	3	150363.2 (Partial Wetlands)	2	0		4.0	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: City of Paxson; Paxson Lake Campgrounds; Glennallen; Wrangell-St. Elias National Park; AHTNA, Inc.; TAPS	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Subsistence Area Disturbances; 2. Recreational Fishing Impacts; 3. Needed cooperation with AHTNA on shareholder outreach and employment; 4.Socio-cultural (crime & quality of life) impacts along route	2.5	2.5	2.9			
	Rich Hwy	At Paxson, the route travels south, along the east side of Paxson Lake, then near TAPS at the McMahon Trail. Route runs mostly parallel to the TAPS, then crosses the TAPS just south of Hogan Hill. It remains on the east side of the Gulkana River, and crosses the river at Gulkana. The route then stays between the Cooper River and the TAPS to the junction of the Glenn Highway.	Terrain in the northern portion of this segment (Paxson to Hogan Hill) is rolling with steep cross-slopes. Soils are primarily glacial till overlying shallow bedrock. The northern segment lies in thaw unstable continuous to discontinuous permafrost where areas of outcropping bedrock, south facing slopes and stream crossings may be unfrozen to sporadically frozen. The southern segment contains gently rolling to moderately level terrain that are comprised of the "GL" landform of the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are complex with the permafrost being particularly sensitive to even minor surface disturbances because of the presence of warm permafrost. Permafrost is generally more widespread and continuous near Hogan Hill and more discontinuous near Glennallen.	71.2	Gulkana River Crossing, TAPS Crossing	25	5	14838.8 (Partial Wetlands)	0	0		3.0	Stream crossings are above average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: City of Paxson, Paxson Lake Campgrounds; Sourdough Campgrounds; Gulkana River and Copper River Recreational Areas; Gulkana; Glennallen; AHTNA, Inc.; TAPS	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Subsistence Area Disturbances; 2. Recreational Fishing Impacts; 3. Needed cooperation with AHTNA on shareholder outreach and employment; 4.Socio-cultural (crime & quality of life) impacts along route	2.5	2.5	2.6			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way	Weighting				
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
Glennallen to Eureka	ANGDA	ANGDA Route (2005): Begins near TAPS ROW, approximately 2 miles north of Glennallen, and proceeds directly west for approximately 16.2 miles before turning southwest and joining the the Glenn Highway ROW. It continues through the juncture of Glenn Highway, west of Glennallen, proceeds to the west, within the highway ROW across the remainder of the Copper River Basin.	This segment conaints gently sloping to flat terrain comprised of the "GL" landform common in the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are complex with the ground being particularly sensitive to even minor surface disturbances because of the presence of warm permafrost. Permafrost is discontinuous.	62.6	Winter Construction	30	3	92927.1	2	0		4.0	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Wrangell-St. Elias National Park; Glennallen; AHTNA; Lake Louise State Recreation Area; Tazlina Lake Recreational Area; Matanuska-Susitna Borough; Copper Valley Electric	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Nelchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Subsistence Impacts to Athapaskan and Tatlatan; Disturbance to sport hunting groups; Population impacts on recreational hubs; Nelchina Caribou herding patterns; Mat-Su land use plans & patterns	2.5	3.0	3.0			
	Glenn Hwy	Route crosses the TAPS one last time after turning west on the Glenn Highway from the Richardson Highway. The route continues west along the north side of the Tazlina River and heads in a southwesterly direction through the MatSu Borough to Eureka.	This segment conaints gently sloping to flat terrain comprised of the "GL" landform common in the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are complex with the ground being particularly sensitive to even minor surface disturbances because of the presence of warm permafrost. Permafrost is discontinuous.	62.7	TAPS Crossing	27	3	377.8 (Partial Wetlands)	0	0		3.5	Stream crossings are average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental climate; seismically active; permafrost present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Wrangell-St. Elias National Park; Glennallen; AHTNA; Lake Louise State Recreation Area; Tazlina Lake Recreational Area; Matanuska-Susitna Borough; Copper Valley Electric	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Nelchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Subsistence Impacts to Athapaskan and Tatlatan; Disturbance to sport hunting groups; Population impacts on recreational hubs; Nelchina Caribou herding patterns; Mat-Su land use plans & patterns	2.5	2.0	2.8			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way	Weighting				
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
Eureka to Chickaloon	ANGDA	ANGDA Route (2005): Begins just west of the Eureka Roadhouse, where the highway heads southwest to skirt Gunsight Mountain, deviates from the highway and travels to the west down the Squaw Creek drainage. At Squaw Creek and Caribou Creek, the route will angle north and ascent Caribou Creek drainage up to Chitna Pass. After Chitna Pass, the route descends the Boulder Creek Valley and crosses the Chickaloon River approximately 1 mile upstream of the town of Chickaloon.	This segment transitions out of the "GL" soils into the rolling hills of the Talkeetna Mountains. The majority of the segment is located in or near floodplains and streambeds. However, a portion of the segment travels through steep mountainous terrain. Soils consist of thick silts and organic (muskeg) deposit over glaciofluvial deposits, and alluvial deposits in river floodplains. The glaciofluvial and alluvial deposits may also contain large boulders. Soils in the mountainous terrain most likely consist of silts and sands overlying weathered bedrock. Permafrost in this segment is sporadic with mostly thaw stable soils.	49.2	Remote Location, Castle Mountain & Caribou (X4) Fault Crossings, Chickaloon River Crossing	58	1	13385.1	0	0		2.5	Stream crossings are above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental and transition zone climate; seismically active; permafrost present; Biological: Alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Mat-Su Borough; Nelchina Public Use Area; Matanuska Valley Moose Range; Chickaloon (Village Traditional Council)	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively utilized for moose harvest; Nelchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Visual and Construction-Population Impacts on Recreational Sites; Moose Creek fish and other wildlife protection; Subsistence resource management	2.0	2.5	2.3			
	Glenn Hwy	Route continues from Eureka in a southwest direction along the north side of the Matanuska River, past the Matanuska Glacier to Chickaloon.	After transitioning out of the "GL" soils the route travels through soils consisting primarily of thick silts and organic (muskeg) deposit over glaciofluvial deposits, and alluvial deposits. Bedrock is present along a large portion of the route with numerous outcrops located along select portions of the highway. Permafrost in this segment, although mostly absent, is sporadic with mostly thaw stable soils.	46.6	Caribou Creek Crossing, Castle Mountain Fault, Pinochle Hill, Generally difficult construction	18	0	0	0	0		3.0	Stream crossings are below average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental and transition zone climate; seismically active; permafrost present; Biological: Alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Mat-Su Borough; Glacier View (Community Council); Chickaloon (Village Traditional Council); Gun Sight Mountain; Matanuska River; Highway-Proximity Businesses	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively utilized for moose harvest; Nelchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological properties; Tourism disruption during construction; Visual impacts during construction; Economic (boom-bust) impacts on small business along highway	2.5	2.5	2.8			

Segment	Route Option	General Route Description	Terrain Description	Engineering								Permitting		Socio Economic			Right-of-Way	Weighting				
				Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings		Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr	Permits	Socio-Econ	ROW
						Total Number	Anadromous Fish												25.00%	25.00%	25.00%	25.00%
Chickaloon to Palmer	ANGDA	ANGDA Route (2005): Begins near Chickaloon, heading west and follows portions of the Chickaloon Trail then continues into the Kings River drainage. Route follows the drainage downstream, crossing the Kings River, and exits the drainage to the west about 2 miles before the river meets the Glenn Highway. Crosses Granite Creek, about 1.2 miles above highway, and proceeds southwest. Then crosses Moose Creek, and turns away from the Glenn Highway, and crossing the Palmer Fishhook Road, intersecting with the new Trunk Road. Meets the Parks highway ROW, and ends at the junction of the existing ENSTAR pipeline.	This segment crosses rolling hills and several drainages. Soils consist of thick silts and organic (muskeg) deposit over glaciofluvial deposits, and alluvial deposits in river floodplains. Soils in the along the hillsides may also include the presence of silts and sands overlying weathered bedrock. Permafrost is mostly absent.	36.4	Moose Creek Crossing	18	11	14332.4	0	0		3.0	Stream crossings are average and potentially impacted wetlands are slightly average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental and transition zone climate; seismically active; permafrost present; Biological: Alpine tundra, high shrub thicket and spruce-hardwood forest; wetlands; anadromous streams; Matanuska River; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Mat-Su Borough; Chickaloon Village Traditional Council; Matanuska Valley Moose Range; Caribou Creek; Palmer; Alpine CC; Buffalo/Soapstone CC; Farm Loop CC; North Lakes CC; Gateway CC; South Lakes CC; Palmer Hay Flats State Game Refuge;	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively utilized for moose harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Palmer Hayflats Game Refuge extensively used for waterfowl harvest; Human: Visual and Construction-Population Impacts on Recreational Sites; fish and other wildlife protection: Visual impacts during construction;	3.0	2.0	2.6			
	Glenn Hwy	Route continues from Chickaloon, along the north side of the Matanuska River to Palmer.	This segment crosses rolling terrain with soils consisting of thick silts and organic (muskeg) deposit over glaciofluvial deposits, and alluvial deposits in river floodplains. Bedrock is not uncommon along this segment. Permafrost is mostly absent.	36.6	Moose Creek Crossing	7	6	0	0	0		2.5	Stream crossings are average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental and transition zone climate; seismically active; permafrost present; Biological: Alpine tundra, high shrub thicket and spruce-hardwood forest; wetlands; anadromous streams; Matanuska River; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: Mat-Su Borough; Chickaloon Village Traditional Council; Matanuska Valley Moose Range; Caribou Creek; Palmer; Alpine CC; Buffalo/Soapstone CC; Farm Loop CC; North Lakes CC; Gateway CC; South Lakes CC; Palmer Hay Flats State Game Refuge; Matanuska River; Area Businesses	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively utilized for moose harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Palmer Hayflats Game Refuge extensively used for waterfowl harvest; Human: Historical and archeological properties; Tourism disruption during construction; Visual impacts during construction; Economic (boom-bust) impacts on small business along highway	2.5	2.0	2.5			