STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

2024-2027
Statewide Transportation Improvement Program
(STIP)

STIP 24-27: Volume 4
Project Selection

More information at **dot.alaska.gov/stip**

Background photo: *View of northern lights through old Knik River Bridge, headlights from new Knik River Bridge.*
By Lisa Torkelson, Alaska DOT&PF

[PENDING APPROVAL]

ALASKA DEPT. OF TRANSPORTATION & PUBLIC FACILITIES

2024-2027 STIP

(STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM)

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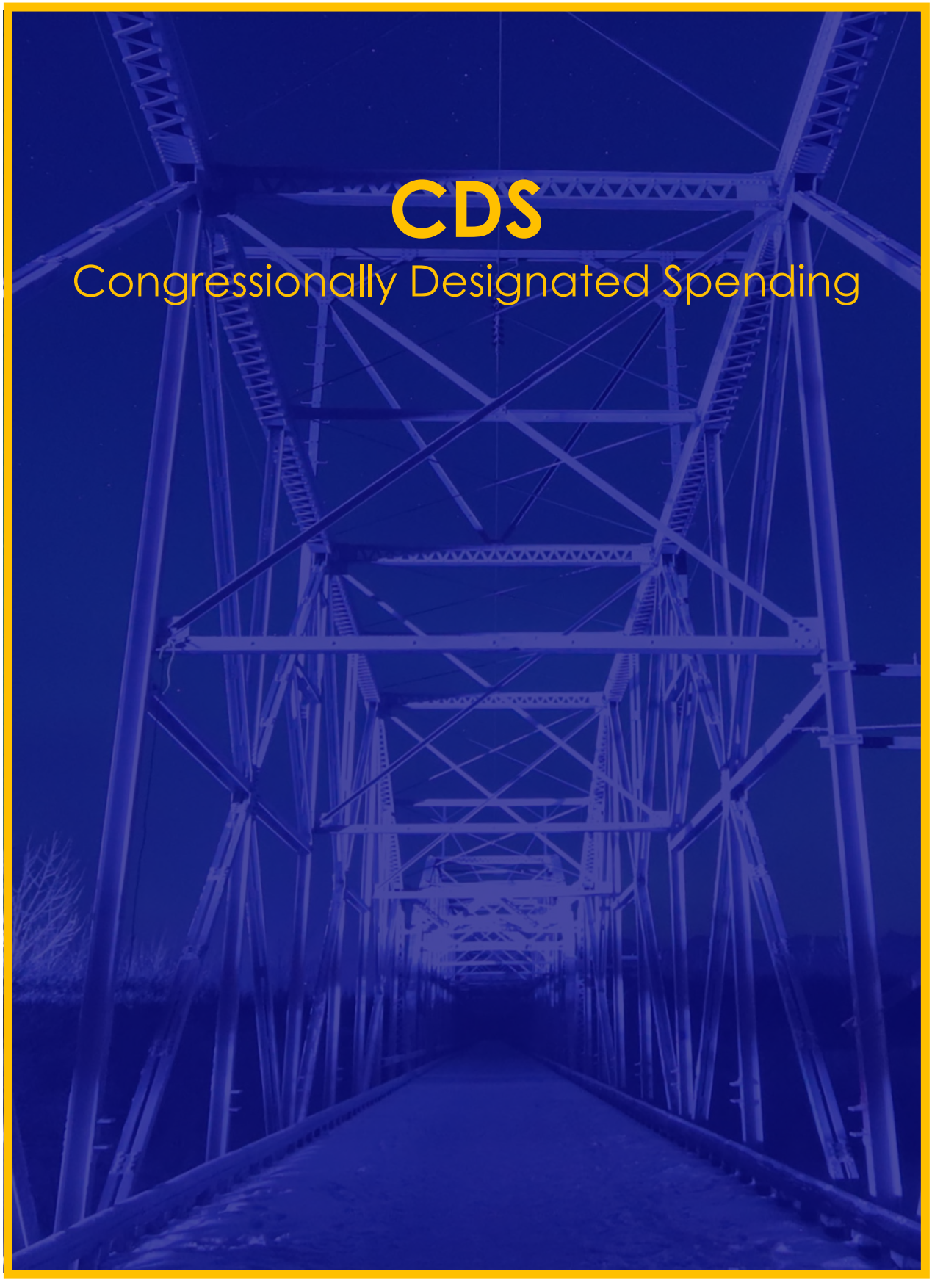

CDS
Congressionally Designated Spending

Hyperion Pull Date 11/20/2023

Transportation, Treasury & Independent Agencies Appropriations Act, FFY2004 2004 Section 115									Transportation, Treasury & Independent Agencies Appropriations Act, FFY2004 2004 Section 115								
	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
51	AK053	H170	AK053 - Ship Creek Improvements, Alaska	1,000,000.00	0	0	1,000,000.00	C	AK053	FFY2005 SECTION 115 DEMO EARMARKS TRANSFER (AK053 Ship Creek Imp Transfer to MARAD)						1,000,000.00	
									AK053	AK053 - Earmark Funds Returned from MARAD						1,000,000.00	0.00%
Transportation, Treasury, Independent Agencies, and General Government Appropriations Act, H.R. 108-792 Section 117 FFY 2005									Transportation, Treasury, Independent Agencies, and General Government Appropriations Act, H.R. 108-792 Section 117 FFY 2005								
	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
65	AK067	H660	AK067 - Seward highway recreational improvement	1,967,856.00	0	1,960,153.47	7,702.53	C	AK067	SEWARD HWY REC IMP, BIRD CREEK CAMPGROUND (SEC 117) AK06	0A31039	Z581150000	58115	CLOSED	1,482,577.38	1,481,577.38	100.07%
66	AK068		AK068 - Ship Creek Improvements, Alaska	1,967,856.00	864,842.52	0	1,103,013.48	C	AK068	FFY2005 SECTION 117 DEMO EARMARKS TRANSFERS OUT - AK061, AK068, AK069						1,322,667.00	
SAFETEA-LU* P.L. 109-56 Section 1702 FFY2005-2009									SAFETEA-LU* P.L. 109-56 Section 1702 FFY2005-2009								
	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
72	AK074	HY10, LY10, L930	AK074 - Gravina Funds available for any purpose	100,147,504.00	0	99,808,007.52	339,496.48	S	AK074	AK TRAFFIC MONITORING SYSTEM FOR HIGHWAYS (TMS/H) AK074	0106(025)		80368	CLOSED	299,471.81	329,198.39	90.97% Appears Sw
									AK074	AMATS: EAGLE RIVER LOOP RD REHAB: OLD GLENN - EAGLE RIVER	0551(003)	Z539360000	53936	CLOSED	2,101,865.23	2,310,504.02	90.97%
									AK074	AMATS: W.DOWLING RD PH I, OLD SEWARD HWY TO C ST AK074 (8	0532(007)	Z508980000	50898	CLOSED	17,526,723.45	19,181,175.90	91.37%
									AK074	AMHS SOUTHWEST WAREHOUSE	0003(119)		69054	CLOSED	253,755.17	317,193.99	80.00%
									AK074	BETHEL CHIEF EDDIE HOFFMAN HWY, AIRPORT TO HIGH SCHOOL A	0208(010)		59326	CLOSED	7,514,618.00	8,260,545.23	90.97%
									AK074	BLOWBACK CREEK BRIDGE REPLACEMENT	0002(293)	Z626160000	62616	CLOSED	42,843.47	47,096.26	90.97%
									AK074	CHENA HOT SPRINGS ROAD MP 20.8-56 REHABILITATION	0650(025)		61425	CLOSED	-	-	
									AK074	DALTON HWY MP 209-235 RECONSTRUCTION	0655(013)	Z609190000	60919	CLOSED	19,315.51	21,232.84	90.97%
									AK074	DALTON HWY MP 362-414 RECONSTRUCTION (CONST PAVE MP 362	0657(003)	Z613660000		CLOSED	363,880.00	400,000.00	90.97%
									AK074	DOYLE ROAD IMPROVEMENTS AK066	0002(267)	Z616690000	61669	CLOSED	94,238.55	103,593.00	90.97%
									AK074	ELLIOTT HWY MP 107.7-120.5 RECONSTRUCTION	0680(032)	Z622270000	62227	CLOSED	289,223.00	317,932.29	90.97%
									AK074	FAIRBANKS COWLES STREET UPGRADE	0641(002)		60434	CLOSED	383,427.00	421,487.29	90.97%
									AK074	FAIRBANKS ELECTRICAL UPGRADES-AK074	000S677		62221	CLOSED	369,450.00	406,122.90	90.97%
									AK074	FALSE PASS LANDFILL ACCESS ROAD AK074	0001(376)		59759	CLOSED	2,190,969.66	2,408,452.95	90.97%
									AK074	FFY06 SEA REGION HWYS SCENIC ENHANCEMENTS AK074	000S571		69047	CLOSED	140,389.46	154,325.01	90.97%
									AK074	FNSB SURFACE AND APPROACH UPGRADES	0002(232)		63172	CLOSED	620,722.72	682,337.83	90.97%
									AK074	HNS HWY FERRY TERMINAL TO UNION STREET REHABILITATION A	0956(018)	Z721700000	72170	CLOSED	22,643.53	24,895.05	90.96%
									AK074	HOOPER BAY OLD TOWN ROADS (VSW) AK074	0001(264)		55642	CLOSED	970,330.68	1,067,335.78	90.91%
									AK074	ILLINOIS STREET RECONSTRUCTION AK090/152/092/093/129/AK07	0663(004)	Z631020000	63102	CLOSED	45,210.58	47,907.79	94.37%
									AK074	JNU AREAWIDE TRAFFIC SIGNAL SYSTEM UPGRADES AK074	0003(136)		68057	CLOSED	430,881.46	473,652.20	90.97%
									AK074	JNU FFY09 AREAWIDE PAVING AK074/100	000S696		68837	CLOSED	89,715.98	98,621.49	90.97%
									AK074	KETCHIKAN THIRD AVENUE EXTENSION AK074	0904(001)		71811	CLOSED	15,502.15	17,040.95	90.97%
									AK074	KODIAK: PASAGSHAK RD SURFACING IMPROVEMENTS 2005	0001(358)	Z577350000	57735	CLOSED	513,121.08	564,055.34	90.97%
									AK074	KTN AIRPORT CREEK BRIDGE CONSTRUCTION	0003(232)	SFHWY00190	190	CLOSED	130,993.28	143,996.14	90.97%
									AK074	KTN AIRPORT FERRY TERM TO THIRD AVE SURFAC (TONGASS) AK0	000S495		68366	CLOSED	97,243.00	106,895.68	90.97%
									AK074	KTN FERRY TERMINAL IMPROVEMENTS (X-REF#SAMHS00015)	000S855	Z674660000		CONSTRUCTION	657,608.41	822,010.51	80.00%
									AK074	KTN GRAVINA AIRPORT FERRY LAYUP FACILITY (RP-AK013) (GRAV)	0952(018)	SFHWY00152		CONSTRUCTION	7,164,883.99	7,876,095.41	90.97%
									AK074	KTN GRAVINA FREIGHT FACILITY (RP-AK022,RP-AK097) (GRAV)	0952(020)	SFHWY00154		CONSTRUCTION	1,890,839.60	2,078,530.95	90.97%
									AK074	KTN GRAVINA REFRBSH EXSTNG FERRY BERTH FACLTY(RP-AK022)	0922(010)	SFHWY00153		CONSTRUCTION	2,043,900.11	2,246,784.77	90.97%
									AK074	KTN HERRING COVE BRIDGE IMPROVEMENT	0902(043)	SFHWY00072		CONSTRUCTION	-	-	
									AK074	KTN N. TONGASS BRIDGE IMPROVEMENTS - WATERFALL CREEKS	0920(027)	Z682290000	68229	CLOSED	-	-	
									AK074	KTN RECONSTRUCT ROAD TO AIRPORT BOUNDARY (RP-AK022)-(X-	0952(019)	SFHWY00156		CLOSED	260,962.39	286,866.36	90.97%
									AK074	KTN REVILLA NEW FERRY BERTH & UPLAND IMPROVEMENTS (GRAV	0003(209)	SFHWY00085		CONSTRUCTION	16,876,311.42	18,551,513.04	90.97%
									AK074	KTN REVILLA NEW PASSENGER WAITING FACILITY (RP-AK097) (GR	0952(017)	SFHWY00151		CONSTRUCTION	1,808,318.18	1,987,818.16	90.97%
									AK074	KTN REVILLA REFRBSH EXG FERRY BERTH FACLTY (RP-AK022) (GR	0952(021)	SFHWY00150		CONSTRUCTION	1,031,352.55	1,133,728.20	90.97%
									AK074	KTN SAXMAN TO SURF ST PAVEMENT REHAB- S. TONGAS (67685)	0902(031)	Z675710000		DESIGN	636,790.00	700,000.00	90.97%

									AK074	KTN SOUTH TONGASS HWY DEERMOUNT TO SAXMAN WIDENING(6	0902(039)	Z676850000		DESIGN	-	-	
									AK074	KTN SOUTH TONGASS PAVEMENT REHABILITATION (GARVEE) AK07	0902(020)		71670	CLOSED	4,643,140.14	10,104,034.59	45.95%
									AK074	KTN SOUTH TONGASS PAVING	0902(040)	Z676740000	67674	CLOSED	2,785,975.51	3,062,521.13	90.97%
									AK074	KTN WATERFRONT PROMENADE - PHASE III	0902(037)	Z681620000	68162	CLOSED	-	-	
									AK074	M/V CHENEGA HULL SURVEY & IMPROVEMENTS AK074	9500(123)		73046	CLOSED	101,549.57	111,629.72	90.97%
									AK074	M/V TUSTUMENA REFURBISHMENT	9500(124)		73062	CLOSED	-	-	
									AK074	MAT-SU MAJOR CORRIDORS PRESERVATION & ACCESS MGMT	0001(411)		52050	CLOSED	-	-	
									AK074	NEW GRAV ISLAND SHTL FERRY BERTH/RELATED TML IMPS (GRAV)	0003(213)	SFHWY00109		CONSTRUCTION	11,506,925.26	12,649,142.84	90.97%
									AK074	NOME BYPASS ROAD AK074	0002(225)		61087	CLOSED	1,184,314.59	1,301,873.80	90.97%
									AK074	NOME-COUNCIL ROAD MP 62-73.6 AK074	0130(029)	Z604000000	60400	CLOSED	1,818,797.00	1,999,337.15	90.97%
									AK074	NOR REG AUTOMATIC VEHICLE CLASSIFICATION AK074/152	000S698	Z633210000	63321	CLOSED	79,024.00	86,868.00	90.97%
									AK074	NOR REG FFY10 M&O CTP PREV MAINT & REPAIRS (PARENT)	000S726		63465	CLOSED	120,266.90	132,205.03	90.97%
									AK074	NOR REG SAGA BRUSHCUTTING FFY2006 AK074	000S569		62801	CLOSED	145,176.88	159,587.64	90.97%
									AK074	NORTH POLE HOMESTEAD RD/NORTH POLE HS BLVD EXT. - AK146	0002(193)		63025	CLOSED	1,522,313.36	1,673,423.61	90.97%
									AK074	PSG SOUTH MITKOF HIGHWAY UPGRADE PHASE 1 AK074	0937(033)		69225	CLOSED	1,551,183.17	1,705,159.02	90.97%
									AK074	REPLACEMENT OF WATER STREET TRESTLE #2(KTN OFF-SYSTEM B	000S735	Z695340000	69534	CLOSED	1,743,460.97	1,916,523.00	90.97%
									AK074	REZANOF DR RESURFACING, KODIAK WYE-MONASHKA BAY AK074	000S697	Z521050000	52105	CLOSED	227,425.00	250,000.00	90.97%
									AK074	SEA FFY06 NHS & NON-NHS PAVEMENT REFURBISHMENT AK074	0003(111)		69007	CLOSED	839,791.14	923,151.74	90.97%
									AK074	SELAWIK LANDFILL ROAD AK090	0002(212)		77141	CLOSED	492,954.00	541,887.00	90.97%
									AK074	SER FFY14 PAVEMENT REFURBISHMENT	0003(173)		68391	CLOSED	1,299,683.90	1,428,695.09	90.97%
									AK074	SGY FERRY TERMINAL MODIFICATIONS	0971(008)	Z696240000		DESIGN	140,502.14	175,627.68	80.00%
									AK074	SIT HALIBUT POINT ROAD PAVEMENT REHAB & DRAINAGE AK074/1	0993(019)	Z693510000	69351	CLOSED	854,986.47	939,855.36	90.97%
									AK074	SITKA ACCESS EIS AK074	0003(071)		67900	CLOSED	-	-	
									AK074	TRUNK ROAD RECONST, PH II PALMER-WASILLA HWY TO FISHHOO	0001(414)	Z511320000	51132	CLOSED	1,364,384.29	1,499,817.85	90.97%
									AK074	UNSTABLE SLOPE MANAGEMENT PROGRAM	4000(090)	Z634400000	63440	CLOSED	265,029.36	291,336.92	90.97%
									AK074	WENDELL AVENUE ADA IMPROVEMENTS	0672(003)		60827	CLOSED	67,827.00	74,559.75	90.97%
									AK074	WENDELL AVENUE BRIDGE	0672(004)	Z632910000		RUP	-	-	
									AK074	WRANGELL ROAD IMPROVEMENTS AK135	0003(135)		68828	CLOSED	495,291.93	544,456.33	90.97%
75	AK077	HY10, LY10	AK077 - Juneau access planning, design and cons	13,498,502.00	0	8,373,735.37	5,124,766.63	S	AK077	JNU ACCESS ROUTE AK077	000S131	Z711000000	71100	CLOSED	8,373,735.37	9,204,941.37	90.97%
									AK077	JUNEAU -LYNN CANAL HIGHWAY - ECHO COVE TO SWEENY CREEK	0933(033)		68937	CLOSED	-		
78	AK080	HY10	AK080 - Emergency evacuation road at Point Hope	4,484.46	0	0	4,484.46	N	AK080	POINT HOPE EVACUATION ROAD EXTENSION AK080	0002(205)	Z769680000	76968	CLOSED	-	999.83	
81	AK083	HY10	AK083 - Improve roads, sidewalks, and road draina	3,004,425.00	0	2,937,990.33	66,434.67	C	AK083	SEWARD ROAD IMPROVEMENTS (AK083)	0001(551)	CFHWY00004	30004	CLOSED	2,937,990.33	3,229,625.45	90.97%
84	AK086	L930	AK086 - Dowling Road extension/reconstruction w	3,004,425.00	0	2,699,700.00	304,725.00	C	AK086	AMATS: W.DOWLING RD PH II, C ST - MINNESOTA DR (GF/FED)	0532(008)	Z510300000	51030	CLOSED	2,699,700.00	2,967,681.66	90.97%
86	AK088	L930	AK088 - Realign rail track to eliminate hwy-rail cros	5,007,375.00	4,499,500.00	442,907.35	64,967.65	N	AK088	FAIRBANKS ROAD / RAIL CROSSING REDUCTION / REALIGNMENT P	0002(445)	NFHWY00425	90425	CLOSED	442,907.35	486,871.90	90.97%
									AK088	HIGH PRIORITY PROJECTS SECTION 1702 - DEMO #AK088/ FFY05/ FFY06 ALLOC - TRANSFER REALIGN RAIL TRACK TO FTA						1,717,248.00	
									AK088	HIGH PRIORITY PROJECTS SECTION 1702 - DEMO #AK088 - FFY07 TRANSFER TO FTA						921,224.00	
									AK088	Transfer to FTA AK088 Realign rail track to eliminate highway-rail crossings and improve highway safety and transit times (-$924,511)						924,511.00	
									AK088	Transfer all remaining AK088 to FTA for Alaska Railroad; Realign rail track to eliminate highway-rail crossings and improve highway safety and tra						936,517.00	
87	AK089	L930	AK089 - Completion of Shotgun Cove Rd, from WH	4,005,900.00	3,599,601.00	0	406,299.00	C	AK089	HIGH PRIORITY PROJECTS SECTION 1702 - DEMO #AK089/ FFY05/06 ALLOC - TRANSFER WHITTIER DECISION PT TO WEST FED LANDS						1,373,799.00	
									AK089	HIGH PRIORITY PROJECTS SECTION 1702 - DEMO #AK089 - FFY07 TRANSFER TO WFL						736,980.00	
									AK089	HIGH PRIORITY PROJECTS SECTION 1702 - #AK089/ FFY08 ALLOC - TRANSFER TO WFL - COMPLETION OF SHOTGUN COVE RD, FROM WHITT						739,608.00	
									AK089	-749,214Transfer AK089 - Completion of Shotgun Cove Rd, from Whittier to the area of Decision Pt.; Transfer FFY09 to Western Federral Lands H						749,214.00	
88	AK090	L930, LY10	AK090 - Planning, design, construction Knik Arm B	151,222,731.00	0	148,630,124.28	2,592,606.72	C	AK090	AKIACHAK SANTIATION RDS RECONST, PHASE I AK090	0205(003)		58272	CLOSED	1,082,083.24	1,189,494.61	90.97%
									AK090	ALASKA HWY TANANA RIVER BRIDGE #0505 AK090	0A21010		61253	CLOSED	1,549,463.55	1,658,954.55	93.40%
									AK090	AMATS: EAGLE RIVER RD REHAB: MP 5.3 TO MP 12.6 AK090	0550(015)	Z539430000	53943	CLOSED	-	476,000.00	
									AK090	AMATS: OLD GLENN HWY, FIRE LAKE TO S BIRCHWOOD LOOP AK09	0558(006)		58061	CLOSED	8,321,381.07	9,112,022.80	91.32%
									AK090	AMATS: OLD GLENN HWY, N.EAGLE RV IX PETERS CR (PARENT) AK0	0558(002)		52515	CLOSED	302,926.21	332,995.73	90.97%
									AK090	AMATS: OLD SEWARD HWY: HUFFMAN TO DOWLING (PARENT) AK	0537(001)	Z531780000	53178	CLOSED	442,553.11	486,482.48	90.97%

									AK090	AMATS: POTTER MARSH TRAIL HEAD ACCESS (PARENT) AK090	0001(158)		53589	CLOSED	8,082.55	8,885.23	90.97%	
									AK090	BLOWBACK CREEK BRIDGE REPLACEMENT	0002(293)	Z626160000	62616	CLOSED	56.78	62.44	90.94%	
									AK090	BONANZA CHANNEL BRIDGE #347 REPAINTING	0130(036)	Z639000000	63900	CLOSED	960,434.00	1,055,765.55	90.97%	
									AK090	CHITINA BIKE/PEDESTRIAN PATH AK090	0850(023)		60928	CLOSED	231,650.00	254,644.00	90.97%	
									AK090	CR SCHOOL ZONE UPGRADES PH II	0001(435)	Z555000000	55500	CLOSED	318,395.00	350,000.00	90.97%	
									AK090	CR: DITCH CLEANING, FY06 AK090	000S561		59384	CLOSED	11,656.56	12,813.63	90.97%	
									AK090	DALTON HWY CULVERTS MP 260-321 AK090	0656(004)		62622	CLOSED	228,869.43	251,587.81	90.97%	
									AK090	DALTON HWY MP 209-235 RECONSTRUCTION	0655(013)	Z609190000	60919	CLOSED	374,923.23	412,139.42	90.97%	
									AK090	ELLIOTT HWY LIVENGOOD CREEK BRIDGE (#0229) AK090	0680(033)	Z635790000	63579	CLOSED	14,245.39	15,659.42	90.97%	
									AK090	FAIRBANKS/NORTH POLE LOAD CENTER UPGRADES STAGE II	0002(233)		63170	CLOSED	337,650.00	371,166.32	90.97%	
									AK090	FMATS LED STREET LIGHT CONVERSION AK090; AK047	0002(235)		63135	CLOSED	195,921.00	215,368.80	90.97%	
									AK090	GLENN HWY: MP 92 TO 97 REHAB - HICKS CREEK AK090	0A15017		52507	CLOSED	12,163,705.73	13,371,117.68	90.97%	
									AK090	ILLINOIS STREET RECONSTRUCTION AK090/152/092/093/129/AK07	0663(004)	Z631020000	63102	CLOSED	4,071,815.00	4,314,735.00	94.37%	
									AK090	KALIFORNSKY BEACH ROAD RESURFACING, MP 4.3 - MP 11 AK090	0463(018)		58867	CLOSED	2,701,101.92	2,970,221.19	90.94%	
									AK090	KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD	0002(384)	NFHWY00162		DESIGN	1,552,186.37	1,706,261.82	90.97%	
									AK090	KNIK ARM CROSSING AK090	0001(365)	Z585830000	58583	CLOSED	53,438,258.16	58,742,726.00	90.97%	
									AK090	KNIK ARM CROSSING P3	0001(431)	Z537350000		RUP	13,586,748.19	14,935,416.28	90.97%	
									AK090	KOTZEBUE ROADS - SHORE AVENUE	0002(109)		60788	CLOSED	7,131,732.74	7,839,653.44	90.97%	
									AK090	KWIGILLINGOK SANITATION BOARDWALK, PH 2 (IHS) AK090	0001(332)	Z571850000	57185	CLOSED	4,100,796.02	4,507,855.89	90.97%	
									AK090	NOR REG ADA IMPROVEMENTS (PH VIII, WENDELL ST) AK090	000S212		67052	CLOSED	59,131.00	65,000.55	90.97%	
									AK090	NOR REG FFY06 M&O NHS PREV MAINT & REPAIRS - INTERST AK09	000S558		62807	CLOSED	3,349,698.25	3,586,400.70	93.40%	
									AK090	NOR REG TRAFFIC DATA EQUIPMENT AK090	000S618		77086	CLOSED	136,417.65	149,959.01	90.97%	
									AK090	NORTH SLOPE BOROUGH ROAD IMPROVEMENTS AK048 & AK090	0002(209)	Z769720000	76972	CLOSED	575,573.00	576,573.00	99.83%	
									AK090	PARKS HWY: MP 72-83 REHAB: WILLOW CR TO KASHWITNA RIVER(	0A41022		54985	CLOSED	632,039.00	676,701.28	93.40%	
									AK090	PETERSBURG MITKOF HIGHWAY UPGRADE AK090	0937(031)		68646	CLOSED	6,127,216.62	6,735,424.67	90.97%	
									AK090	RICHARDSON HWY NORTH POLE INTERCHANGE (GARVEE) AK140	0A24026		62184	CLOSED	4,263,794.08	4,564,964.02	93.40%	
									AK090	SELAWIK LANDFILL ROAD AK090	0002(212)		77141	CLOSED	1,635,640.00	1,798,969.43	90.92%	
									AK090	SEWARD MERIDIAN PKWY IMP - PH I PARKS TO PAL-WAS GARVE	0001(388)	Z511840000	51184	CLOSED	4,574,650.00	5,028,745.00	90.97%	
									AK090	STEVENS VILLAGE SANITATION ROAD AK090	0002(156)		61532	CLOSED	101,224.00	111,271.84	90.97%	
									AK090	TOK CUTOFF MP 0-2 AND MP 5-24 RESURFACING AK090	0A13015		63364	CLOSED	3,167,333.00	3,391,148.82	93.40%	
									AK090	TOK CUTOFF MP 44-98 SURFACE REPAIRS AK090	000S556		62805	CLOSED	1,675,447.76	1,841,758.57	90.97%	
									AK090	TRUNK RD RECONST, PH I PARKS HWY TO PALMER-WASILLA HWY A	0001(378)		59301	CLOSED	655,206.18	720,244.22	90.97%	
									AK090	TRUNK ROAD RECONST, PH II PALMER-WASILLA HWY TO FISHHOO	0001(414)	Z511320000	51132	CLOSED	1,251,904.11	1,376,172.56	90.97%	
									AK090	TRUNK ROAD RECONSTRUCTION (PARENT) AK046/090	0001(117)	Z524320000	52432	CLOSED	954,591.44	1,049,348.27	90.97%	
									AK090	USFS: PORTAGE VALLEY BLUE ICE TR SYS CONST, PHASE III AK090	0001(387)		50830	CLOSED	1,353,159.23	1,487,478.53	90.97%	
									AK090	WEIGH-IN-MOTION REHAB: STERLING HWY, MINNESOTA & GLENN	000S625		51059	CLOSED	1,820,872.90	1,994,248.42	91.31%	
									AK090	WHITTIER TUNNEL OPERATIONS, 2002-2009 AK090	0496(009)		56058	CLOSED	1,091,640.00	1,200,000.00	90.97%	
									AK090	YAKUTAT AREAWIDE PAVING	000S528		68345	CLOSED	1,533,669.00	1,685,906.34	90.97%	
									AK090	YUKON RIVER BRIDGE RE-DECKING AND BRIDGE RAIL #0271 AK09	0652(015)		76874	CLOSED	148,266.00	162,983.40	90.97%	
									AK090	Transaction no longer needed						-		
92	AK094	L930, LY10	AK094 - Construction and imp to roads at Alaska F	3,004,425.00	0	2,517,161.06	487,263.94	C	AK094	AMATS: UNIVERSITY LAKE DR EXTENSION (APU)	0001(407)	Z597640000		DESIGN	2,517,161.06	2,767,023.26	90.97%	
94	AK096		AK096 - Anchorage Traffic Congestion Relief	4,499,500.00	0	4,499,500.00	0	C	AK096	TUDOR ROAD/LAKE OTIS PARKWAY INTX IMP (ES & 1702 ERMK)	0001(359)		58890	CLOSED	4,499,500.00	4,946,136.14	90.97%	Appears Sw
95	AK097		AK097 - Earthwork and roadway construction Grav	36,407,150.24	0	36,407,150.24	0	S	AK097	KETCHIKAN GRAVINA ISLAND ACCESS: GRAVINA HIGHWAY PH 1 AK	0003(123)		67818	CLOSED	25,821,301.22	28,390,214.68	90.95%	Appears Sw
									AK097	KTN LEWIS REEF RD UNDERPASS AK097	0003(122)		68456	CLOSED	10,585,849.02	11,636,637.38	90.97%	
96	AK098	L930, LY10	AK098 - Wasilla Wideband multimedia mobile eme	5,007,375.00	0	4,393,904.89	613,470.11	H	AK098	WASILLA WIDEBAND MULTIMEDIA PILOT (IWAYS) - DESIGN AK098	0106(022)		80328	CLOSED	11,062.99	12,161.12	90.97%	
									AK098	WASILLA WIDEBAND MULTIMEDIA PILOT (IWAYS) AK098	0106(016)			CLOSED	319,193.44	350,877.70	90.97%	
									AK098	WASILLA WIRELESS COMMUNICATIONS NETWORK (WWCN)	000S897	HFHWY00087		PLANNING	4,063,648.46	4,467,020.40	90.97%	
98	AK100	L930	AK100 - Planning, design, construction Knik Arm B	28,466,928.00	0	28,386,874.00	80,054.00	C	AK100	AMATS: C ST, O'MALLEY TO DIMOND (GARVEE) AK100	0527(014)		54281	CLOSED	8,465,757.00	9,305,097.57	90.98%	
									AK100	AMATS: CHESTER CREEK TRAIL CONNECTION & UAA SPUR TRAIL	0001(262)		55066	CLOSED	1,024,983.21	1,126,726.62	90.97%	
									AK100	AMATS: GLENN HWY PATH REHAB: MULDOON RD- N. BIRCHWOOD	0001(282)	Z556590000	55659	CLOSED	4,580.34	5,035.00	90.97%	
									AK100	AMATS: O'MALLEY RD RECONST: NEW SEWARD TO HILLSIDE (PARE	0512(005)	Z539350000		CONSTRUCTION	909,700.00	1,000,000.00	90.97%	
									AK100	BETHEL TUNDRA RIDGE ROAD PAVING	0001(207)	Z542890000		CONSTRUCTION	192,093.68	533,000.00	36.04%	
									AK100	BLOWBACK CREEK BRIDGE REPLACEMENT	0002(293)	Z626160000	62616	CLOSED	-	-		
									AK100	CENTRAL REGION SCHOOL ZONE UPGRADES AK100	0001(367)	Z582980000	58298	CLOSED	2,636,162.83	2,896,837.57	91.00%	
									AK100	DALTON HWY CULVERTS MP 260-321 AK090	0656(004)		62622	CLOSED	5,586,468.00	6,141,000.42	90.97%	
									AK100	DALTON HWY MP 209-235 RECONSTRUCTION	0655(013)	Z609190000	60919	CLOSED	427,680.70	470,133.78	90.97%	
									AK100	DILLINGHAM: WOOD RIVER ROAD RECONSTRUCTION (ES) AK100	0001(260)		55130	CLOSED	684,698.24	802,663.76	85.30%	
									AK100	GLENN HWY: WEIGH STATION SCALE REPAIR 06 AK100	0A16036		58578	CLOSED	1,676,824.84	1,795,315.65	93.40%	
									AK100	GST CAUSEWAY REPLACEMENT AK139	0003(053)	Z675990000	67599	CLOSED	-	-		
									AK100	JNU FFY09 AREAWIDE PAVING AK074/100	000S696		68837	CLOSED	1,006,645.13	1,106,568.22	90.97%	
									AK100	KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD	0002(384)	NFHWY00162		DESIGN	23,139.16	25,436.03	90.97%	

									AK100	KODIAK "Y" INTERSECTION IMPROVEMENTS	0389(009)		57398	CLOSED	145,782.63	159,987.73	91.12%
									AK100	NAPASKIAK: SANITATION BOARDWALK IMPROVEMENTS (VSW) AK1	0001(331)	Z571840000	57184	CLOSED	3,947,585.79	4,339,437.06	90.97%
									AK100	NOR REG SIGNAL INTERCONNECT	000S811	Z617630000		CLOSED	113,712.50	125,000.00	90.97%
									AK100	SMART M&O VEHICLES PHASE 2 (IWAYS) AK100	0106(015)		76389	CLOSED	105,463.95	115,932.67	90.97%
									AK100	STERLING HWY MPST44.5-58 SUNRISE INN TO SKILAK LKE RD REC	0212(015)	Z530140000		DESIGN	909,700.00	1,000,000.00	90.97%
									AK100	STERLING WEIGH STATION REPLACEMENT	0A33018		52115	CLOSED	525,896.00	563,057.82	93.40%
103	AK105	HY20, LY20	AK105 - Construction and improvements at Alaska	3,004,425.00	0	396,417.24	2,608,007.76	C	AK105	AMATS: UNIVERSITY LAKE DR EXTENSION (APU)	0001(407)	Z597640000		DESIGN	396,417.24	435,766.74	90.97%
113	AK115	L930	AK115 - Construction of relocation road in Shishma	5,007,375.00	0	5,004,594.68	2,780.32	N	AK115	SHISHMAREF RELOCATION ROAD AK115	0002(199)	Z767760000	76776	CLOSED	1,564,595.06	1,719,901.88	90.97%
									AK115	SHISHMAREF RELOCATION ROAD PLANNING & ENV LINKAGE STUDY	0002(428)	NFHWY00352		DESIGN	3,276,253.62	3,601,466.00	90.97%
									AK115	SHISHMAREF SANITATION ROAD EROSION CONTROL	0002(514)	NFHWY00687		DESIGN	163,746.00	180,000.00	90.97%
120	AK122	LY20	AK122 - Statewide: Road culvert repl and repair to	5,007,375.00	0	5,007,374.97	0.03	H	AK122	CORDOVA POWER CREEK CULVERT REPLACEMENT AK122	0002(222)		60981	CLOSED	92,407.40	101,580.07	90.97%
									AK122	HAINES SAWMILL CREEK CULVERT REPLACEMENT AK122	0003(114)		69081	CLOSED	538,241.18	591,665.28	90.97%
									AK122	KALIFORNSKY BEACH RD; COAL CR FISH PASSAGE AK122	0463(019)		51170	CLOSED	1,894,423.00	2,082,470.00	90.97%
									AK122	KENAI SPUR HWY CULVERTS MP 9.8 & 10.2	0221(017)	CFHWY00002	30002	CLOSED	30,215.69	33,215.01	90.97%
									AK122	KTN HOMESTEAD CREEK REPAIR/REHAB-S.TONGASS HWY AK122	0003(166)	Z675040000	67504	CLOSED	19,363.04	21,285.11	90.97%
									AK122	KTN SHORELINE DRIVE CULVERT REPLACEMENT	0003(228)	SFHWY00182	182	CLOSED	167,696.82	184,342.99	90.97%
									AK122	KTN WOOD ROAD CULVERT REPLACEMENT AK122	0003(212)	SFHWY00098		CLOSED	14,322.32	15,744.00	90.97%
									AK122	MCCARTHY ROAD UPGRADES AK130	0850(025)	Z771290000	77129	CLOSED	583,791.22	641,740.38	90.97%
									AK122	NOR REG DEEP CULVERTS REPLACEMENT	000S770	Z639130000		COMPLETED	601,846.06	648,626.00	92.79%
									AK122	PLACK ROAD CULVERT REPLACEMENT - FISH PASSAGE AK122	0002(197)		76743	CLOSED	113,304.59	87,966.61	128.80%
									AK122	STATEWIDE CULVERT REPAIR OR REPLACE AK122	000S578		76447	CLOSED	134,464.27	147,811.67	90.97%
									AK122	VALDEZ TIDAL FLATS CULVERT REPLACEMENT AK122	0711(068)	Z637650000	63765	CLOSED	817,299.38	898,426.99	90.97%
122	AK124	LY20	AK124 - Aleknagik: Wood River Br, or design, eng,	3,004,425.00	0	2,875,165.20	129,259.80	C	AK124	ALEKNAGIK WOOD RIVER BRIDGE CONSTRUCTION, PHASE II	0410(005)	Z546270000	54627	CLOSED	418,347.03	459,873.62	90.97%
									AK124	ALEKNAGIK WOOD RIVER BRIDGE DESIGN (1702) AK124	0001(152)	Z535810000	53581	CLOSED	2,456,818.17	2,412,489.56	101.84%
128	AK130	LY20	AK130 - Upgrade road access McCarthy for design	5,007,375.00	0	4,952,288.61	55,086.39	N	AK130	MCCARTHY ROAD UPGRADES AK130	0850(025)	Z771290000	77129	CLOSED	4,952,288.61	5,443,870.10	90.97%
139	AK141	HY20, LY20	AK141 - Bethel: Dust Control Mitigation for rural ro	1,502,213.00	0	1,454,071.35	48,141.65	C	AK141	BETHEL CHIEF EDDIE HOFFMAN HWY,WATSON'S CNR (3RD BROWN	0208(011)		58111	CLOSED	336,257.19	369,635.25	90.97%

SAFETEA-LU* P.L. 109-56 Section 1934 FFY 2005 - 2009

	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region
150	AK152	L900, LY30	AK152 - Imp to Knik Arm Bridge (revised per Sectio	20,046,828.00	0	11,671,835.57	8,374,992.43	C
154	AK156	L900	AK156 - Petersburg: Road imp incl design, eng, pe	501,171.00	0	453,069.75	48,101.25	S
157	AK159	L900, LY30	AK159 - Homer: Intermodal deep-water dock facilit	2,004,682.00	0	1,639,964.56	364,717.44	C
158	AK160	LY30	AK160 - Anchorage: Study, design, eng of Knik Cr	2,004,682.00	0	87,376.11	1,917,305.89	C
160	AK162	L900	AK162 - McGrath: Road erosion along the Kuskoku	501,171.00	453,069.75	0	48,101.25	C

Transportation, Treasury, Housing and Urban Development, the Judiciary, District of Columbia, and Independent Agencies Approp Act, H.R. 109-307 FFY 2006

	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region
163	AK165	LY60	AK165 - Keystone Drive Reconstruction and Upgra	990,000.00	0	984,952.41	5,047.59	C

SAFETEA-LU* P.L. 109-56 Section 1302 FFY 2005-2009

	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region
167	AK169	LY50	AK169 - Planning, design, and construction of Knik	27,176,669.00	0	4,242,286.00	22,934,383.00	C

SAFETEA-LU* P.L. 109-56 Section 1306 FFY 2005-2009

	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region
168	AK170		AK170 - Freight Intermodal Dist Pilot Grant Project	4,496,015.83	0	4,490,491.16	5,524.67	N

Transportation, Housing And Urban Development and Related Agencies Appropriations Act, 2010 (Division A of the Consolidated Appropriations Act, 2010, Public Law

SAFETEA-LU* P.L. 109-56 Section 1934 FFY 2005 - 2009

	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
	AK152	AKIACHAK SANITATION RD RECONSTRUCTION (VSW) AK152	0205(002)		54812	CLOSED	8,396.09	9,228.09	90.98%
	AK152	AMATS: LAKE OTIS PKWY, ABBOTT-68TH & 88TH AVE, TOLOFF AK1	0001(354)		57433	CLOSED	3,600,429.82	3,957,821.10	90.97%
	AK152	DALTON HWY CULVERTS MP 260-321 AK090	0656(004)		62622	CLOSED	578,176.22	635,568.01	90.97%
	AK152	ILLINOIS STREET RECONSTRUCTION AK090/152/092/093/129/AK07	0663(004)	Z631020000	63102	CLOSED	566,229.00	600,009.00	94.37%
	AK152	KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD	0002(384)	NFHWY00162		DESIGN	1,024,461.92	1,126,153.58	90.97%
	AK152	KNIK ARM CROSSING AK090	0001(365)	Z585830000	58583	CLOSED	1,472,848.16	1,619,048.21	90.97%
	AK152	KNIK ARM CROSSING OVERSIGHT	000S846		83665	CLOSED	44,157.91	48,541.18	90.97%
	AK152	KNIK ARM CROSSING P3	0001(431)	Z537350000		RUP	1,307,801.09	1,437,618.00	90.97%
	AK152	NAPASKIAK: SANITATION BOARDWALK IMPROVEMENTS (VSW) AK1	0001(331)	Z571840000	57184	CLOSED	2,099,243.00	2,307,621.00	90.97%
	AK152	NOR REG AUTOMATIC VEHICLE CLASSIFICATION AK074/152	000S698	Z633210000	63321	CLOSED	11,946.00	13,132.00	90.97%
	AK152	SEWARD MERIDIAN PKWY IMP - PH I PARKS TO PAL-WAS GARVE	0001(388)	Z511840000	51184	CLOSED	925,012.60	1,016,833.38	90.97%
	AK152	WEIGH-IN-MOTION REHAB: STERLING HWY, MINNESOTA & GLENN	000S625		51059	CLOSED	33,133.76	35,475.11	93.40%
	AK156	PSG ROAD IMPROVEMENTS AK104	0003(137)	Z678790000	67879	CLOSED	453,069.75	498,043.04	90.97%
	AK159	HOMER DEEP WATER DOCK FEASIBILITY STUDY AK159	0001(499)	Z543920000	54392	CLOSED	1,639,964.56	1,802,753.17	90.97%
	AK160	KNIK ARM CROSSING AK090	0001(365)	Z585830000	58583	CLOSED	87,376.11	96,049.36	90.97%
	AK162	TRANSFER AK162 - McGrath: Road erosion along the Kuskokwim River. Per attached e-mail from Phyllis Chun of WFL; Contact: Phone (360)619-						453,069.75	

Transportation, Treasury, Housing and Urban Development, the Judiciary, District of Columbia, and Independent Agencies Approp Act, H.R. 109-307 FFY 2006

	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
	AK165	KEYSTONE DR IMP, MP0.0-3.7 AK118/AK165	0001(398)		51573	CLOSED	984,952.41	984,952.41	100.00%

SAFETEA-LU* P.L. 109-56 Section 1302 FFY 2005-2009

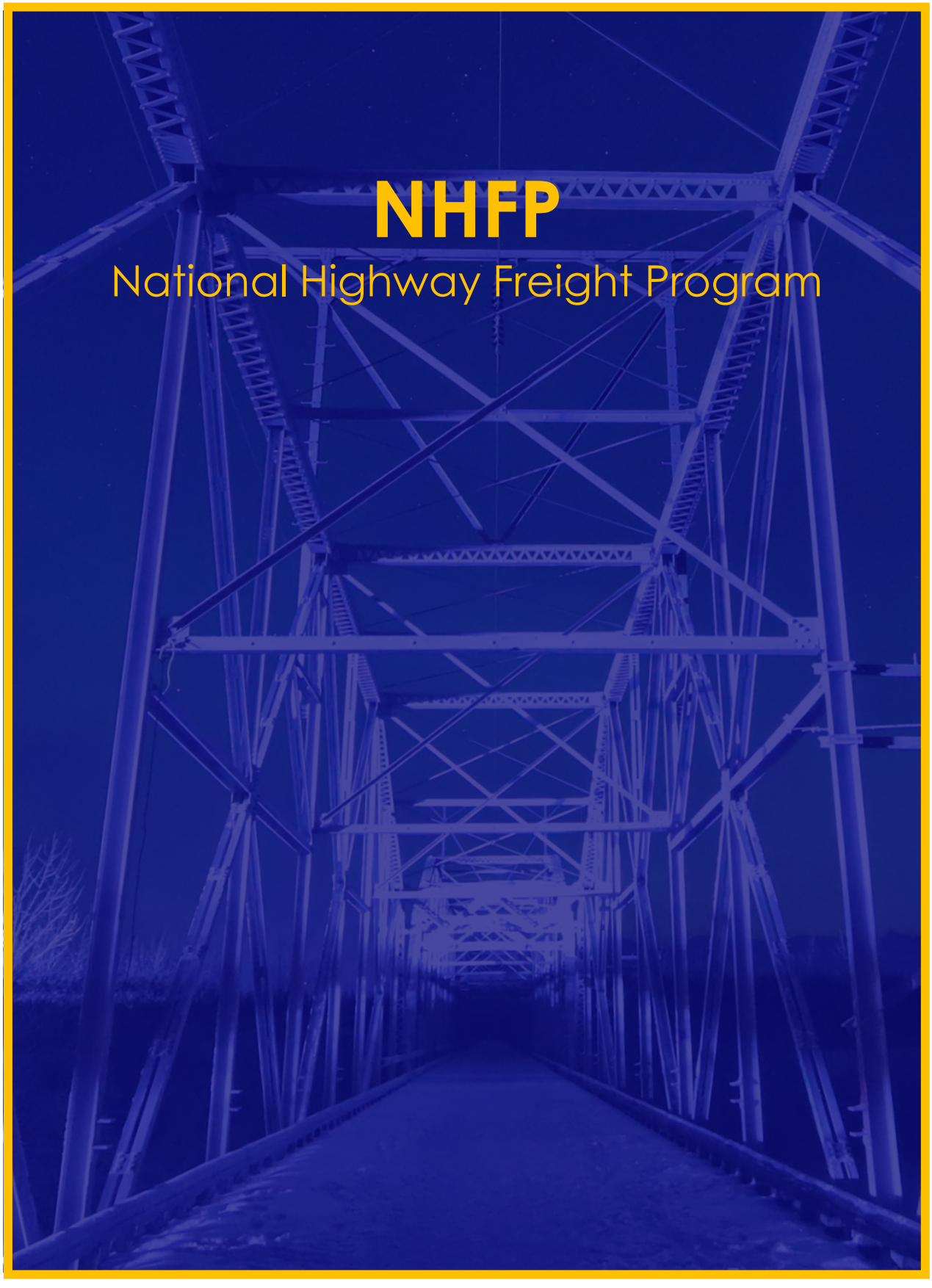
	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
	AK169	GLENN HWY: GAMBELL ST TO AIRPORT HEIGHTS AK169	0A16035	Z588000000		CLOSED	4,112,973.45	4,403,609.73	93.40%
	AK169	KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD	0002(384)	NFHWY00162		DESIGN	129,312.55	142,148.57	90.97%

SAFETEA-LU* P.L. 109-56 Section 1306 FFY 2005-2009

	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
	AK170	FAIRBANKS ALASKA RAILROAD FREIGHT YARD AK170	0002(211)		77053	CLOSED	2,072,891.33	2,278,653.74	90.97%
	AK170	VAN HORN RD REHABILITATION/SAFETY IMPROVEMENTS AK170	0604(002)		61175	CLOSED	2,417,599.83	2,657,579.23	90.97%

Transportation, Housing And Urban Development and Related Agencies Appropriations Act, 2010 (Division A of the Consolidated Appropriations Act, 2010, Public Law

	Demo ID	APPN	Designation	Allocated Funds	Transferred Out	Obligated to Date	Remaining Funds	Region	EARMARK	PJ NAME	FED PJ #	IRIS #	AKSAS HIST. #	PJ STATUS	FED $	TOTAL $	FED Share
173	AK176	56C0	Sitka Waterfront Development, AK	486,917.00	132,773.46	132,773.46	221,370.08	S	AK176	SITKA - SAWMILL COVE WATERFRONT DEVELOPMENT	0003(160)	Z696000000	69600	CLOSED	132,773.46	132,773.46	100.00%
									AK176	Transfer 16-19 STIP Amd #3 ID 30689 $1,492,773.46 fed funds as identified to WFL for AK SITKA 2017(1) Sitka Sea Walk Phase 2. Please note, t						132,773.46	
Infrastructure, Investment & Jobs Act - Consolidated Appropriations Act, 2022- 2025 (Public Law 117-Varies)									**Infrastructure, Investment & Jobs Act - Consolidated Appropriations Act, 2022 (Public Law 117-103)**								
	Demo ID	**APPN**	**Designation**	**Allocated Funds**	**Transferred Out**	**Obligated to Date**	**Remaining Funds**	**Region**	**EARMARK**	**PJ NAME**	**FED PJ #**	**IRIS #**	**AKSAS HIST. #**	**PJ STATUS**	**FED $**	**TOTAL $**	**FED Share**
174	AK177	Y928	Kotzebue Cape Blossom Road	27,662,000.00	0	0	27,662,000.00	N									
	AK178	Y926	Seldovia Road Resurfacing Project	22,000.00	0	0	22,000.00	S									
	AK179	Y926	Juneau North Douglas Crossing Project	7,000,000.00	0	0	7,000,000.00	S									
FAST Act - Fixing America's Surface Transportation Act Repurposed Earmarks									**FAST Act - Fixing America's Surface Transportation Act Repurposed Earmarks**								
	Demo ID	**APPN**	**Designation**	**Allocated Funds**	**Transferred Out**	**Obligated to Date**	**Remaining Funds**	**Region**	**EARMARK**	**PJ NAME**	**FED PJ #**	**IRIS #**	**AKSAS HIST. #**	**PJ STATUS**	**FED $**	**TOTAL $**	**FED Share**
187	RP-AK022		Gravina Access	1,987,000.00	0	1,907,276.52	79,723.48	S	RP-AK022	KTN AIRPORT CREEK BRIDGE CONSTRUCTION	0003(232)	SFHWY00190	190	CLOSED	136,743.93	136,743.93	100.00%
									RP-AK022	KTN AIRPORT FERRY CAPACITY MODIFICATIONS (GRAVINA)	0003(233)	SFHWY00184	184	CLOSED	45,276.52	45,276.52	100.00%
									RP-AK022	KTN GRAVINA FREIGHT FACILITY (RP-AK022,RP-AK097) (GRAV)	0952(020)	SFHWY00154		CONSTRUCTION	0	0	#DIV/0!
									RP-AK022	KTN GRAVINA REFRBSH EXSTNG FERRY BERTH FACLTY(RP-AK022)	0922(010)	SFHWY00153		CONSTRUCTION	450,000.00	450,000.00	100.00%
									RP-AK022	KTN RECONSTRUCT ROAD TO AIRPORT BOUNDARY (RP-AK022)-(X-	0952(019)	SFHWY00156		CLOSED	838,018.58	838,018.58	100.00%
									RP-AK022	KTN REVILLA REFRBSH EXG FERRY BERTH FACLTY (RP-AK022) (GRA	0952(021)	SFHWY00150		CONSTRUCTION	309,361.68	309,361.68	100.00%
198	RP-AK084		Wrangell - Evergreen Road Improvements and Pe	203,150.00	0	203,120.72	29.28	S	RP-AK084	WRG EVERGREEN ROAD IMPROVEMENTS AND PEDESTRIAN ACCESS	0003(158)	Z680290000		CLOSED	203,120.72	23,283.24	872.39%
Transportation, Treasury, Housing and Urban Development, the Judiciary, District of Columbia, and Independent Agencies Approp Act, H.R. 109-307 FFY 2006									**Transportation, Treasury, Housing and Urban Development, the Judiciary, District of Columbia, and Independent Agencies Approp Act, H.R. 109-307 FFY 2006**								
	Demo ID	**APPN**	**Designation**	**Allocated Funds**	**Transferred Out**	**Obligated to Date**	**Remaining Funds**	**Region**	**EARMARK**	**PJ NAME**	**FED PJ #**	**IRIS #**	**AKSAS HIST. #**	**PJ STATUS**	**FED $**	**TOTAL $**	**FED Share**
220	S112R		REALLOCATED to ANY PURPOSE - November 5,	524,178.00	0	524,178.00	0	H	S112R	PARKS HWY: MP 146 - 163 PAVEMENT PRESERVATION	0A42007		54147	CLOSED	524,178.00	524,178.00	100.00%



NHFP

National Highway Freight Program

ALASKA MOVES 2050

Appendix J - Freight Investment Plan

October 2022

ALASKA STATEWIDE LRTP
FREIGHT PLAN

Appendix J - Freight Investment Plan

The Freight Investment Plan is fiscally constrained and includes a list of freight-supportive infrastructure projects across Alaska. It also describes how funds made available would be invested and matched.

Freight Investment Project List—FY 22 to FY 27

Project	Region	Description	Phase	Cost FY22 to FY27	Planned NHFP Funds	State Match: 9.09%	Other Fed. & State Funds	Beyond Plan Period	STIP #
Dalton Highway Reconstruction MP 18-37	Northern	"Reconstruction, including widening and rehabilitation of approximately 19 miles of the Dalton Highway in the Hess Creek Area. Work includes replacing Hess Creek Bridge #1213."	Construction	**$60,000,000**	$17,000,000	$5,418,000	$54,582,000	$55M	22446
Dalton Highway Reconstruction (MP 0-9)	Northern	"Reconstruct the Dalton Highway between MP 0-9 to improve substandard sections. This work will include the replacement of the Lost Creek Culvert with bridge #2322. "	Design and Construction	**$41,000,000**	$25,000,000	$90,300	$15,909,700	$40M	22453
Sterling Highway MP 58-79	Central	Skilak Lake Road -Sterling rehabilitation and passing lane	Construction	**$68,293,404**	$17,500,000	$1,590,750	$49,202,654	TBD	2673, 32300, 32683, 33242, 32319

Project	Region	Description	Phase	Cost FY22 to FY27	Planned NHFP Funds	State Match: 9.09%	Other Fed. & State Funds	Beyond Plan Period	STIP #
Ocean Dock Road	Central	"Generally includes the intersection of Ocean Dock Road at the C Street ramps and the larger area of the Ocean Dock Road corridor from Whitney Road to Roger Graves Road within the Port of Alaska. Improvements will reduce freight delay caused by train and truck interactions at the existing rail-road at-grade crossings and to decrease the potential for crashes. "	Planning through Construction	**$46,000,000**	$29,768,000	$2,705,911	$13,526,089	TBD	No
State Rail Plan	Statewide	Statewide Rail Plan	Planning	**$1,100,000**	$910,000	$82,719	$107,281		
Truck Parking Study	Statewide	Complete a statewide truck parking study in coordination with the private sector to understand truck parking needs and identify cost-effective strategies to meet the needs.	Planning through Construction	**$350,000**	$322,000	$29,270	$-	TBD	No
		TOTAL Project Costs FY 22 to FY 27		**$216,743,404**	**$90,500,000**				
		TOTAL ESTIMATED NHFP APPORTIONMENT			**90,500,000**	**$9,916,950**			

Illustrative Listing of Projects

Below is an illustrative listing of freight projects. The list is not fiscally constrained, nor is it in any specific order. Some projects include more detail than others and some may already be in various stages of planning, design, and construction. The primary purpose of this listing is for documentation and future reference in the event additional federal dollars become available in the future.

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
	Dalton Highway MP 222-235		CRFC (certified)	$17,120	Yes	Y
	Sterling Highway MP 60-79		PHFS	$17,159	Yes	Y
	Dalton Highway MP 222-235		CRFC (certified)	$10,700	Yes	Y
	Dalton Highway MP 0-9		CRFC (certified)	$22,051	Yes	Y
	Modernization of the Klondike Highway		N/A	Unknown	No	
	Juneau Douglas North Crossing Bridge		N/A	Unknown	No	
Statewide (DOT&PF Priorities)	**The Williamsport-Pile Bay Road**		N/A	Unknown	No	

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Statewide (Freight Advisory Committee Priorities)	**Parks Highway Alternative Corridor (Wasilla Bypass)**	Planning and Environmental Linkages (PEL) Study underway and will be finalized in Winter 2023.	PHFS/CRFC (potential)	Unknown	No	Y
	A road to Juneau		N/A	Unknown	No	
	Bridges on the Richardson Highway	Address bridges on the Richardson Highway that are height and/ or weight restricted.	N/A	Unknown	No	
	Fund weigh stations for 24-hour operation	Research/perform a study to identify funding mechanisms to keep weigh stations open for 24 hours.	N/A	Unknown	No	
	Truck parking areas		N/A	Unknown	No	Y
	Chulitna River Bridge (Parks Highway)	Identified by the FAC as a bridge that hinders efficient freight movement	PHFS	Unknown	No	Y
	Eagle River Bridge (Glenn Highway)	Identified by the FAC as a bridge that hinders efficient freight movement	PHFS	Unknown	No	Y
	Improvements outside of the Port of Alaska for trucks and the railroad to move cargo to and from the port more efficiently		PHFS Intermodal Connector	Unknown	No	Y
	Rerouting of the railroad mainline around Fairbanks		N/A	$800,000	No	
	ARRC Rail Bridge Improvements	The ARRC Bridge Program identifies structures requiring upgrade, overhaul or replacement. In pursuit of this program, ARRC's current 5-year plan calls for more than 30 bridges to be replaced or rehabilitated.	N/A	Varies	No	TBD

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Fairbanks Area (DOT&PF Northern Region, including FAST Planning)	**Robertson, Gerstle and Johnson River Bridge Replacements (Alaska Highway)**	Replace all three highway bridges to new standards. Includes reconstruction, drainage improvements, roadside hardware, and utilities.	PHFS	Unknown	No	Y
	Parks Highway MP252 - 262 Rehabilitation		PHFS	Unknown	No	Y
	Parks Highway MP262 - 276 Rehabilitation		PHFS	Unknown	No	Y
	Parks Highway MP285 - 305 Rehabilitation		PHFS	Unknown	No	Y
	Parks Highway Road/ Rail Swap (MP 235)	Realign the Parks Highway and the railroad in the vicinity of Denali National Park to eliminate the at grade road/rail crossing at MP 235.	PHFS	Unknown	No	Y
	Parks Highway MP 315 - 325 Reconstruction	Reconstruct the Parks Highway from Milepost 319 to 325 and replace Little Goldstream Creek Bridge at Milepost 315. Project addresses roadway geometry and safety issues.	PHFS	Unknown	No	Y
	Parks Highway MP 183-192 Reconstruction	Reconstruct the Parks Highway and replace the East Fork Chulitna River Bridge #0260. Project enhances safety and road conditions.	PHFS	Unknown	No	Y
	Elliott Highway MP 12-19 Rehabilitation	State of Good Repair project to address road damage	PHFS (Proposed)	Unknown	No	Y
	Elliott Highway MP 51-63 Rehabilitation	State of Good Repair project to address road damage. Rehabilitate the Elliott Highway from MP 51-63 including bridge work (Tolovana River Bridge #0440), roadside hardware, drainage improvements, and utilities.	PHFS (Proposed)	Unknown	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Fairbanks Area (DOT&PF Northern Region, including FAST Planning)	**Elliott Highway MP 63-73 Rehabilitation**	SOGR project to address road damage	PHFS (Proposed)	Unknown	No	Y
	Dalton Highway MP109-144 Reconstruction	Reconstruction, including widening, spot repairs and resurfacing of approximately 35 miles of the Dalton Highway. Also includes replacing Douglas Creek Bridge #1560. Construction will happen in 3 stages: NID 30276, NID 30270 and the final segment of construction including bridge #1560 under this NID 22452.	CRFC (certified)	Unknown	No	Y
	Dalton Highway MP 305-335 Upgrades	Upgrade the Dalton Highway from Milepost 305 to 335. Work includes resurfacing, minor realignments, grade raises, addition of turnouts, roadside hardware, drainage improvements, utilities, and replacement of the Dan Creek Bridge No. 1521.	CRFC (potential)	Unknown	No	Y
	Dalton Highway MP 190 Hammond River Bridge Replacement	Replace the Hammond River Bridge, which is structurally deficient.	CRFC (certified)	Unknown	No	Y
	Tok Cutoff MP 60-68 Rehabilitation	SOGR project to address road condition	PHFS	Unknown	No	Y
	Tok Cutoff MP 68-76 Rehabilitation	SOGR project to address road condition	PHFS	Unknown	No	Y
	Alaska Highway MP 1235-1268 Rehabilitation and Passing Lanes	Rehabilitate highway and construct passing lanes.	PHFS	Unknown	No	Y
	Alaska Highway Passing Lanes MP 1221 - 1422	Construct passing lanes on the Alaska Highway (to promote safety) - note, project has two stages of work. Project addresses freight and safety issues.	PHFS	Unknown	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Fairbanks Area (DOT&PF Northern Region, including FAST Planning)	**Parks Highway MP 163-183 Rehabilitation**	Rehabilitate the Parks Hwy to improve drainage, and construct passing lanes and an at grade railroad crossing at Milepost 169 (Note: project has 3 stages).	PHFS	Unknown	No	
	Richardson Highway MP 248-263 Passing Lanes (Delta to Fairbanks)	Project facilitates safety and passing movements.	N/A	Unknown	No	
	Steese Expressway/ Johansen Expressway Interchange	Construct a grade-separated interchange at the intersection of Steese Expressway and Johansen Expressway. Realign adjacent access as necessary to accommodate the selected interchange configuration. Work includes a new bridge.	PHFS	Unknown	No	
	Richardson Highway Mile Point 139-151 Milepost 137-148 Rehabilitation and Widening (Stage I of III)	Rehabilitate the interstate portion of the Richardson Highway facilitating freight movement from the Alaska Highway to the Glenn Highway.	PHFS	Unknown	No	
	Richardson Highway MP 233 Bear Creek Bridge #0593 Replacement	Reconstruct the Richardson Highway between MP232 and 234.5, and replace the Bear Creek Bridge #0593. Note this project is not on the interstate but does facilitate freight between Valdez and Fairbanks.	N/A	Unknown	No	
	Steese Highway MP 11-20 Rehabilitation and Widening	Rehabilitate the Steese Highway past Fox to support traffic and freight. Project will include widened shoulders, improved drainage and intersection improvements.	N/A	Unknown	No	
	Parks Highway MP 305-319 Reconstruction	Reconstruct the Parks Highway north of Nenana; includes passing lanes, pavement, drainage, bridge work	PHFS	Unknown	No	

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Fairbanks Area (DOT&PF Northern Region, including FAST Planning)	**Parks Highway MP 169 Hurricane Crossing**	Grade separated railroad crossing at MP 169 on the Parks Highway.	PHFS	Unknown	No	
	Fairbanks Rail Extension to Delta Junction and Ft Greely	Extend rail connectivity to Delta Junction and Ft. Greely. Connecting to Delta Junction facilitates freight movement related to natural resource extraction/mining (Kinross Mine Tetlin to Fort Knox Ore Transport). Connecting to Ft. Greely provides a connection for military movements.	N/A	Unknown	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**AMATS MTP Project #111 – Glenn Highway Capacity Improvements Phase II - Artillery Road Interchange to Hiland**	Construct improvements to the southbound Glenn Highway from Artillery Road Interchange to Hiland Road Interchange.	PHFS	$53,000	No	Y
	AMATS MTP Project #112 – Glenn Highway Hiland Road Interchange Reconstruction	Reconstruct the Glenn Highway Interchange at Hiland Road. Make necessary non-motorized improvements including connection of the Glenn Highway pathway. Evaluate the need for a two lane on ramp from Hiland Road Interchanges to the weigh station. Project would consider adjacent land use.	PHFS	$30,000 (2018)	No	Y
	AMATS MTP Project #113 – Glenn Highway Interchange Analysis - North Eagle River to Eklutna	Assess the following interchanges for current and future operations and make recommendations for any improvements: Old Glenn Hwy/Eklutna Village Rd, Thunderbird Falls, Mirror Lake, North Peters Creek/Settlers Dr, South Peters Creek/Ski Rd, Birchwood Loop Rd North, Birchwood Loop Rd South, North Eagle River Interchange.	PHFS	$5,657 (2018)	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**AMATS MTP Project #114 - Glenn Highway: Hiland Road & Artillery Road Interchanges Planning and Environmental Linkages (PEL) Study**	Further refine and analyze Glenn Highway interchange concepts at Hiland Road and Artillery Road to evaluate environmental challenges and improve the understanding of various design issues and anticipated project costs. Bridges in the project area include #0535, 1327, 1328 & 1341.	PHFS	$2,000 (2018)	No	Y
	AMATS MTP Project #117 - Midtown Congestion Relief Project	On completion of the Midtown Congestion Relief Planning and Environmental Linkages (PEL) study and after the NEPA process identifies a preferred alternative, purchase right of way for future improvements from Tudor Road to 20th Avenue and extend the Seward Highway frontage roads; includes interim projects identified as part of the Midtown Congestion Relief PEL. Project would include non-motorized improvements and consider adjacent land use.		$193,288 (2018)	No	
	AMATS MTP Project #128 - Seward Highway Reconstruction - O'Malley Road to Dimond Blvd	Reconstruct and widen from 4 to 6 lanes. Landscaping and possible noise walls. Includes reconstruction of Dimond Blvd interchange. Recommend separated pathways on all frontage road improvements.	PHFS	$130,930 (2018)	No	Y
	AMATS MTP Project #129 - Seward Highway/ Glenn Highway Connection PEL Study - 20th Avenue (Chester Creek) to Airport Heights Road	The intent of this PEL is to define a vision for the future of this connection, identify environmental and resource concerns and opportunities in the study area, and use the information to develop reasonable alternatives through consultation with the affected agencies and the public.	PHFS	$5,000 (2018)	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**AMATS MTP Project #130 - Seward Highway/O'Malley Road Interchange**	Reconstruct the interchange at Seward Highway and O'Malley Road. Project would include non-motorized improvements and consider adjacent land use.	PHFS	$20,800 (2018)	No	Y
	AMATS MTP Project #132 - Seward Highway/ Tudor Road Interchange Reconstruction	Reconstruct the Seward Highway/ Tudor Road Interchange and make necessary safety and capacity improvements. Project would include non-motorized improvements and consider adjacent land use.	PHFS	$31,500 (2018)	No	Y
	AMATS MTP Project #204 - Glenn Highway Artillery Road Interchange Reconstruction	Reconstruct the Glenn Highway Interchange at Artillery Road. Project would include non-motorized improvements, including connection of the Glenn Highway Pathway. Project would consider adjacent land use.	PHFS	$51,400 (2018)	No	Y
	AMATS MTP Project #212 - Midtown Congestion Relief Project	Reconstruct the Seward Hwy as a freeway from 20th Avenue to Tudor Road which may include interchanges at 36th Avenue, Northern Lights Blvd, Benson Blvd, Fireweed Lane, and the addition of frontage roads. Project would include non-motorized improvements and consider adjacent land use.	PHFS	$250,125 (2018)	No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**AMATS MTP Project #214 - Seward Highway /Glenn Highway Connection - 20th Avenue (Chester Creek) to 13th**	Construct freeway connection between Seward Highway/20th Avenue and 13th Avenue with freeway access and egress ramps onto Ingra/ Gambell Streets near the northern termini of the project. Reconstruct Ingra Street/ Gambell Street and construct separated grade crossings of the freeway to reconnect portions of the east-west street system. Construct an interchange at Airport Heights Drive and Glenn Highway Intersection. Project would include non-motorized improvements and consider adjacent land use.	PHFS	$237,500 (2018)	No	Y
	Anton Anderson Memorial Tunnel Operations	This tunnel is an important critical link to an ice-free port with rail connectivity to the Kenai Peninsula Borough, Municipality of Anchorage, the Matanuska-Susitna Borough and the Fairbanks North Star Borough	CRFC (Potential)		No	Y
	Bethel Chief Eddie Hoffman Highway	Provides the only connection between the town of Bethel, Bethel Airport, and Port of Bethel.	CRFC (Potential)		No	Y
	Bridge Access Road Pavement Preservation	Roadway pavement preservation on this road is essential as it provides the only alternative crossing of the Kenai River that could provide access to the entire lower Kenai Peninsula	N/A		No	Y
	Eklutna Interchange Bridge Height Improvements	Bridge height clearances at this interchange have restricted freight movement.	PHFS (Glenn Hwy)		No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**Glenn Hwy Airport Heights to Park Hwy Rehab**	Rehabilitate the highway to extend pavement life and provide safety/ capacity improvements on entrance ramps that are functionally deficient. https://dot.alaska.gov/creg/glenn/	PHFS		No	Y
	Glenn Hwy MP 34-42 Reconstruction	This reconstruction project will result in a four-lane divided highway designed to accommodate increasing traffic by adding lanes, widening shoulders, accommodating turning movements at designated turn pockets, and other traffic/safety improvements. http://www.brooks-alaska.com/glennhighway/	PHFS		No	Y
	Glenn Hwy 53-56 Reconstruction	To improve overall roadway maintenance, mitigation of rock fall due to unstable gravel slopes of Moose Creek Canyon, improvement of tight roadway curves, provide accommodation for bicyclists and pedestrians. Project is federally funded with a state match of 9 percent. http://www.glennhighwayatmoosecreek.com/Documents/20211215_Moose_Creek_PFS_508.pdf	PHFS	$35,000	No	Y
	Glenn Highway Over Height Bypass Improvements - Anchorage to Eklutna	Easy on, easy off solutions to encourage truckers to avoid bridges with inadequate load heights.	PHFS		No	Y
	Kenai Spur Hwy 29-38	Resurface the Kenai Spur Highway between mileposts 29 and 38. Improvements to roadside hardware, safety, drainage, signs, and minor structural section improvements may also be included.	N/A		No	Y

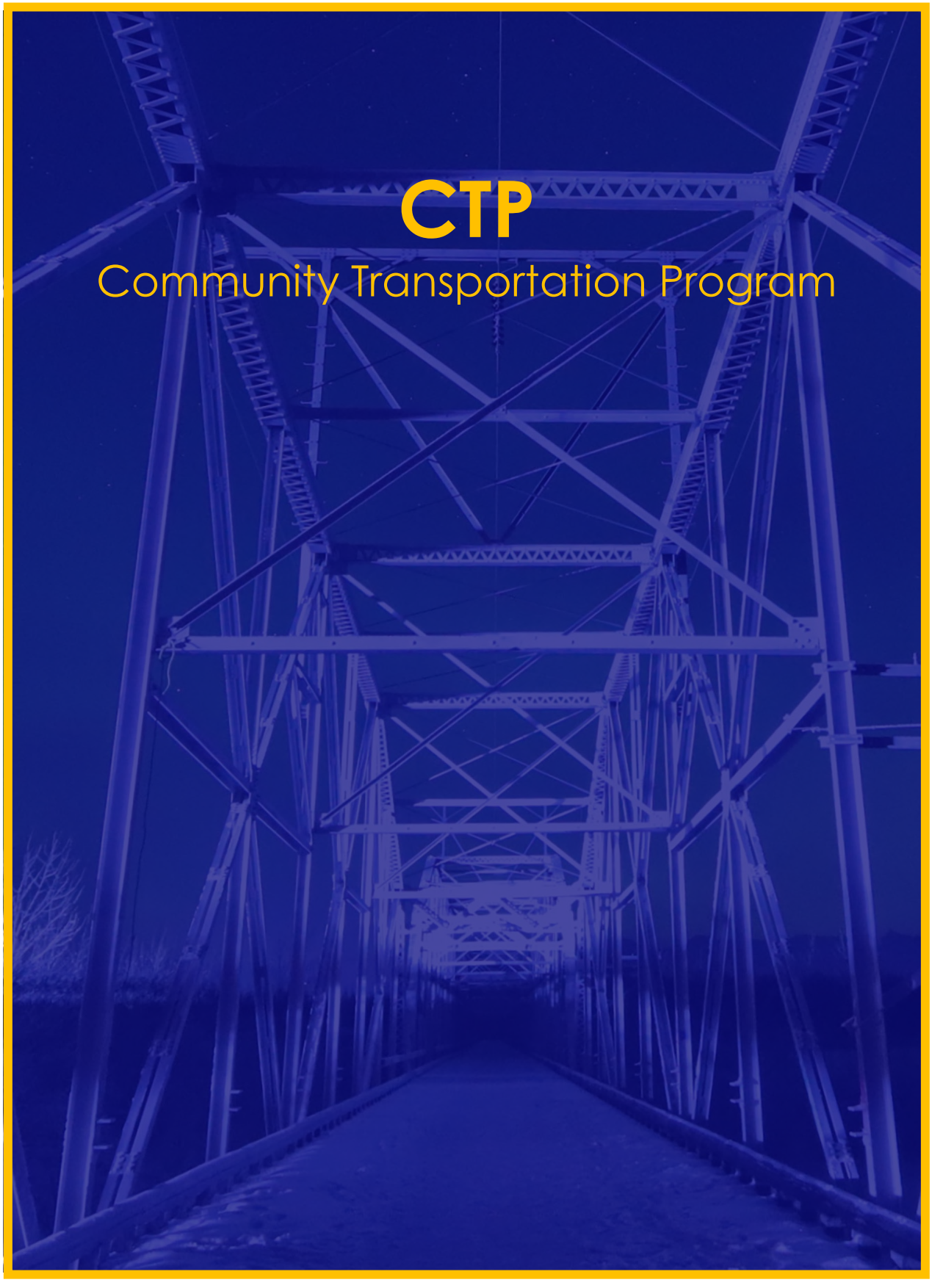
Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**Parks Highway and Palmer-Wasilla Highway Intersection Freight Bottleneck Relief**	Freight bottleneck relief from Parks Highway at Hyer Road to Knik-Goose Bay Road.	PHFS and CUFC (Proposed)		No	Y
	Parks Highway Freight Bottleneck Relief through Wasilla	Freight bottleneck relief through Wasilla	PHFS		No	Y
	Parks Hwy 99-123 Rehabilitation	This section of the Parks Highway has the greatest seasonal weight restriction, limiting the entire route's efficiency to the freight industry.	PHFS		No	Y
	Port of Anchorage Access Improvements	DOT&PF Central Region has a study underway to address solutions.	PHFS Intermodal Connector		No	Y
	Seward Hwy 36th Ave Interchange		PHFS		No	Y
	Seward Highway 99 to 118	This section of the Seward Highway is part of the Governor's safety initiative and improvements would help freight travel as well as safety.	PHFS		No	Y
	Seward Hwy Sterling Intersection improvements	Construct improvements to the Seward Highway and Sterling Highway intersection to improve traffic flow and safety.	PHFS (Sterling Hwy)		No	Y
	Seward Hwy Alyeska Hwy intersection	Construct a divided highway intersection at the Alyeska Highway to allow queuing for left turning vehicles.	PHFS		No	Y
	Seward Hwy MP104-108.5 (Windy Corner to Rainbow Point)	Improve the Windy Corner area of the Seward Highway to include highway realignment, auxiliary lanes, safety improvements, wildlife viewing turnouts, and railroad relocation as needed.	PHFS		No	Y

Region (Identified By)	Project Name	Project Description	Designation	Estimated Cost (in $000s)	Currently on STIP?	NHFP Eligible? (Y/N)
Anchorage Area (DOT&PF Central Region, including AMATS)	**Seward Hwy 25.5-36 Rehabilitation**	Restoring, resurfacing, and rehabilitation (3R) of the Seward Highway, from MP 25.5 to 36, Trail River to the Sterling Wye, to preserve and extend the service life of the highway, enhance safety, and provide passing lanes. The project may also include pedestrian amenities and traffic calming in the community of Moose Pass. This is a new project in the corridor to revisit the roadway rehabilitation, initially through the development of an Environmental Document.	N/A		No	Y
	Seward Hwy O'Malley to Dimond Reconstruction	Reconstruct the Seward Highway between O'Malley Road and Dimond Blvd. which may include: new north and south bound lanes and auxiliary lanes, a new interchange connecting 92nd Avenue to Academy Drive, reconstruction of the existing interchanges within the project limits, construction and reconstruction of frontage roads, pathway and sidewalk improvements, noise walls and drainage improvements.	PHFS		No	Y

LRTP

ALASKA STATEWIDE LONG-RANGE
TRANSPORTATION PLAN

ALASKA STATEWIDE LRTP
FREIGHT PLAN



CTP

Community Transportation Program

	<5K	5-50K	50-200K	Totals (Fed)
Funding Available:	41,539,513.81	15,047,879.35	8,412,606.84	65,000,000.00
Projects to Program:	41,672,732.00	14,679,242.00	-	56,351,974.00
Award Percentage of Total Program:	64%	23%	0%	87%
Remaining Balance:	(133,218.19)	368,637.35	8,412,606.84	

Method: Controlling for AMATS & FAST, applying sub-allocation percentages to the entire funds available, including the statewide/flex funding. FHWA does not require award strictly by rank.

Outcome: This method would fund a total of 10 projects.

Concern: There is not a single project in the 50-200K population category that fits within the budget. Bogard project left on the project list, but will exceed 50-200K budget, Flex funding will need to be shifted from another category to accommodate. Projects not awarded strictly in ranking order due to pre-assigned suballocation of the statewide/flex funds. Method is more difficult to explain to the public. Over half of the funding is allocated for the <5K population category, based on sub-allocation percentages.

Rank	Project Name	Pop Category	Federal ($)	Local Match ($)	Match Percentage	Total Cost (calculated)	Total PEB Score	
1	Bogard Road Rehabilitation: Greentree Street to Earl Drive	50-200K	13,099,680.00	1,300,320.00	9%	14,400,000.00	382	
2	Wales to Tin City Road Reconstruction*	<5K	1,848,000.00	2,188,296.00	54%	4,036,296.00	371	
3	Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	50-200K	12,393,367.50	1,381,632.50	10%	13,775,000.00	369	
4	Seldon Road Reconstruction, Snowgoose Drive to Lucille St.	50-200K	14,406,446.25	1,606,053.75	10%	16,012,500.00	367	plus design for this segment
5	Bogard Road Rehabilitation: Engstrom to Greentree Street	50-200K	11,553,190.00	1,146,810.00	9%	12,700,000.00	362	
6	Vintage Boulevard and Clinton Drive Reconstruction	5-50K	6,391,875.00	2,130,625.00	25%	8,522,500.00	344	
7	Akutan Harbor Access road	<5K	6,780,000.00	1,875,000.00	22%	8,655,000.00	339	
8	Wales Community Roads Improvement*	<5K	1,848,000.00	3,961,563.00	68%	5,809,563.00	338	
9	Eielson AFB Old Rich Highway Improvements and Roundabout	<5K	3,928,680.00	748,320.00	16%	4,677,000.00	335	
10	Juneau Glacier Highway Improvements: Access Road to Egan	5-50K	8,287,367.00	822,633.00	9%	9,110,000.00	334	
11	Unalaska Captain's Bay Road	<5K	9,992,538.00	3,162,462.00	24%	13,155,000.00	334	
12	Kasaan to Goose Creek Access road - MP 0.0 to 5.4*	<5K	13,293,444.00	1,481,975.00	10%	14,775,419.00	333	
13	Katlian Avenue Paving and Improvements	5-50K	8,033,874.00	2,555,126.00	24%	10,589,000.00	327	
14	Little Diomede Community Boardwalk Improvements*	<5K	1,162,000.00	1,732,300.00	60%	2,894,300.00	326	
15	Otto Lake Road Resurfacing and Widening	<5K	2,820,070.00	279,930.00	9%	3,100,000.00	317	
16	Forest Park Service Area Road & Sewer Improvements	5-50K	6,291,152.00	701,347.00	10%	6,992,500.00	317	
17	Shaktoolik Community Roads Improvement*	<5K	3,102,657.00	551,827.00	15%	3,654,484.00	314	
18	Mission Road Rehabilitation	5-50K	7,547,250.00	2,515,750.00	25%	10,063,000.00	311	
19	Main Street Rehabilitation	<5K	6,049,505.00	600,495.00	9%	6,650,000.00	297	
20	Sand Point Humbolt Slough Bridge Rehabilitation	<5K	712,933.00	79,567.00	10%	792,500.00	275	
21	Iliamna Areawide Roads Resurface	<5K	15,000,000.00	1,488,952.00	9%	16,488,952.00	271	
22	West Lagoon Road Reconstruction	<5K	2,650,050.00	294,450.00	10%	2,944,500.00	271	
23	Johnson Road Improvements	<5K	7,505,935.00	745,065.00	9%	8,251,000.00	269	
24	Donut Hole Road	5-50K	14,305,230.00	1,594,770.00	10%	15,900,000.00	261	
25	Homestead Lane Extension	5-50K	2,444,819.00	242,681.00	9%	2,687,500.00	204	

**202(a)9 Transfer Requested*

Recommendation 1 - By Score, applying sub-allocations first

Score Rank	Project Name	Population Category	STBG Funding <5K	STBG Funding 5-50K	STBG Funding 50-200K	STBG FLEX	Federal Funding Total	Match	Total Project Cost
1	Bogard Road Rehabilitation: Greentree Street to Earl Drive	50-200K			4,245,302.44	8,854,377.56	**13,099,680.00**	1,300,320.00	14,400,000.00
2	Wales to Tin City Road Reconstruction*	<5K	1,848,000.00				**1,848,000.00**	2,188,296.00	4,036,296.00
6	Vintage Boulevard and Clinton Drive Reconstruction	5-50K		6,391,875.00			**6,391,875.00**	2,130,625.00	8,522,500.00
7	Akutan Harbor Access road	<5K	6,780,000.00				**6,780,000.00**	1,875,000.00	8,655,000.00
8	Wales Community Roads Improvement*	<5K	1,848,000.00				**1,848,000.00**	3,961,563.00	5,809,563.00
9	Eielson AFB Old Rich Highway Improvements and Roundabout	<5K	3,928,680.00				**3,928,680.00**	748,320.00	4,677,000.00
10	Juneau Glacier Highway Improvements: Access Road to Egan	5-50K		1,201,823.38		7,085,543.62	**8,287,367.00**	822,633.00	9,110,000.00
11	Unalaska Captain's Bay Road	<5K	6,557,645.09			3,434,892.91	**9,992,538.00**	3,162,462.00	13,155,000.00
3	Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	50-200K				12,393,367.50	**12,393,367.50**	1,381,632.50	13,775,000.00
	**202(a)9 Transfer Requested*							**17,570,851.50**	**82,140,359.00**

	<5K	5-50K	50-200K	FLEX	Totals (Fed)
Funding Available:	20,962,325.09	7,593,698.38	4,245,302.44	32,198,674.09	65,000,000.00
Projects to Program:	20,962,325.09	7,593,698.38	4,245,302.44	31,768,181.59	64,569,507.50
Award Percentage of Total Program:	32%	12%	7%	49%	99.34%
Remaining Balance:	(0.00)	0.00	0.00	430,492.50	

Method: Award in rank order beginning with sub-allocated funding and then moving to Flex funds.

Outcome: This method would fund a total of 9 projects. This method is straightforward. This method allows larger projects to be funded because the statewide/flex is available for overflow.

Concern: A majority of the FLEX funding is allocated to the 50-200k projects.

Comments: Include Wales Community Roads Improvements to capture as many projects as possible. Also bundled with the other Wales project.

Recommendation 2 - By Score, applying Statewide/Flex first

Rank	Project Name	Pop Category	<5K	5-50K	50-200K	FLEX	Federal Total	Match	Total Project Cost
1	Bogard Road Rehabilitation: Greentree Street to Earl Drive	50-200K				13,099,680.00	13,099,680.00	1,300,320.00	14,400,000.00
2	Wales to Tin City Road Reconstruction*	<5K				1,848,000.00	1,848,000.00	2,188,296.00	4,036,296.00
3	Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	50-200K				12,393,367.50	12,393,367.50	1,381,632.50	13,775,000.00
6	Vintage Boulevard and Clinton Drive Reconstruction	5-50K		1,534,248.41		4,857,626.59	6,391,875.00	2,130,625.00	8,522,500.00
16	Forest Park Service Area Road & Sewer Improvements	5-50K		6,291,152.00			6,291,152.00	701,347.00	6,992,500.00
7	Akutan Harbor Access road	<5K	6,780,000.00				6,780,000.00	1,875,000.00	8,655,000.00
8	Wales Community Roads Improvement*	<5K	1,848,000.00				1,848,000.00	3,961,563.00	5,809,563.00
9	Eielson AFB Old Rich Highway Improvements and Roundabout	<5K	3,928,680.00				3,928,680.00	748,320.00	4,677,000.00
14	Little Diomede Community Boardwalk Improvements*	<5K	1,162,000.00				1,162,000.00	1,732,300.00	2,894,300.00
15	Otto Lake Road Resurfacing and Widening	<5K	2,820,070.00				2,820,070.00	279,930.00	3,100,000.00
17	Shaktoolik Community Roads Improvement*	<5K	3,102,657.00				3,102,657.00	551,827.00	3,654,484.00
20	Sand Point Humbolt Slough Bridge Rehabilitation	<5K	712,933.00				712,933.00	79,567.00	792,500.00
							-		

	<5K	5-50K	50-200K	FLEX	Totals (Fed)
Funding Available:	20,962,325.09	7,593,698.38	4,245,302.44	32,198,674.09	65,000,000.00
Projects to Program:	20,354,340.00	7,825,400.41	-	32,198,674.09	60,378,414.50
Award Percentage of Total Program:	31%	12%	0%	50%	93%
Remaining Balance:	607,985.09	(231,702.03)	4,245,302.44	(0.00)	

Method: Award in rank order beginning with flex funding and then moving to sub-allocated funding

Outcome: This method would fund a total of 12 projects. This method is straightforward, and follows federal regulation intent to award by rank.

Concerns: Cannot max out sub-allocated funding because flex not available for overflow. A majority of the FLEX funding is allocated to the 50-200k projects, which could be challenging for funds management smaller sub-allocated amount for the 50-200K category.

Recommendation 3 - By Score, Appropriation by Pop. Category, (flex integrated)

Rank	Project Name	Pop Category	<5k	5-50k	50-200k	Federal Totals	Match	Total Project Cost
2	Wales to Tin City Road Reconstruction*	<5K	1,848,000.00			1,848,000.00	2,188,296.00	4,036,296.00
6	Vintage Boulevard and Clinton Drive Reconstruction	5-50K		6,391,875.00		6,391,875.00	2,130,625.00	8,522,500.00
7	Akutan Harbor Access road	<5K	6,780,000.00			6,780,000.00	1,875,000.00	8,655,000.00
8	Wales Community Roads Improvement*	<5K	1,848,000.00			1,848,000.00	3,961,563.00	5,809,563.00
9	Eielson AFB Old Rich Highway Improvements and Roundabout	<5K	3,928,680.00			3,928,680.00	748,320.00	4,677,000.00
10	Juneau Glacier Highway Improvements: Access Road to Egan	5-50K		8,287,367.00		8,287,367.00	822,633.00	9,110,000.00
11	Unalaska Captain's Bay Road	<5K	9,992,538.00			9,992,538.00	3,162,462.00	13,155,000.00
12	Kasaan to Goose Creek Access road - MP 0.0 to 5.4*	<5K	13,293,444.00			13,293,444.00	1,481,975.00	14,775,419.00
14	Little Diomede Community Boardwalk Improvements*	<5K	1,162,000.00			1,162,000.00	1,732,300.00	2,894,300.00
15	Otto Lake Road Resurfacing and Widening	<5K	2,820,070.00			2,820,070.00	279,930.00	3,100,000.00

MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Division of Project Delivery
Office of the Director

TO: Ryan Anderson
Commissioner

DATE: February 12, 2024

CC: Katherine Keith
Deputy Commissioner

PHONE NO: 907-465-6981

FROM: James Marks
Division Director

SUBJECT: Community Transportation Program (CTP) Award Recommendations

Dear Commissioner Anderson,

On December 20, 2023, DOT&PF held the Community Transportation Program (CTP) Project Evaluation Board (PEB) meeting in conjunction with the Transportation Alternatives Program (TAP). Staff presented 46 total projects to the Project Evaluation Board (PEB). 25 of which were CTP specific projects.

To recap events to date, 190 project needs were submitted during the Notice of Intent to Apply stage of the programs. Planning staff scored all eligible projects (84) with applications submitted by the community sponsors. Based on funding availability, our team had asked the communities to assist in the production of the full project packages (46) to present to the PEB. Planning staff worked with DOT&PF preconstruction staff to produce engineering estimates for these projects.

PROGRAM CRITERIA & SCORING PROCESS

CTP has two different designations, 'Urban/Rural' and 'Remote'; each designation has a different set of criteria. Projects in each category were scored against each other.

The PEB meeting was structured as a consent agenda, where all agreed-upon scores from pre-scoring were considered as consensus, and the PEB's evaluation discussion focused on the scoring variances. PEB members had the option to change their scores during the meeting based on the rationale presented by other PEB members for their scores in an effort to score consistently. PEB members also had discretion to change pre-populated scores.

The PEB resulted in the following prioritized order of projects by score. The full list is below or can also be viewed through the PowerBI Platform, click here to view.

Project Name	Project Sponsor	STBG Population Category	Urban/ Remote	PEB Score
Bogard Road Rehabilitation: Greentree Street to Earl Drive	DOT&PF Central Region	50K-200K	Urban	381.8
Wales to Tin City Road Reconstruction	City of Wales via Kawerak Inc.	<5K (Rural)	Remote	371
Seldon Road Reconstruction, Wasilla Fishhook Road to Snowgoose Drive	Matanuska Susitna Borough	50K-200K	Urban	369.3
Seldon Road Reconstruction, Snowgoose Drive to Lucille St.	Matanuska Susitna Borough	50K-200K	Urban	367.3
Bogard Road Rehabilitation: Engstrom to Greentree Street	Alaska DOT&PF - Central Region	50K-200K	Urban	361.5
Vintage Boulevard and Clinton Drive Reconstruction	City and Borough of Juneau	5k-49,999	Urban	344
Akutan Harbor Access road	Akutan	<5K (Rural)	Remote	338.8
Wales Community Roads Improvement	City of Wales via Kawerak Inc.	<5K (Rural)	Remote	338
Eielson AFB Old Rich Highway Improvements and Roundabout	Eielson Air Force Base	<5K (Rural)	Urban	335.3
Juneau Glacier Highway Improvements: Access Road to Egan	Alaska DOT&PF - Southcoast Region	5k-49,999	Urban	334
Unalaska Captain's Bay Road	City of Unalaska	<5K (Rural)	Urban	334
Kasaan to Goose Creek Access road - MP 0.0 to 5.4	Organized Village of Kasaan	<5K (Rural)	Remote	332.5
Katlian Avenue Paving and Improvements	City and Borough of Sitka	5k-49,999	Urban	326.7
Little Diomede Community Boardwalk Improvements	City of Diomede via Kawerak Inc.	<5K (Rural)	Remote	326
Otto Lake Road Resurfacing and Widening	Denali Borough	<5K (Rural)	Urban	317.3
Forest Park Service Area Road & Sewer Improvements	Ketchikan	5k-49,999	Urban	317.3
Shaktoolik Community Roads Improvement	City of Shaktoolik via Kawerak Inc.	<5K (Rural)	Remote	314.3
Mission Road Rehabilitation	City of Kodiak	5k-49,999	Urban	311
Main Street Rehabilitation	Homer	<5K (Rural)	Urban	296.5
Sand Point Humbolt Slough Bridge Rehabilitation	City of Sand Point	<5K (Rural)	Remote	275
Iliamna Areawide Roads Resurface	Alaska DOT&PF - Southcoast Region	<5K (Rural)	Remote	271
West Lagoon Road Reconstruction	City of King Cove	<5K (Rural)	Remote	271
Johnson Road Improvements	Alaska DOT&PF - Northern Region	<5K (Rural)	Urban	269
Donut Hole Road	City of Bethel	5k-49,999	Urban	260.7
Homestead Lane Extension	Soldotna	5k-49,999	Urban	204.2

Please note, a full record of meeting minutes is available upon the request of any applicants.

PROJECT FUNDING

FY24 STBG Apportionments from Draft 24-27 STIP, Funding & Fiscal Constraint, Table 3
obligation limitation not applied

STBG Appr.	159,242,947.00	%
>200k	33,620,615.00	21%
50-200	16,839,173.00	11%
5-50k	12,894,682.00	8%
<5k	35,595,635.00	22%
Flex	54,675,817.00	34%
Off-System Bridges	5,617,025.00	4%

Projects will be included in the STIP based on projected funding availability and final PEB score. Note that STBG apportionments are categorized by population in addition to some STBG "flexible" funding, which can be programmed anywhere in the state. This funding availability will affect the final list of projects that can advance to construction more quickly. Higher dollar cost projects may be more difficult to fit into earlier years and may have longer development timelines.

When the solicitation of projects began in November of 2022, calculations showed that there would be 120M available for CTP. Since that time, both project cost increases due to continued inflation/supply chain issues and additional high priority projects inserted into the STIP consumed some of the available STBG dollars, leaving less STBG available for programming.

We propose a budget of $65M in federal funding for CTP Awards, with a Total Project Cost of $82.1M.

FY24-27 STIP Programming
62,020,359.00

FY28-31 STIP Programming
20,120,000.00

Total Project Cost: $82,140,359.00
Federal Funding: $64,569,507.5
Match Funding: $17,570,851.50

RECOMMENDATION

The Project Delivery Division recommends the following:

1. Program first phase of design for prioritized CTP projects (see list below). This will provide communities with an initial package with which to seek discretionary grant dollars if there is a wait between initial design (not including environmental review) and construction funding availability. The DOT&PF can provide staff resources through AML and the DOT&PF FLAG team to assist interested communities in pursuing discretionary grants.

2. Determine availability of construction funding based on projected apportionments and available funding for both programs, and advance projects to construction as funding is projected.

The projects we recommend programming based on award in rank order of the PEB score, programming by available sub-allocated funding and finally, programming with available Flex funds. This method allows larger projects to be funded because the statewide/flex is available for overflow. This recommendation would fund a total of 9 projects and is relatively straightforward, providing ease of communications to project sponsors and the public.

Project Name	Project Total Cost	Federal	Match
Bogard Road Rehabilitation: Greentree Street to Earl Drive	14,400,000.00	13,099,680.00	1,300,320.00
Wales to Tin City Road Reconstruction*	4,036,296.00	1,848,000.00	2,188,296.00
Vintage Boulevard and Clinton Drive Reconstruction	8,522,500.00	6,391,875.00	2,130,625.00
Akutan Harbor Access road	8,655,000.00	6,780,000.00	1,875,000.00
Wales Community Roads Improvement*	5,809,563.00	1,848,000.00	3,961,563.00
Eielson AFB Old Rich Highway Improvements and Roundabout	4,677,000.00	3,928,680.00	748,320.00
Juneau Glacier Highway Improvements: Access Road to Egan	9,110,000.00	8,287,367.00	822,633.00
Unalaska Captain's Bay Road	13,155,000.00	9,992,538.00	3,162,462.00
Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	13,775,000.00	12,393,367.50	1,381,632.50
Totals:	**82,140,359.00**	**64,569,507.50**	**17,570,851.50**

**202(a)9 Transfer Requested*

How did we program it?

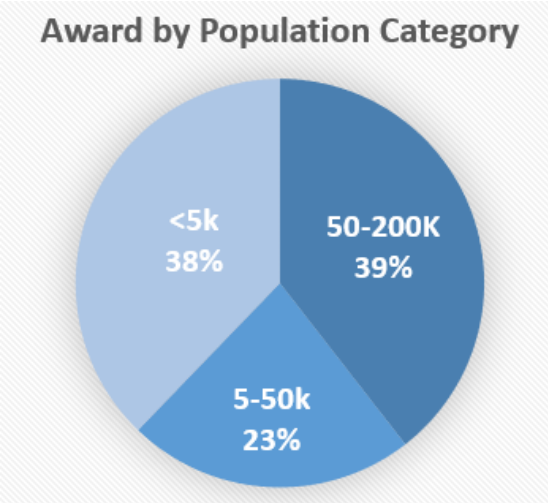
Score Rank	Project Name	Population Category	STBG Funding <5K	STBG Funding 5-50K	STBG Funding 50-200K	STBG FLEX	Federal Funding Total
1	Bogard Road Rehabilitation: Greentree Street to Earl Drive	50-200K			4,245,302.44	8,854,377.56	**13,099,680.00**
2	Wales to Tin City Road Reconstruction*	<5K	1,848,000.00				**1,848,000.00**
6	Vintage Boulevard and Clinton Drive Reconstruction	5-50K		6,391,875.00			**6,391,875.00**
7	Akutan Harbor Access road	<5K	6,780,000.00				**6,780,000.00**
8	Wales Community Roads Improvement*	<5K	1,848,000.00				**1,848,000.00**
9	Eielson AFB Old Rich Highway Improvements and Roundabout	<5K	3,928,680.00				**3,928,680.00**
10	Juneau Glacier Highway Improvements: Access Road to Egan	5-50K		1,201,823.38		7,085,543.62	**8,287,367.00**
11	Unalaska Captain's Bay Road	<5K	6,557,645.09			3,434,892.91	**9,992,538.00**
3	Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	50-200K				12,393,367.50	**12,393,367.50**

**202(a)9 Transfer Requested*

	<5K	5-50K	50-200K	FLEX	Totals (Fed)
Funding Available:	20,962,325.09	7,593,698.38	4,245,302.44	32,198,674.09	65,000,000.00
Projects to Program:	20,962,325.09	7,593,698.38	4,245,302.44	31,768,181.59	64,569,507.50
Award Percentage of Total Program:	32%	12%	7%	49%	99.34%
Remaining Balance:	(0.00)	0.00	0.00	430,492.50	

Outcome:

This method represents each of the population categories in relative balance: the 50-200K category would receive 39%, 5-50K would receive 23% and <5k would represent 38% of the available program funding.



STIP Planning:

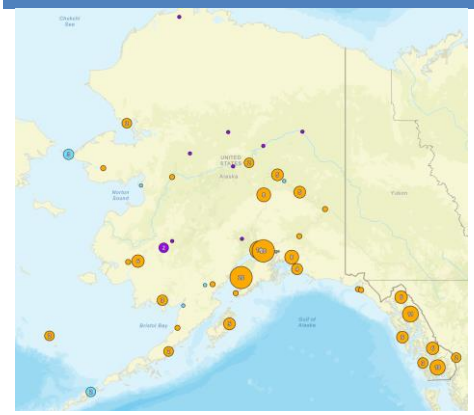
In reference to STIP planning, we propose the schedule in Attachment A. This is an aggressive schedule for an Amendment to include the projects in the STIP, as well as getting project starts completed; however, two of the projects listed are 202(a)9 transfer requests and we feel they are important to the communities.

Attachment A represents the total project costs outlined by Fiscal Year for STIP planning.

POLICY DECISIONS NEEDED

1. Allocation of 50-200K CTP funds to MVP & FAST:
    a. Status: FAST has been allocated 9.6M in federal funds for FY24. MVP has been allocated 7.2M in federal funds for FY24. The combination is 16.8M, which is more than the FY24 apportionment from FHWA for 50-200K STBG.
    a. Status: FFY22 & FFY23: Funds have been allocated to FAST and have been awarded.
    b. Status: Funds are currently integrated into award recommendations starting in FY24.
        i. **If MVP is being allocated CTP funds, DOT&PF will need to recalculate the award recommendations. Their allocation is currently integrated into the 50-200K funding suballocation because they have already participated in the Statewide call for projects.**
        ii. If the MVP allocation remains in the Statewide program, STIP NID 34393 will need to be reallocated to the CTP Alaskawide program, NID 34223.
    c. **Recommendation:** The MVP allocation is currently integrated into the 50-200K funding suballocation because they have already participated in the Alaskawide call for projects. The recommendation is to leave the allocation with Alaskawide for this cycle. This decision directly benefits MVP as they would have two major projects funded because of the access to Flex funding.

PUBLIC OUTREACH



This program is well loved by communities across the State, and we would like to present the awards with enthusiasm. We have published the ranked projects on the CTP website by score to show how many projects were considered across the State.

We are currently working on a video with the PIO Communications team to describe the CTP program process and how we came to the resulting awards.

APPROVAL

Ryan Anderson, PE
Commissioner

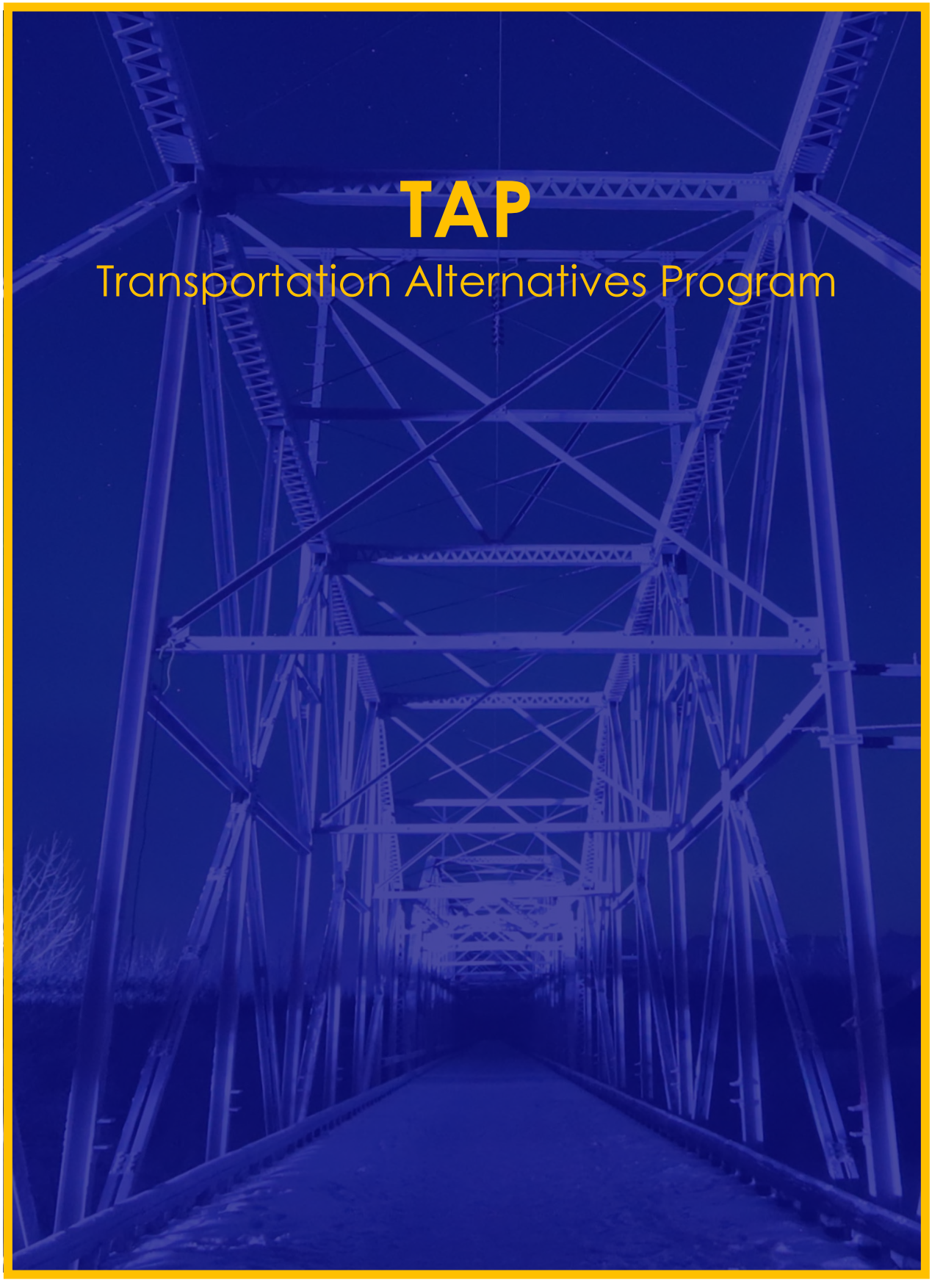
Date

Attachment: Total Project Costs outlined by Fiscal Year

Attachment A: Total Project Costs outlined by Fiscal Year

Project Name	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31
Bogard Road Rehabilitation: Greentree Street to Earl Drive	1,500,000.00	300,000.00	-	2,200,000.00	-	-	10,400,000.00	-
Wales to Tin City Road Reconstruction*	4,036,296.00	-	-	-	-	-	-	-
Vintage Boulevard and Clinton Drive Reconstruction	1,200,000.00	532,500.00	6,790,000.00	-	-	-	-	-
Akutan Harbor Access road	600,000.00	485,000.00	-	7,570,000.00	-	-	-	-
Wales Community Roads Improvement*	5,809,563.00	-	-	-	-	-	-	-
Eielson AFB Old Rich Highway Improvements and Roundabout	900,000.00	690,000.00	3,087,000.00	-	-	-	-	-
Juneau Glacier Highway Improvements: Access Road to Egan	600,000.00	380,000.00	330,000.00	7,800,000.00	-	-	-	-
Unalaska Captain's Bay Road	300,000.00	245,000.00	-	12,610,000.00	-	-	-	-
Seldon Road Reconstruction, Wasilla Fishhook Rd. to Snowgoose Dr.	1,440,000.00	615,000.00	-	2,000,000.00	-	-	7,254,000.00	2,466,000.00
Totals:	**16,385,859.00**	**3,247,500.00**	**10,207,000.00**	**32,180,000.00**	**-**	**-**	**17,654,000.00**	**2,466,000.00**

**202(a)9 Transfer Requested*



TAP

Transportation Alternatives Program

Rank	Project Name	Pop Category	Federal ($)	Local Match ($)	Match Percentage	Total Cost (calculated)	Total PEB Score
1	Portage Curve Multi-Modal and Trail of Blue Ice Connector	<5K	1,216,125	405,375	25.00%	1,621,500	439
2	Naknek to King Salmon Non-motorized Pathway	<5K	4,676,000	1,206,500	19.51%	6,182,500	438
3	Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	5-50K	4,995,028	2,575,500	34.00%	7,575,000	415
4	Healy to Antler Ridge Separated Path	<5K	3,111,710	388,290	9.03%	4,300,000	411
5	Healy Area and School Pedestrian Path	<5K	1,910,370	189,630	9.03%	2,100,000	389
6	Knik River Wayside Gold Star Families Memorial	<5K	1,456,386	257,614	15.03%	1,714,000	388
7	Craig-Klawock Bike and Pedestrian Path Stage 1*	<5K	5,000,000	496,317	9.03%	5,496,317	381
8	Spruce Mill Promenade	5-50K	5,000,000	2,467,500	33.04%	7,467,500	363
9	Homer All-Ages and Abilities Pedestrian Pathway (HAPP)	<5K	*3,487,500*	*387,500*	*10.00%*	*3,875,000*	363
10	Inner/Outer Springer Loop Separated Pathway	50-200K	*1,862,379*	*207,621*	*10.03%*	*2,070,000*	359
11	Hoonah - City Streets Sidewalk Construction	<5K	2,538,063	251,937	9.03%	2,790,000	345
12	Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	<5K	1,223,547	121,453	9.03%	1,345,000	345
13	Montana Creek Bridge Replacement	5-50K	2,221,942	220,558	9.03%	2,442,500	340
14	Pinky's Park Trail	5-50K	4,813,394	536,606	10.03%	5,350,000	327
15	Seven Pastures Pedestrian Path Improvements	<5K	830,205	140,795	14.50%	971,000	327
16	Palmer Fishhook Separated Pathway: Glenn Highway to Trunk Road	5-50K	2,967,896	294,604	9.03%	3,262,500	326
17	Moose Pass Bike Path Connections	<5K	10,188,640	1,011,360	9.03%	11,200,000	326
18	Forest Park Drive Walkway	5-50K	476,841	53,159	10.03%	530,000	322
19	Egan Drive/Valdez Sign Turnout	<5K	225,000	100,000	30.77%	325,000	321
20	Lemon Creek Multi-Modal Path	5-50K	4,557,000	1,000,000	18.00%	5,557,000	320
21	Seldon Road Separated Pathway	50-200K	4,298,333	426,667	9.03%	4,725,000	303

**202(a)9 Transfer or IGA Requested*

Recommendation 1 - By score, applying sub-allocations first

Score Rank	Project Name	Population Category	<5K	5K-50K	50K-200K	FLEX	Federal Total	Match	Total Project Cost	
1	Portage Curve Multi-Modal and Trail of Blue Ice Connector	<5K	1,216,125.00				**1,216,125.00**	405,375.00	1,621,500.00	*Matches*
2	Naknek to King Salmon Non-motorized Pathway	<5K	4,676,000.00				**4,676,000.00**	1,206,500.00	6,182,500.00	*Matches*
3	Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	5-50K		2,404,099		2,590,928.93	**4,995,028.00**	2,575,500.00	7,575,000.00	*Matches*
4	Healy to Antler Ridge Separated Path	<5K	744,369.20			2,367,341	**3,111,710.00**	388,290.00	4,300,000.00	*Matches*
10	Inner/Outer Springer Loop Separated Pathway	50-200K			1,862,379		**1,862,379.00**	207,621.00	2,070,000.00	*Matches*
21	Seldon Road Separated Pathway	50-200K			1,277,136	3,021,197	**4,298,333.00**	426,667.00	4,725,000.00	*Matches*
5	Healy Area and School Pedestrian Path	<5K				1,910,370	**1,910,370.00**	189,630.00	2,100,000.00	*Matches*
6	Knik River Wayside Gold Star Families Memorial	<5K				1,456,386	**1,456,386.00**	257,614.00	1,714,000.00	*Matches*
12	Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	<5K				1,223,547	**1,223,547.00**	121,453.00	1,345,000.00	*Matches*
19	Egan Drive/Valdez Sign Turnout	<5K				225,000	**225,000.00**	100,000.00	325,000.00	*Matches*
									31,958,000.00	

	<5K	5k-49,999	50-199,999	FLEX	Totals
Funding Available:	6,636,494.20	2,404,099.07	3,139,515.46	12,819,891.26	25,000,000.00
Projects to Program:	6,636,494.20	2,404,099.07	3,139,515.46	12,794,769.27	24,974,878.00
Award Percentage of Total Program:	27%	10%	13%	51%	99.90%
Remaining Balance:	0.00	0.00	0.00	25,121.99	

Method: Award in rank order beginning with sub-allocated funding and then moving to Flex funds.

Outcome: This method would fund a total of 10 projects. This method is straightforward, and follows federal regulation intent to award by rank. This method allows larger projects to be funded because the statewide/flex is available for overflow.

Concern: Only one project for the 5-50K category. This project may become time-sensitive to avoid lapsing funds. Fewer total projects are awarded.

Recommendation 2 - By Score, applying Statewide/Flex first

Rank	Project Name	Pop Category	<5K	5K-50K	50K-200K	FLEX	Federal Total	Match	Total Project Cost
1	Portage Curve Multi-Modal and Trail of Blue Ice Connector	<5K				1,216,125.00	1,216,125.00	405,375.00	1,621,500.00
2	Naknek to King Salmon Non-motorized Pathway	<5K				4,676,000.00	4,676,000.00	1,206,500.00	6,182,500.00
3	Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	5-50K				4,995,028.00	4,995,028.00	2,575,500.00	7,575,000.00
4	Healy to Antler Ridge Separated Path	<5K	1,178,971.74			1,932,738.26	3,111,710.00	388,290.00	4,300,000.00
5	Healy Area and School Pedestrian Path	<5K	1,910,370.00				1,910,370.00	189,630.00	2,100,000.00
6	Knik River Wayside Gold Star Families Memorial	<5K	1,456,386.00				1,456,386.00	257,614.00	1,714,000.00
10	Inner/Outer Springer Loop Separated Pathway	50-200K			1,862,379.00		1,862,379.00	207,621.00	2,070,000.00
12	Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	<5K	1,223,547				1,223,547.00	121,453.00	1,345,000.00
13	Montana Creek Bridge Replacement	5-50K		2,221,942			2,221,942.00	220,558.00	2,442,500.00
15	Seven Pastures Pedestrian Path Improvements	<5K	830,205				830,205.00	140,795.00	971,000.00
							-	#N/A	#N/A
							-	#N/A	#N/A

	<5K	5k-49,999	50-199,999	FLEX	Totals
Funding Available:	6,636,494.20	2,404,099.07	3,139,515.46	12,819,891.26	25,000,000.00
Projects to Program:	6,599,479.74	2,221,942.00	1,862,379.00	12,819,891.26	23,503,692.00
Award Percentage of Total Program:	26%	9%	7%	51%	94%
Remaining Balance:	37,014.46	182,157.07	1,277,136.46	0.00	

Method: Award in rank order beginning with flex funding and then moving to sub-allocated funding

Outcome: This method would fund a total of 10 projects. This method is straightforward, and follows federal regulation intent to award by rank. This method allows for more projects to be programmed because it skips larger projects and selects smaller projects that fit within the allocation defined.

Concerns: Cannot max out sub-allocated funding because flex is not available for overflow. Only allows for one project each in the 5-50K and the 50-200K categories. This project may become time-sensitive to avoid lapsing funds. There are some lower priority projects funded because they fit within small remaining funding availability.

Recommendation 3 - By Score, Appropriation by Pop. Category, (flex integrated)

Rank	Project Name	Pop Category	<5K	5K-50K	50K-200K	Federal Totals	Match	Total Project Cost
1	Portage Curve Multi-Modal and Trail of Blue Ice Connector	<5K	1,216,125.00			1,216,125.00	405,375.00	1,621,500.00
2	Naknek to King Salmon Non-motorized Pathway	<5K	4,676,000.00			4,676,000.00	1,206,500.00	6,182,500.00
3	Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	5-50K		4,995,028.00		4,995,028.00	2,575,500.00	7,575,000.00
4	Healy to Antler Ridge Separated Path	<5K	3,111,710.00			3,111,710.00	388,290.00	4,300,000.00
5	Healy Area and School Pedestrian Path	<5K	1,910,370.00			1,910,370.00	189,630.00	2,100,000.00
6	Knik River Wayside Gold Star Families Memorial	<5K	1,456,386.00			1,456,386.00	257,614.00	1,714,000.00
10	Inner/Outer Springer Loop Separated Pathway	50-200K			1,862,379.00	1,862,379.00	207,621.00	2,070,000.00
12	Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	<5K	1,223,547			1,223,547.00	121,453.00	1,345,000.00
21	Seldon Road Separated Pathway	50-200K			4,298,333	4,298,333.00	426,667.00	4,725,000.00

	<5K	5k-49,999	50-199,999	Totals
Funding Available:	13,621,582.42	4,934,477.85	6,443,939.72	25,000,000.00
Projects to Program:	13,594,138.00	4,995,028.00	6,160,712.00	24,749,878.00
Award Percentage of Total Program:	54%	20%	25%	99%
Remaining Balance:	27,444.42	(60,550.15)	283,227.72	

Method: Controlling for AMATS, applying sub-allocation percentages to the entire funds available, including the statewide/flex funding.

Outcome: This method would fund a total of 9 projects. This method allows for more projects to be programmed because it skips larger projects and selects smaller projects that fit within the allocation defined.

Concern: FHWA may require flex/statewide to remain flex without suballocations applied. Projects not awarded strictly in ranking order due to pre-assigned suballocation of the statewide/flex funds. Only one project for the 5-50K category and two projects for the 50-200K category. Those projects may become time-sensitive to avoid lapsing funds. Method is more difficult to explain.

Overall Concerns

Only 2 projects for 50-200K and they are both are larger (and assumed longer development projects). There could be a potential lapsing concern regardless of which recommendation is chosen. FAST may have some Lapsing funds are in the near-term and this program, as a whole, may not be able to deliver quickly enough. Julius and Marie are working on updates/analysis.
50-200K funding was provided to FAST for FY22 and FY23. It can no longer be provided directly to them with MVP coming on board, unless a strategy is presented to the Secretary of USDOT.

MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Division of Project Delivery
Office of the Director

TO: Ryan Anderson
Commissioner

DATE: February 12, 2024

CC: Katherine Keith
Deputy Commissioner

PHONE NO: 907-465-6981

FROM: James Marks
Division Director

SUBJECT: Transportation Alternatives Program (TAP) Award Recommendations

Dear Commissioner Anderson,

On December 20, 2023, we held the Transportation Alternatives Program (TAP) Project Evaluation Board (PEB) meeting in conjunction with the Community Transportation Program (CTP). DOT&PF staff presented 46 total projects to the PEB board; 21 of which were TAP specific projects.

To recap events to date, 190 project needs were submitted during the Notice of Intent to Apply stage of the programs. Planning staff scored all eligible projects (84) with applications submitted by the community sponsors. Based on funding availability, our team had asked the communities to assist in the production of the full project packages (46) to present to the PEB. The planners worked with DOT&PF engineering staff to produce SSEs for these projects.

PROGRAM CRITERIA & SCORING PROCESS

The Department's planning chiefs and Strategic Investment Section completed a "consistency review" including a preliminary environmental review, to ensure that staff application of scores was consistent. Each of the original 84 eligible CTP & TAP project applications submitted by Alaskan communities were pre-scored, with a total of 21 TAP projects advancing to the December PEB meeting. Each PEB member reviewed all the projects and individually scored them.

The PEB meeting was structured as a consent agenda, where all agreed-upon scores from pre-scoring were considered as consensus, and the PEB's evaluation discussion focused on the scoring variances. PEB members had the option to change their scores during the meeting based on the rationale presented by other PEB members for their scores in an effort to score consistently. PEB members also had discretion to change pre-populated scores.

The PEB resulted in the following prioritized order of projects by score. The full list is below or can also be viewed through the PowerBI Platform, click here to view.

Project Name	Project Sponsor	Population Category	PEB Score
Portage Curve Multi-Modal and Trail of Blue Ice Connector	US Forest Service	<5K (Rural)	439
Naknek to King Salmon Non-motorized Pathway	Naknek	<5K (Rural)	437.5
Palmer Fishhook Separated Pathway: Trunk Road to Edgerton Parks Road	Matanuska Susitna Borough	5k-49,999	414.8
Healy to Antler Ridge Separated Path	Denali Borough	<5K (Rural)	410.5
Healy Area and School Pedestrian Path	Denali Borough	<5K (Rural)	388.5
Knik River Wayside Gold Star Families Memorial	Alaska Dept. of Fish & Game	<5K (Rural)	387.7
Craig-Klawock Bike and Pedestrian Path Stage 1	Craig	<5K (Rural)	381
Spruce Mill Promenade	City of Ketchikan	5k-49,999	363
Homer All-Ages and Abilities Pedestrian Pathway (HAPP)	Homer	<5K (Rural)	362.7
Inner/Outer Springer Loop Separated Pathway	Matanuska Susitna Borough	50K-200K	358.5
Hoonah - City Streets Sidewalk Construction	City of Hoonah	<5K (Rural)	345
Hartney Bay/Eyak Native Corporation Recreation Site Improvement Project	Cordova Historical Society	<5K (Rural)	344.8
Montana Creek Bridge Replacement	City and Borough of Juneau	5k-49,999	340
Pinky's Park Trail	City of Bethel	5k-49,999	326.7
Seven Pastures Pedestrian Path Improvements	Municipality of Skagway	<5K (Rural)	326.5
Palmer Fishhook Separated Pathway: Glenn Highway to Trunk Road	Alaska DOT&PF - Central Region	5k-49,999	325.7
Moose Pass Bike Path Connections	Moose Pass	<5K (Rural)	325.5
Forest Park Drive Walkway	Ketchikan Gateway Borough	5k-49,999	322
Egan Drive/Valdez Sign Turnout	City of Valdez	<5K (Rural)	321.3
Lemon Creek Multi-Modal Path	City and Borough of Juneau	5k-49,999	319.8
Seldon Road Separated Pathway	Alaska DOT&PF - Central Region	50K-200K	303

Please note, a full record of meeting minutes is available upon request.

PROJECT FUNDING

The Transportation Alternatives Program (TAP) Set-Aside from the Surface Transportation Block Grant (STBG) Program. The public funding notice for TAP was $20-30 million. The population sub allocations are outlined in the following categories, controlling for AMATS:

- < 5,000
- 5,000-49,999
- 50,000 to 199,999 (Fairbanks North Star Borough, Mat-Su Borough) *
- >200,000 (Municipality of Anchorage)
- Flexible (any population in any area of the state)

Please note, funding availability will affect the final list of projects that can advance to construction more quickly. Higher dollar-cost projects may be more difficult to fit into earlier years apportionment categories and may have longer development timelines and risk the lapsing of funds.

The program awards are recommended based on available IIJA TAP funds; however, the total program award could be adjusted if Carbon Reduction Program funds became available to transfer.

We propose a budget of $25M in federal funding for TAP Awards, with a Total Project Cost of $31.9M.

FY24-27 STIP Programming
23,068,000.00

FY28-31 STIP Programming
8,890,000.00

Total Project Cost: $31,958,000.00
Federal Funding: $24,974,878.00
Match Funding: $5,878,650.00

*Due to the recent signing of our new urbanized area, any projects in the urbanized area of the Mat-Su Borough will be funded with TAP 50-200k funds.

RECOMMENDATION

It is the recommendation that $25M federal TAP funds be programmed in FFY24-FFY27 for this call for projects. Funding for the program would be FFY23, FFY24, FFY25 TAP funds approximately (lapsing in FFY26, FFY27, FFY28 respectively). IIJA funding for FFY26 (lapsing FFY29), will be held for contingency. The funding recommendations will span over the next transportation bill and pending reauthorization, the funds will have to be re-programmed, adjusted, and updated.

It is the recommendation that projects be awarded based on rank order of the PEB score, available sub-allocated funding and finally, available Flex funds. This recommendation would fund a total of 10 projects and is relatively straightforward, providing ease of communications to project sponsors and the public.

Project Name	Project Total Cost	Federal	Match
Portage Curve Multi-Modal and Trail of Blue Ice Connector	1,621,500.00	1,216,125.00	405,375.00
Naknek to King Salmon Non-motorized Pathway	6,182,500.00	4,676,000.00	1,206,500.00
Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	7,575,000.00	4,995,028.00	2,575,500.00
Healy to Antler Ridge Separated Path	4,300,000.00	3,111,710.00	388,290.00
Inner/Outer Springer Loop Separated Pathway	2,070,000.00	1,862,379.00	207,621.00
Seldon Road Separated Pathway	4,725,000.00	4,298,333.00	426,667.00
Healy Area and School Pedestrian Path	2,100,000.00	1,910,370.00	189,630.00
Knik River Wayside Gold Star Families Memorial	1,714,000.00	1,456,386.00	257,614.00
Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	1,345,000.00	1,223,547.00	121,453.00
Egan Drive/Valdez Sign Turnout	325,000.00	225,000.00	100,000.00
	31,958,000.00	**24,974,878.00**	**5,878,650.00**

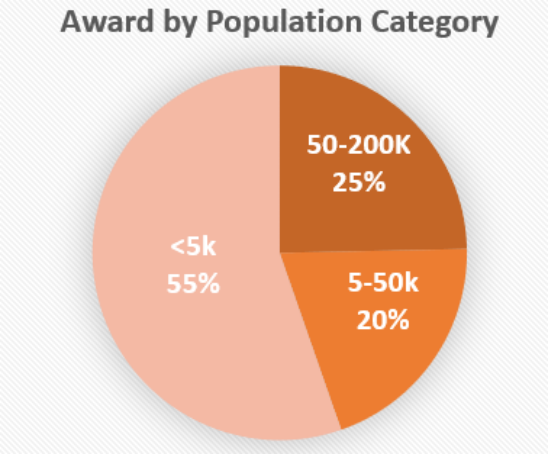
How did we program it?

Score Rank	Project Name	Population Category	<5K	5K-50K	50K-200K	FLEX	Federal Total
1	Portage Curve Multi-Modal and Trail of Blue Ice Connector	<5K	1,216,125.00				**1,216,125.00**
2	Naknek to King Salmon Non-motorized Pathway	<5K	4,676,000.00				**4,676,000.00**
3	Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	5-50K		2,404,099		2,590,928.93	**4,995,028.00**
4	Healy to Antler Ridge Separated Path	<5K	744,369.20			2,367,341	**3,111,710.00**
10	Inner/Outer Springer Loop Separated Pathway	50-200K			1,862,379		**1,862,379.00**
21	Seldon Road Separated Pathway	50-200K			1,277,136	3,021,197	**4,298,333.00**
5	Healy Area and School Pedestrian Path	<5K				1,910,370	**1,910,370.00**
6	Knik River Wayside Gold Star Families Memorial	<5K				1,456,386	**1,456,386.00**
12	Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	<5K				1,223,547	**1,223,547.00**
19	Egan Drive/Valdez Sign Turnout	<5K				225,000	**225,000.00**

	<5K	5k-49,999	50-199,999	FLEX	Totals
Funding Available:	6,636,494.20	2,404,099.07	3,139,515.46	12,819,891.26	25,000,000.00
Projects to Program:	6,636,494.20	2,404,099.07	3,139,515.46	12,794,769.27	24,974,878.00
Award Percentage of Total Program:	27%	10%	13%	51%	99.90%
Remaining Balance:	0.00	0.00	0.00	25,121.99	

Outcome

This method represents each of the population categories, with a stronger emphasis in the rural communities based on available funding. The 50-200K category would receive 25%, 5-50K would receive 20% and the <5k population would receive 55% of the available program funding. This method funds both of the 50-200K projects scored at the PEB.



STIP Planning

In reference to STIP planning, we propose the schedule below. This is an aggressive schedule for an Amendment to include the projects in the STIP, as well as getting project starts completed, but the priority is capturing any lapsing funds.

Project Name	FY24	FY25	FY26	FY27	FY28	FY29
Portage Curve Multi-Modal and Trail of Blue Ice Connector	250,000.00	-	1,371,500.00	-	-	-
Naknek to King Salmon Non-motorized Pathway	500,000.00	332,500.00	5,350,000.00	-	-	-
Palmer Fishhook Separated Pathway: Trunk Rd. to Edgerton Parks Rd.	461,000.00	506,000.00	1,348,000.00	-	-	5,260,000.00
Healy to Antler Ridge Separated Path	550,000.00	-	250,000.00	3,500,000.00	-	-
Inner/Outer Springer Loop Separated Pathway	400,000.00	300,000.00	-	1,370,000.00	-	-
Seldon Road Separated Pathway	420,000.00	175,000.00	500,000.00	-	3,630,000.00	-
Healy Area and School Pedestrian Path	300,000.00	-	150,000.00	1,650,000.00	-	-
Knik River Wayside Gold Star Families Memorial	318,000.00	-	1,396,000.00	-	-	-
Hartney Bay/Eyak Native Corporation Rec Site Improvement Project	410,000.00	-	320,000.00	615,000.00	-	-
Egan Drive/Valdez Sign Turnout	50,000.00	275,000.00	-	-	-	-
	3,659,000.00	**1,588,500.00**	**10,685,500.00**	**7,135,000.00**	**3,630,000.00**	**5,260,000.00**

POLICY DECISIONS NEEDED

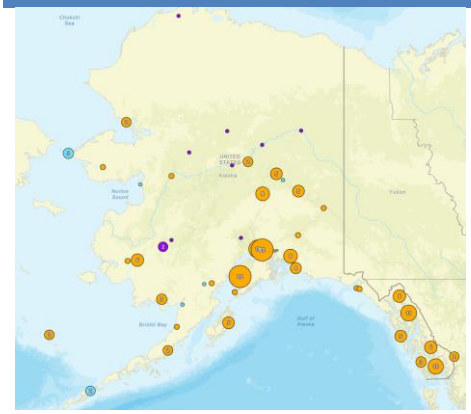
1. Cost Overruns:
    a. If a project exceeds their estimate by more than 10%.
        i. **Recommendation:** A memo must be submitted from the Project Manager, through the TAP Program Manager, to the Director of the Administrative Services Division. Allow cost runs up to 30% with appropriate STIP action and approvals. If cost overruns exceed 30%, find another funding source to cover the overrun either internal funds (STBG) or Discretionary Grants.

    b. If project exceeds $5M in federal share.
        i. **Recommendation:** Find another funding source to cover the overrun either internal funds (STBG) or Discretionary Grants.

2. Allocation of 50,000-199,999 TAP funds to MVP & FAST:
    a. FFY22 & FFY23: Funds have been allocated to FAST and have been awarded.
    b. Starting FFY24: Funds can no longer be allocated directly to MPO's without written approval from the Secretary of USDOT. Funds are currently integrated into award recommendations starting in FY24.
        i. If MVP & FAST are being allocated TAP funds, DOT&PF will need to recalculate the award recommendations.

ii. Alternatively, if their allocation remains in the Statewide program, STIP NID 33864 will need to be reallocated to the Statewide TAP program, NID 30689.

PUBLIC OUTREACH



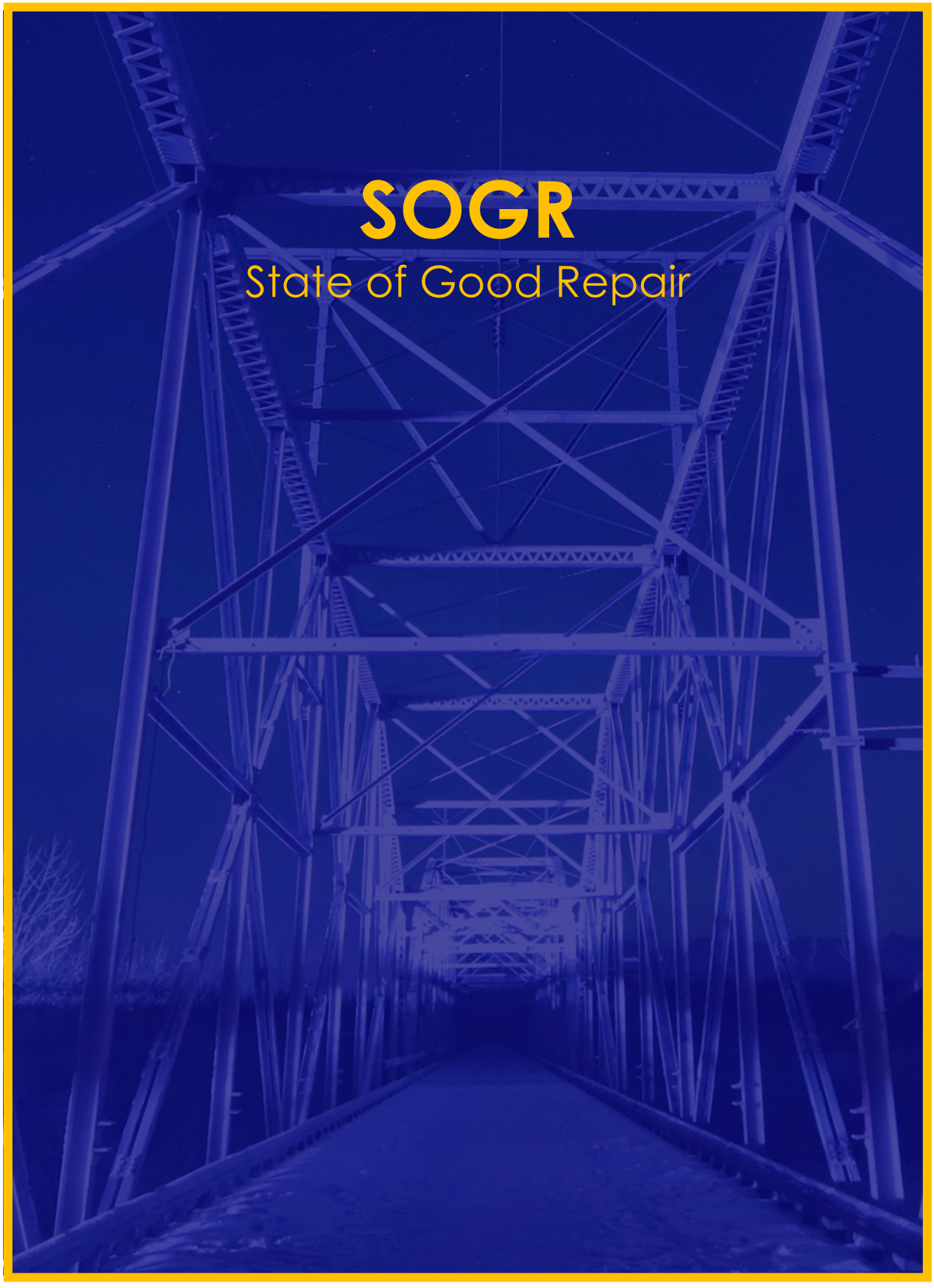
This program is well loved by communities across the State, and we would like to present the awards with enthusiasm. We have published the ranked projects on the TAP website by score to show how many projects were considered across the State.

We are currently working on a video with the PIO Communications team to describe the TAP program process and how we came to the resulting awards.

APPROVAL

Ryan Anderson, PE
Commissioner

Date



SOGR

State of Good Repair

2023

SOGR Call for Projects

Instructions & Guidance

ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

DIVISION OF PLANNING & PROGRAM DEVELOPMENT

2023 | Version 1.0

This document was created by the DOT&PF, Planning & Program Development, Strategic Investment Section

Questions or comments, contact:

Jill Melcher

jill.melcher@alaska.gov; PH 907-465-8592

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Overview

This document is intended for department staff nominating a State of Good Repair (SOGR) project for bridge and pavement on the National Highway System (NHS) or the Alaska Highway System (AHS). Criteria is broken out by two main categories: Bridge & Pavement. Gravel improvement projects are included as SOGR eligible and are part of the Pavement scoring criteria. Additionally, roadside hardware is also included. See eligibility tables

The project selection process was designed to be data driven, where projects with the highest score will be selected based on the amount of available funding. This process does not discriminate by Department Region, other geographic areas, political or organizational factors, or by sociodemographic factors.

The project selection formula for bridge projects is based on 7 criteria: Opportunity Cost; Service Life Extension per Dollar; Time in Poor; Mitigated at Risk Deck Area; Total Person Delay due to need to Detour (if at risk); Desk Area made more Resilient to Environmental Risks; and, Change in Functionally Obsolete Deck Area.

The project selection formula for pavement projects is based on 6 criteria: Opportunity Cost per Lane Mile; Change in Overall Level of Service per Dollar per Lane Mile (Remote & Non-Remote Projects); Time in Poor; Change in Vehicle Operating Cost; Time since Last Treatment; and, Regional Maintenance & Operations (M&O) Rating.

Gravel projects can compete with pavement projects. Within the Change in Overall LOS per Dollar per Lane Mile criteria we can calculate a remote road's pavement condition using data collection from video (PASER data). See Pavement Criteria for more information on this conversion.

Project selection is based on equal weights between proactive and reactive criteria. General criteria have been added to factor in other important aspects needed to objectively and comprehensively score projects. This method allows for a balance of improvement types, i.e., preservation, rehabilitation, reconstruction and replacement projects.

Combined Projects

Combined projects shall be submitted individually. Please use one row for each in the call for projects spreadsheet using the same Need ID#. Combined projects are calculated using a rank ordered weighted methodology. See the last page of this document.

Available Funding

Category	Total	Project Type	Amount
National Highway System	$242,000,000	Bridge	$63,000,000
		Pavement	$117,000,000
Alaska Highway System	$35,000,000	Bridge	$12,300,000
		Pavement	$22,800,000

The TAMP recommends an investment mix of 75% pavement and 25% bridge. Current estimates from the Chief Engineer and Bridge section place the pavement as 'over-funded' and bridge as 'under-funded' in the 12-year program. Bridge engineering recommended a 65/35 split to 'course-correct' with flexibility to review projects as they are submitted as adjust as necessary.

SOGR Call for Projects Schedule

		Begin	Due
1	**Call for Projects Begin** – Planning Chiefs or designee populate AHS and NHS pavement and bridge projects into the project scoring template. See CFP Checklist for Planning Chiefs.	Mar 31	May 15
2	**Quality Control** - Pavement, Bridge and the Data Analytics teams perform quality control procedures such as: a. Check project input data for accuracy b. Check project eligibility c. Check criteria scoring calculations for accuracy d. Check the scope or work and project location against the TAMP e. Check against the STIP to ensure it is not already programmed	May 16	May 19
3	**Approval to move forward**- Strategic Investment Section Chief & Program Development Chief review and approve	May 22	May 23
4	**Director Approval**	May 24	May 26
5	**CPRT Meeting for Final Review** – to confirm selected projects	TBD	

Eligibility

Pavement and gravel projects being nominated shall be run through the TAMP team to ensure it meets the first level of eligibility. Roadside infrastructure improvements may be included as part of a bridge or pavement project. See examples of roadside infrastructure below.

Bridge Projects

Project Type	Description
Removes the bridge's fair or poor status	Projects improve the NBI rating of the inspection component (i.e., deck, superstructure, substructure or culvert) from 6 or below to a 7 or higher.
Bridge Rehabilitation or Replacement	Rehabilitation involves major work required to restore the structural integrity of a bridge, as well as work necessary to correct major safety defects. Total replacement of an existing bridge with a new facility constructed in the same general traffic corridor. Longer and wider bridges are allowable to meet traffic and hydraulic requirements within the design life of the structure. See FHWA Bridge Preservation Guide, August 2018.
Adds or restores strength, improves hydraulic adequacy, or both	Examples of strength restoration include patching, repair or replacement of deck, superstructure or substructure elements. Hydraulic adequacy reduces the risk of overtopping.

Pavement Projects

Project Type	Description
Major Rehabilitation	Replacement of the pavement layer (>2"). Can include replacement or stabilization of the base material.
Minor Rehabilitation	Standard 1R project Scope (≤ 2" pavement)
Preventative Maintenance	Sand seal, chip seal, or other surface treatment
Reconstruction*	Replacement of the entire pavement and underlying structural section
Culvert & Drainage	Improvement of culvert and drainage systems as needed. Some projects may include slope alterations given it has environmental clearance.
Roadside hardware	Must be paired with pavement or bridge project.

*Does not include geometric alterations or additional capacity, including turn or passing lanes

Gravel

Project Type	Description
Resurfacing*	Any resurfacing work required to return the gravel road to a state of good repair.

*Gravel to pavement projects are not eligible.

Roadside Infrastructure Elements

**must be combined with eligible pavement or bridge project*

Project Type
Drainage and culverts
Guardrails, including cable-median barriers, fencing that protect people and infrastructure
Traffic signals, lighting, and ITS that enhance safety and provide information
Overhead signs and other structures, such as noise walls, retaining walls and concrete barriers
Signage, including traffic and directional signs

Project Submission Instructions

Project submission templates are attached to the email announcement and will also be placed on the Department intranet, under Program Development, Strategic Investment Section.

Instructions on how to submit a project:

- Access the Bridge or Pavement project list spreadsheet
- Select the appropriate tab for NHS or AHS projects.
- Fill out all visible columns. Use down arrows to select options where appropriate. You do not need to fill in pavement or bridge condition data as that will be automated based on the location information.
- Regional M&O Rating- Please work with your Regional M&O Manager to rank projects from highest (starting with 1) to lowest.
- Combined projects- Use one row per project using the same Need ID#
- Obtain location data from ATLAS MAP 49. Use Milepoint, not Milepost. Decimal to the tenths is acceptable.
- Do not worry about entering condition data. That will be populated in the scoring template.
- Save the template with the same title and append Region, Ex. SOGR Pavement Project List_Northern.xlsx.

Project scoring is kept in a separate template and will be disseminated once all projects have been added to your sheets.

Questions? Email Jill Melcher and Matt Murphy.

Bridge Criteria Weights

Group	Group Weight	Criteria	Criteria Weight
Proactive	40	Opportunity Cost	20%
		Service Life Extension	20%
Reactive	40	Time in Poor	13.3%
		Mitigated At [Structural] Risk Deck Area	13.3%
		Total Person Delay due to need to Detour [if at risk]	13.3%
General	20	Deck Area made more Resilient to Environmental Risks	10%
		Change in Functionally Obsolete Deck Area	10%
		TOTAL	**100%**

Pavement & Gravel Criteria Weights

Group	Group Weight	Criteria	Criteria Weight
Proactive	40	Opportunity Cost	15%
		Change in Overall LOS per Dollar per Lane Mile	25%
Reactive	40	Time in Poor	25%
		Change in Vehicle Operating Cost	15%
General	20	Time Since Last Treatment	10%
		Regional M&O Rating	10%
		TOTAL	**100%**

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Bridge Criteria

Opportunity Cost

Project Data
- Structure Number
- Lowest Rating
- NHS Designation

2022 NBI Data
- Structure Number (Field 8)
- Structure Type (Field 43A)

Tabularly join **NBI data** to **projects** using the structure number.

Find the **structure type** of each bridge via the tabular join:
- 2, 5, or 6 = Concrete
- 3, 4, or 9 = Steel
- 7 = Timber

Calculate the opportunity cost based on **NHS designation**, **structure type**, and the **lowest rating** (of deck, superstructure, substructure, and culvert ratings) using the following matrix from the 2019 DOT&PF TAMP (Table F.6)

NHS	Type	Excellent	Good	Fair	Poor
NHS	Concrete	$ -	$ 75	$ 500	$ 700
NHS	Steel	$ -	$ 125	$ 700	$ 975
NHS	Timber	$ -	$ 30	$ 300	$ 200
Non-NHS	Concrete	$ -	$ 75	$ 500	$ 700
Non-NHS	Steel	$ -	$ 125	$ 700	$ 975
Non-NHS	Timber	$ -	$ 30	$ 300	$ 200

- *Opportunity cost is found by subtracting the current condition cost (i.e. Good) from the cost if the bridge falls to the next condition level (i.e. Fair)*

Project	NHS	Lowest Rating	Structure Type	Opportunity Cost
1	NHS	5	Concrete	($700-$500) = $200
2	Non-NHS	7	Steel	($700-$125) = $675

Service Life Extension per Dollar

Project Data
- Primary Work
- Project Cost
- Lowest Rating

Calculate the service life extension based on the starting condition (based on the **lowest rating**), the **primary work**, and the assumptions in the chart below.

Assume any replacement project moves the bridge to excellent condition and assume a rehabilitation on a fair or poor bridge moves a bridge to good condition. Rehabs on good bridges move to excellent. Use the midpoints of the bar charts for the # of years.

Starting Condition	Project Type	Life Extension
Good	Replace or Reconstruct	17
Fair	Replace or Reconstruct	42
Poor	Replace or Reconstruct	68
Good	Rehabilitation	17
Fair	Rehabilitation	25
Poor	Rehabilitation	51

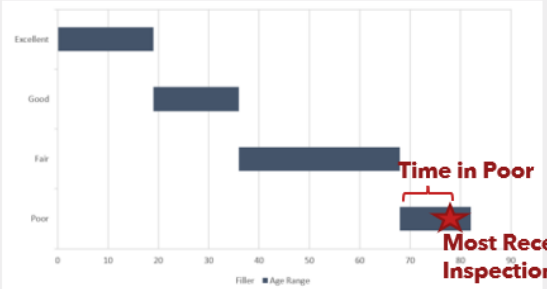
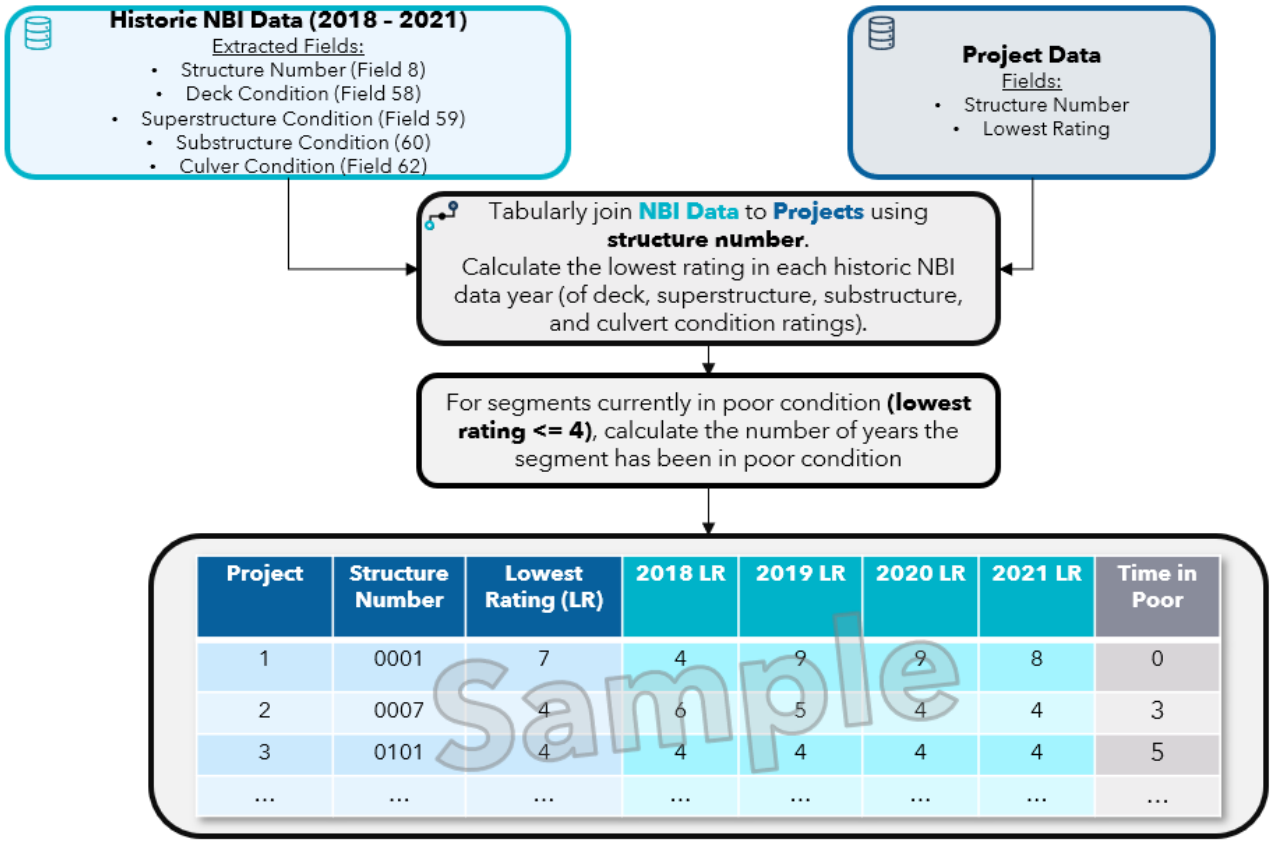


Figure F.5.
NHS Concrete Bridges Deterioration Rates

Divide the **service life extension** by the **project cost** to arrive at the service life extension per dollar.

Project	Primary Work	Cost	Lowest Rating	Service Life Extension	Service Life Extension per $
1	Replace	$6 M	3	68 years	0.000011
2	Rehab	$1.5 M	5	25 years	0.000016

Time in Poor



Project	Structure Number	Lowest Rating (LR)	2018 LR	2019 LR	2020 LR	2021 LR	Time in Poor
1	0001	7	4	9	9	8	0
2	0007	4	6	5	4	4	3
3	0101	4	4	4	4	4	5
…	…	…	…	…	…	…	…

Mitigated At [Structural] Risk Deck Area

2022 NBI Data
Extracted Fields:
- Structure Number (Field 8)
- Structure Open, Closed, or Posted (Field 41)
- Deck Area

Project Data
Fields:
- Structure Number
- Lowest Rating

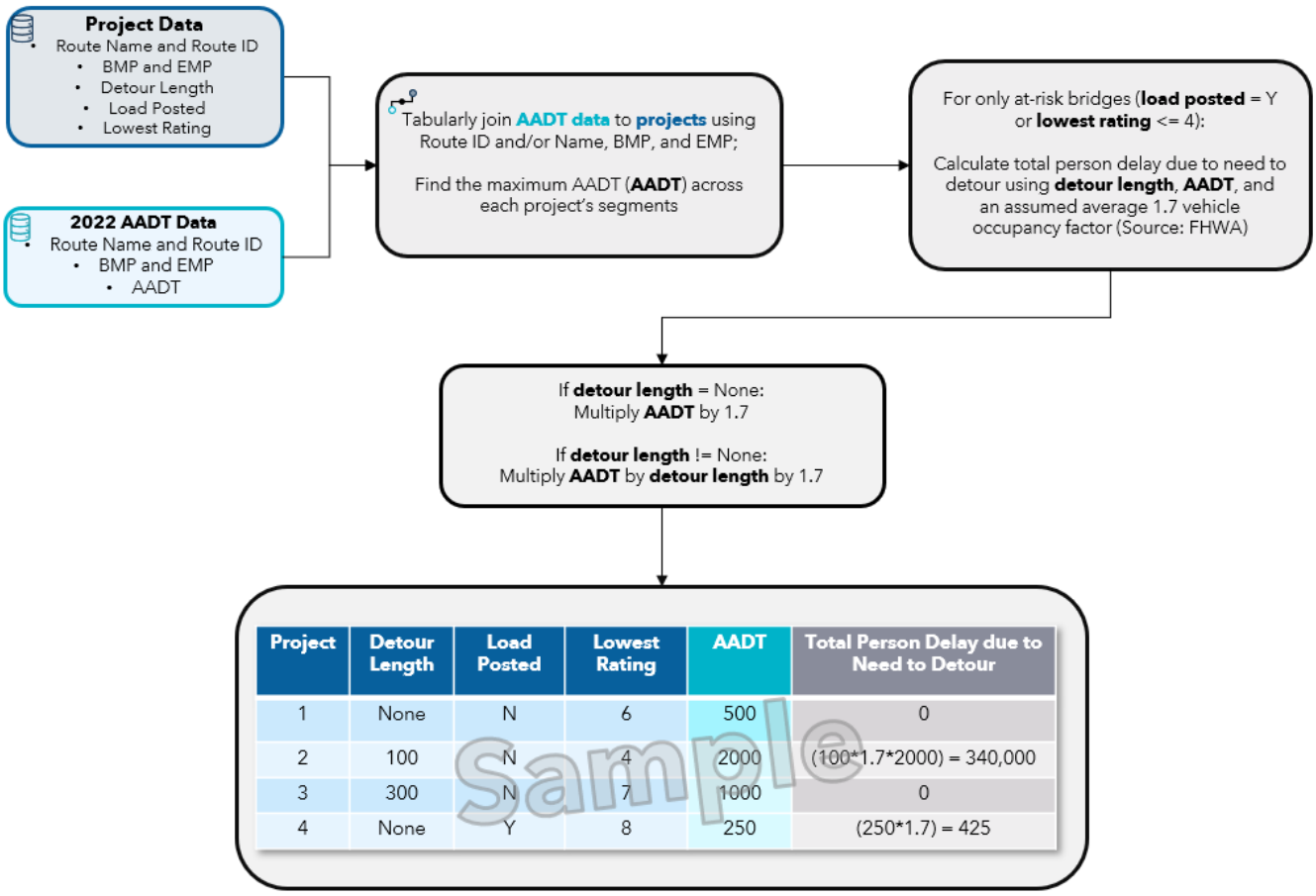
Tabularly join **NBI Data** to **Projects** using the **structure number**.

Determine if the bridge is load posted using the **structure open/closed/posted** field. (P = Posted).
Determine if the bridge is structurally deficient using the **lowest rating** of deck, superstructure, substructure, and culvert ratings. (<= 4 = Yes)

Only score projects on this criteria that are either load posted OR structurally deficient.

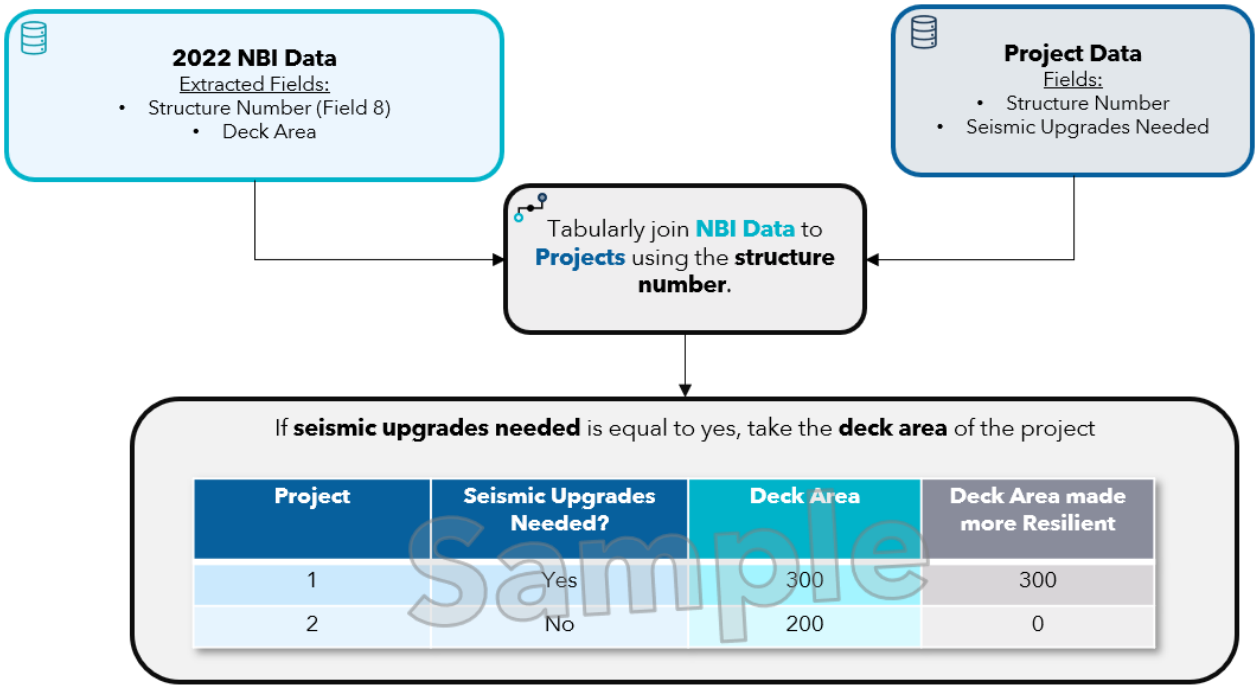
Project	Lowest Rating	Structure, Open, Closed, Posted	Deck Area	Load Posted?	Structurally Deficient?	Mitigated at Risk Deck Area
1	7	A	300	No	No	0
2	6	P	200	Yes	No	200

Total Person Delay due to need to Detour [if at risk]



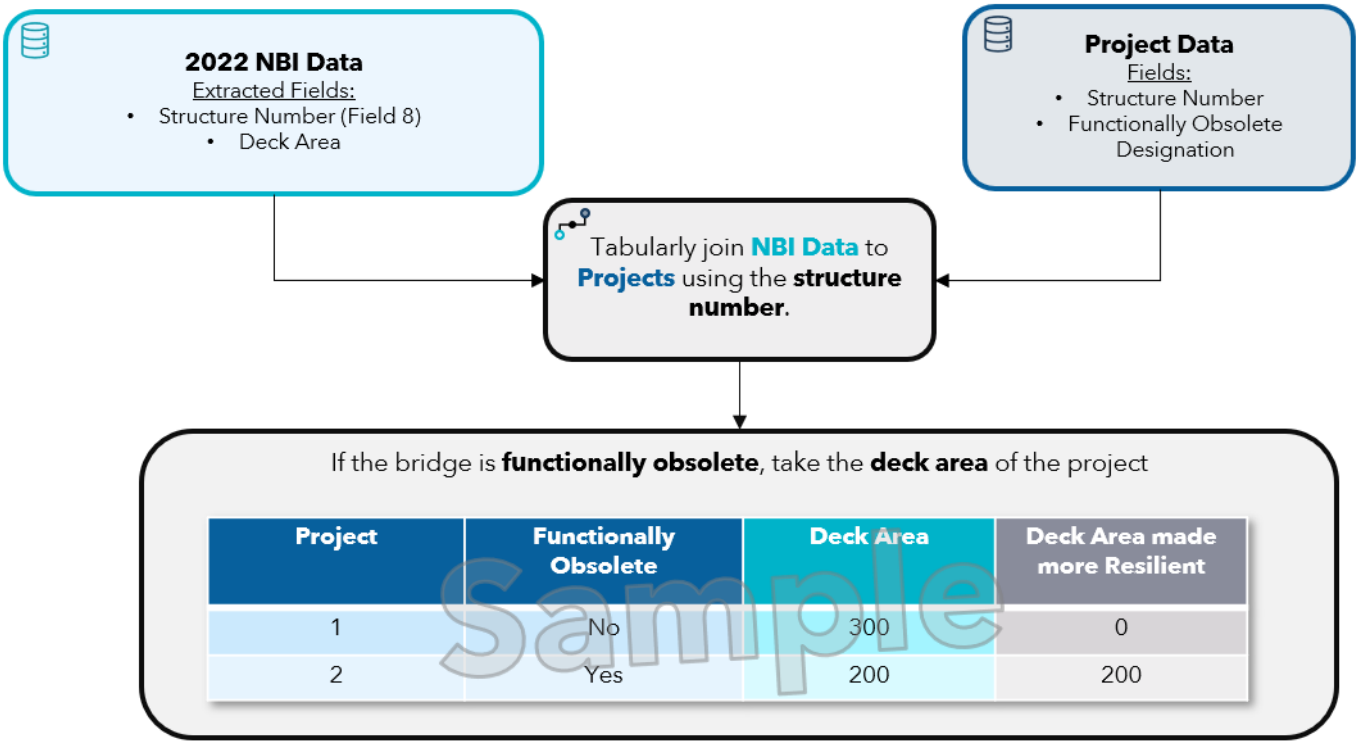
Project	Detour Length	Load Posted	Lowest Rating	AADT	Total Person Delay due to Need to Detour
1	None	N	6	500	0
2	100	N	4	2000	(100*1.7*2000) = 340,000
3	300	N	7	1000	0
4	None	Y	8	250	(250*1.7) = 425

Deck Area made more Resilient to Environmental Risks



Project	Seismic Upgrades Needed?	Deck Area	Deck Area made more Resilient
1	Yes	300	300
2	No	200	0

Change in Functionally Obsolete Deck Area



Project	Functionally Obsolete	Deck Area	Deck Area made more Resilient
1	No	300	0
2	Yes	200	200

Score Normalization & Weighting

Project Criteria Raw Values

- Opportunity Cost
- Service Life Extension per Dollar
- Time in Poor
- Mitigated at Structural Risk Deck Area
- Total Person Delay due to Need to Detour
- Deck Area made more Resilient to Environmental Risks
- Change in Functionally Obsolete Deck Area

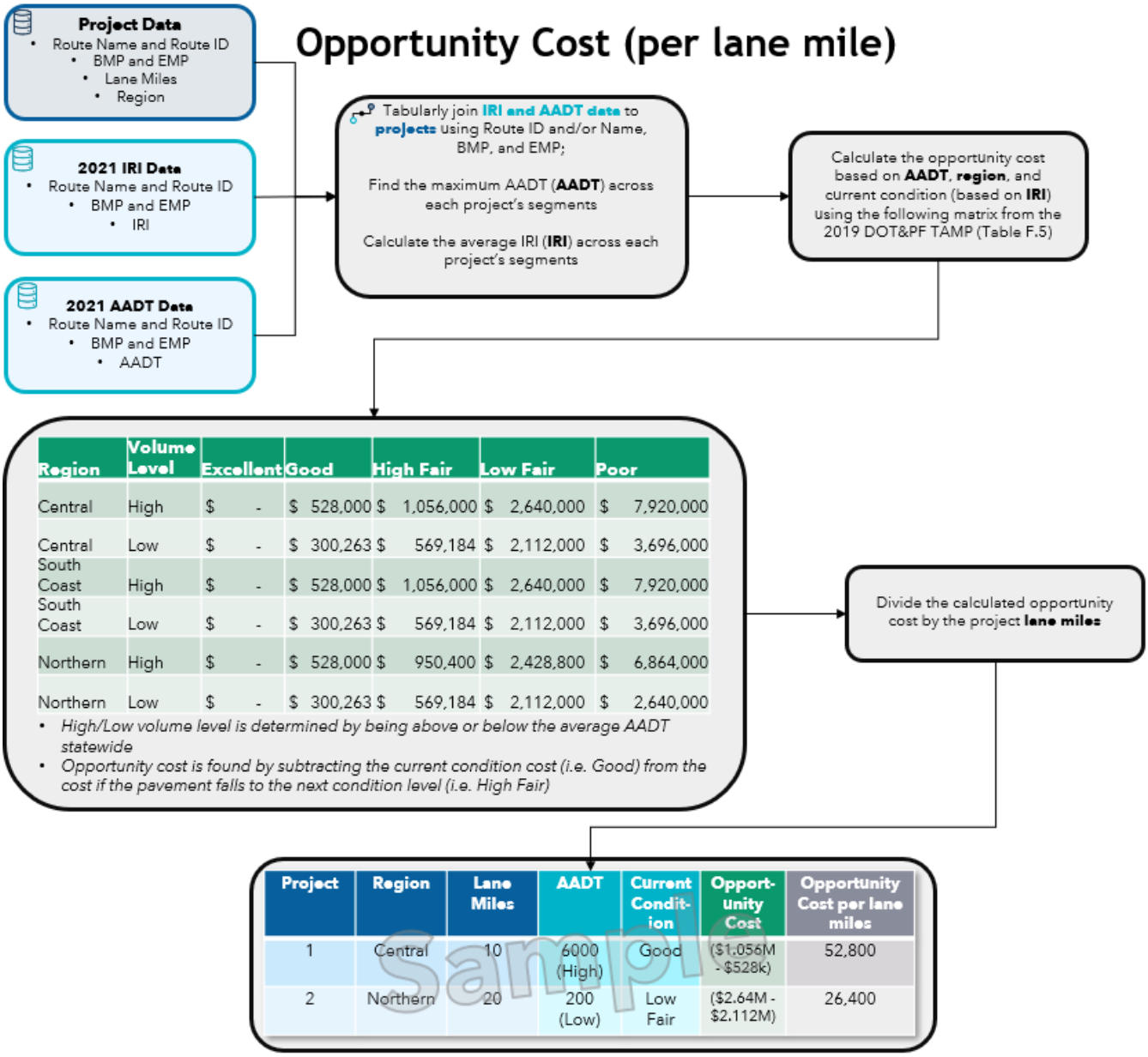
Convert **raw values** into a 0-10 criteria score based on the percentile of the raw value compared to the other raw values.

Ex: A raw value in the 90th percentile receives a 9, a raw value in the 80th percentile receives an 8, etc. Raw values of 0 receive a 0

Find the weighted sum of the criteria scores using the weights below. For project sets that do not include any combined projects (multiple projects with the same **Need ID**), rank projects based on their weighted sum. For project sets with combined projects, see the next page.

Group	Group Weight	Criteria	Criteria Weight
Proactive	40%	Opportunity Cost	20%
		Service Life Extension per Dollar	20%
Reactive	40%	Time in poor	13%
		Mitigated at Structural Risk Deck Area	13%
		Total Person Delay due to need to Detour	13%
General	20%	Change in Functionally Obsolete Deck Area	10%
		Deck Area made more Resilient to Environmental Risks	10%

Pavement Criteria



Region	Volume Level	Excellent	Good	High Fair	Low Fair	Poor
Central	High	$ -	$ 528,000	$ 1,056,000	$ 2,640,000	$ 7,920,000
Central	Low	$ -	$ 300,263	$ 569,184	$ 2,112,000	$ 3,696,000
South Coast	High	$ -	$ 528,000	$ 1,056,000	$ 2,640,000	$ 7,920,000
South Coast	Low	$ -	$ 300,263	$ 569,184	$ 2,112,000	$ 3,696,000
Northern	High	$ -	$ 528,000	$ 950,400	$ 2,428,800	$ 6,864,000
Northern	Low	$ -	$ 300,263	$ 569,184	$ 2,112,000	$ 2,640,000

- *High/Low volume level is determined by being above or below the average AADT statewide*
- *Opportunity cost is found by subtracting the current condition cost (i.e. Good) from the cost if the pavement falls to the next condition level (i.e. High Fair)*

Change in Overall LOS per Dollar per Lane Mile: Remote Projects

Project Data
- Total Cost
- Lane Miles
- Gravel Roadway

PASER Data
- ROUTE_NAME and ROUTE_ID
- FROM_MPT
- TO_MPT
- SCORE
- SURFACERATING
- GRAVELLAYER
- DRAINAGE
- LOOSEAGGREGATE
- WASHBOARDING
- POTEHOLES
- CROWN
- RUTS

Blading Data (2020 - 2022)
- Route Name and Route ID
- BMP and EMP
- Number of Bladings in 3-year period **(CountOfDWR)**

Tabularly join **PASER data** to **projects** using Route ID and/or Name, BMP, and EMP;

Is the project on a gravel roadway?

Yes

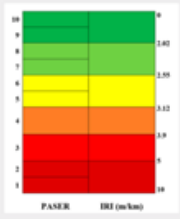
Tabularly join **blading data** to **projects** using Route ID and/or Name, BMP, and EMP;

From the **blading data**, find the maximum number of bladings in a single year (**CountOfDWR/3**) across each project's segments

Take the **surface rating** (1 - Excellent, 2 - Good, 3 - Fair, 4 - Poor) and apply PCI-like deduct values based on:
- **Roughness** (0 - Poor or Invalid, 1 - Fair, 2 - Good)
- **Rutting** (0 - Poor or Invalid, 1 - Fair, 2 - Good)
- **Crown** (0 - Poor or <blank>, 2 - Flat, 3 - Excellent)
- **Potholes** (0 - Low or <blank>, 1 - Moderate, 2 - Severe)
- **Wash boarding** (0 - Low or <blank>, 1 - Moderate, 2 - Severe)
- **Loose Aggregate** (0 - Bad or <blank>, 2 - Good)
- **Drainage** (0 - Poor or <blank>, 3 - Excellent or Good)
- **Gravel Layer** (0 - Poor or <blank>, 3 - Excellent or Good)

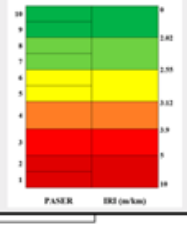
Surface Rating	Roughness	Rutting	Crown	Potholes	Wash boarding	Loose Aggregate	Drainage	Gravel Layer	Deduct Points	Final Value
Fair (3)	Poor (0)	Fair (1)	Flat (2)	Blank (0)	Blank (0)	Good (2)	Poor (0)	Good (3)	8 out of 19	3 - (8/19) = 2.58
Fair (3)	Poor (0)	Fair (1)	Poor (0)	Low (0)	Blank (0)	Bad (0)	Poor (0)	Poor (0)	1 out of 19	3 - (1/19) = 2.95

Convert this final value to IRI using the crosswalk below. The crosswalk is represented by this polynomial equation:
$y = -0.0523x^3 + 0.9697x^2 - 5.9466x + 14.455$.
Then convert from m/km to in/miles.



No

Convert the asphalt **score** (1-10) to a IRI using the crosswalk below. The crosswalk is represented by this polynomial equation:
$y = -0.0523x^3 + 0.9697x^2 - 5.9466x + 14.455$.
Then convert from m/km to in/miles.



Convert the **IRI** to a 0-100 scale

$y_{IRI} = -0.45x + 127.27$

0 - 100 Value	IRI
0	280
10	258
20	236
30	214
40	192
50	170
60	148
70	126
80	104
90	82
100	60

Subtract this value from 100 to find the **LOS delta**.

Convert this to a per dollar per lane mile basis by dividing the **LOS delta** by the total **project cost** and then by the **lane milage**

Project	Gravel Roadway	Asphalt Score	IRI (m/km)	Converted IRI (Asphalt)	Deduct-based Final Value	IRI (m/km)	Converted IRI (Gravel)	LOS	LOS Delta	Bladings per Year	Cost	Lane Miles	LOS per $
1	Y	-	-	-	2.58	4.67	295	0	100	2	$1M	10	0.00001
2	N	7	2.285	145	-	-	-	62	28	NA	$500k	2	0.000028
...	...	...	...	...	...	...	...	...	...	...	...	...	...

* Note that for gravel roadways both the calculated LOS per $ per lane mile and the calculated bladings per year will be used in the scoring normalization

Change in Overall LOS per Dollar per Lane Mile: Non-Remote Projects

Project Data
- Total Cost
- Lane Miles
- Gravel Roadway

2022 IRI, Rutting, Cracking Data
- Route Name2 and Route ID
- BMP and EMP
- IRI AVG
- Rut AVG
- Cracking (%)

Tabularly join **pavement data** to **projects** using Route ID and/or Name, BMP, and EMP;

Calculate the average IRI (**IRI AVG**), rutting (**Rut AVG**), and cracking percentage (**Cracking (%)**) across each project's segments

Convert the **IRI**, **rutting**, and **cracking** values to a 0-100 scale

$y_{IRI} = -0.45x + 127.27$

$y_{Rutting} = -125x + 100.00$

$y_{Cracking} = 2.55x + 100.62$

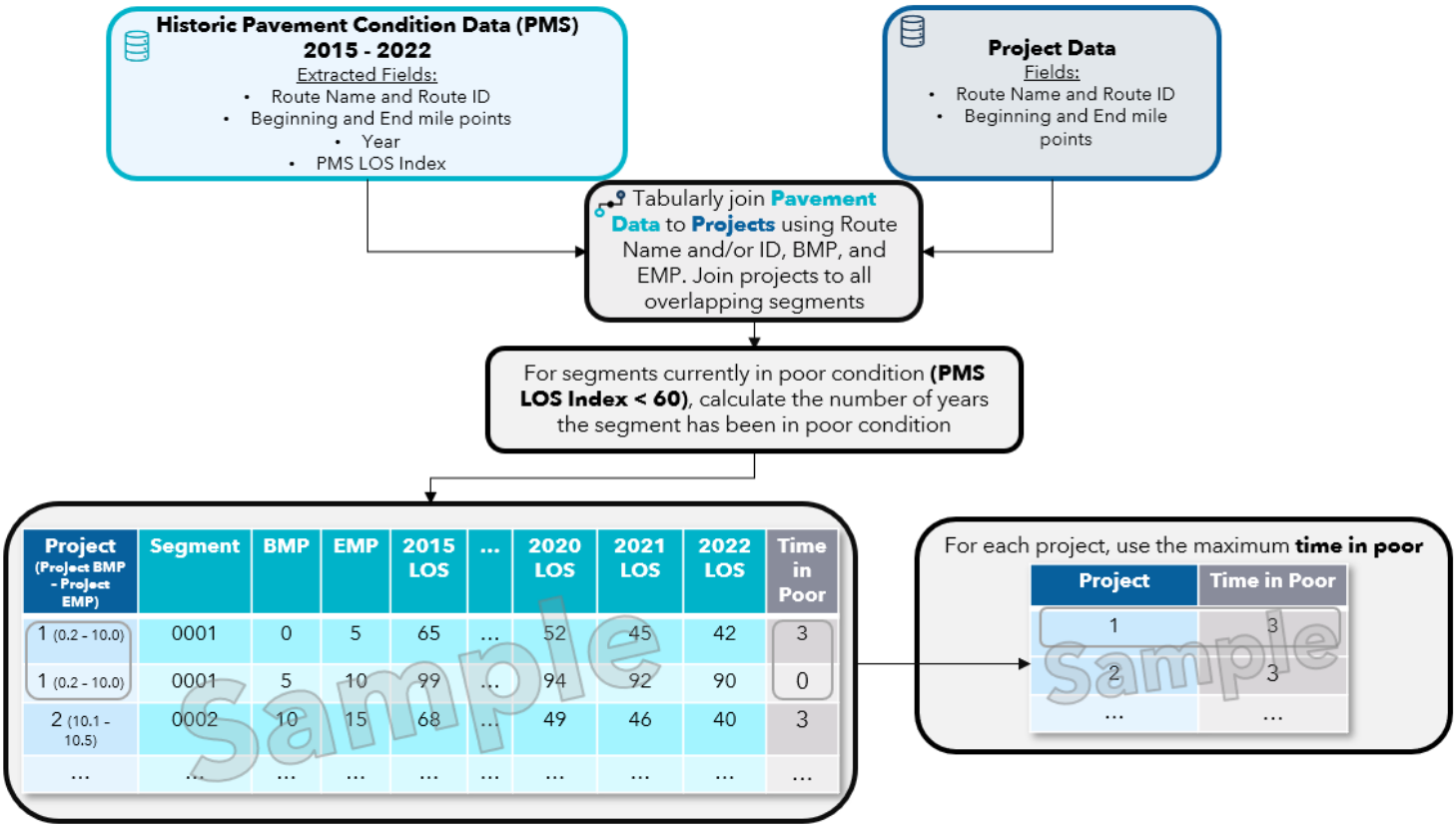
0 - 100 Value	IRI	Rutting	Cracking
0	280	0.8	38
10	258	0.72	36
20	236	0.64	32
30	214	0.56	28
40	192	0.48	24
50	170	0.4	20
60	148	0.32	16
70	126	0.24	12
80	104	0.16	8
90	82	0.08	4
100	60	0	0

Find the **LOS** value by averaging the IRI, rutting, and cracking 0 - 100 values. Subtract this value from 100 to find the **LOS delta**.

Convert this to a per dollar per lane mile basis by dividing the **LOS delta** by the total **project cost** and then by the **lane milage**

Project	Gravel Roadway	IRI (0 - 100 value)	Rutting (0 - 100 value)	Cracking % (0 - 100 value)	LOS Delta	Cost	Lane Miles	LOS per $
1	Y	60 (100)	0.24 (70)	8% (80)	16.7	$1M	10	0.00000167
2	N	170 (50)	0.72 (10)	28% (30)	70	$500k	2	0.00007
…	…	…	…	…	…	…	…	…

Time in Poor


Historic Pavement Condition Data (PMS) 2015 - 2022
Extracted Fields:
• Route Name and Route ID
• Beginning and End mile points
• Year
• PMS LOS Index
Project Data
Fields:
• Route Name and Route ID
• Beginning and End mile points
Tabularly join Pavement Data to Projects using Route Name and/or ID, BMP, and EMP. Join projects to all overlapping segments
For segments currently in poor condition (PMS LOS Index < 60), calculate the number of years the segment has been in poor condition
Project (Project BMP - Project EMP)
Segment
BMP
EMP
2015 LOS
...
2020 LOS
2021 LOS
2022 LOS
Time in Poor
1 (0.2 - 10.0)
0001
0
5
65
...
52
45
42
3
1 (0.2 - 10.0)
0001
5
10
99
...
94
92
90
0
2 (10.1 - 10.5)
0002
10
15
68
...
49
46
40
3
Sample
For each project, use the maximum time in poor
Project
Time in Poor
1
3
2
3
Sample

Change in Vehicle Operating Costs

Project Data
- Route Name and Route ID
- BMP and EMP

2021 IRI Data
- Route Name and Route ID
- BMP and EMP
- IRI

2021 AADT Data
- Route Name and Route ID
- BMP and EMP
- AADT
- Total_Truck

Tabularly join **IRI and AADT data** to **projects** using Route ID and/or Name, BMP, and EMP;

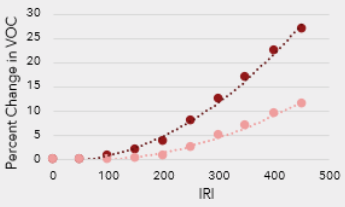
Find the maximum AADT (**AADT**), maximum percent of trucks (**Total_Truck**) across each project's segments

Calculate the truck AADT by multiplying the maximum **AADT** by the maximum **Total_Truck**

Calculate the average IRI (**IRI**) across each project's segments

The table below shows the **VOC constant values** for trucks and cars across different IRI values.
The chart below shows the equations relating IRI and percent change in VOC for trucks and cars.

IRI	VOC trucks	VOC cars
0	$1.290	$0.143
50	$1.290	$0.143
100	$1.303	$0.143
150	$1.316	$0.144
200	$1.342	$0.144
250	$1.393	$0.147
300	$1.451	$0.150
350	$1.509	$0.153
400	$1.580	$0.157
450	$1.638	$0.159



$y_{trucks} = 0.0001x^2 - 0.0039x - 0.2409$

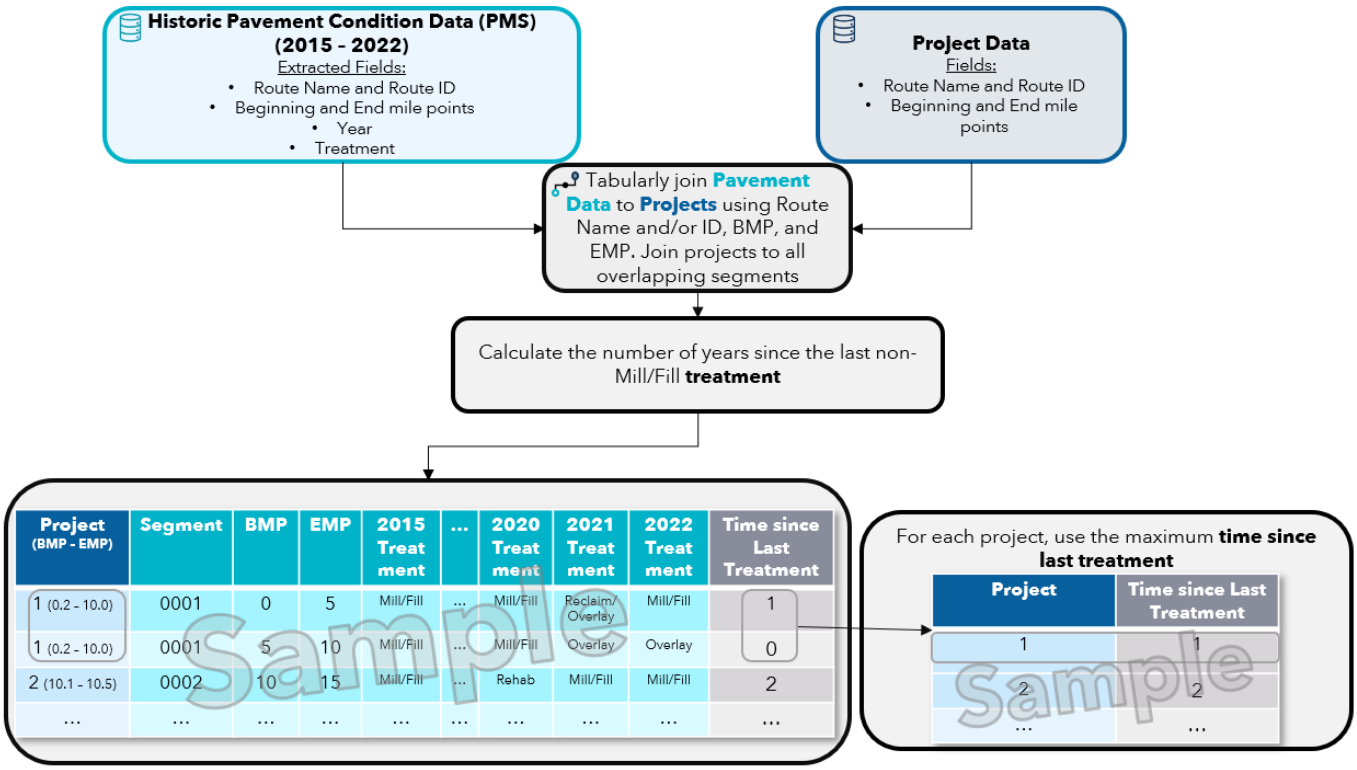
$y_{cars} = 0.0001x^2 - 0.0078x - 0.0045$

Calculate the **% change in VOC for trucks** and the **% change in VOC for cars** using the equations relating IRI and percent change in VOC.

Multiply this **% change in VOC cars** by the **VOC cars constant** and the **non-truck AADT**. Repeat for the **% change in VOC trucks**, the **VOC trucks constant** and **truck AADT**. Sum to find the total change in VOC.

Project	AADT	% trucks	Truck AADT	IRI	VOC Truck Constant	VOC Truck Change	VOC Car Constant	VOC Car Change	Change in VOC
1	6000	5%	300	200	1.342	1,199	0.144	1,999	3,198
2	2000	10%	200	400	1.580	4,487	0.157	3,639	8,126

Time Since Last Treatment



Regional M&O Rating

Project Data
- Regional M&O Score

Utilizes given **regional M&O score** of:
- >25th
- >25th+R
- >50th
- 50th+R
- >75th
- >75th+R
- >90th
- >90th+R

Score Normalization & Weighting

Project Criteria Raw Values
- Opportunity Cost
- Change in LOS per dollar
- Time in Poor
- Change in Vehicle Operating Costs
- Time since Last Treatment
- Regional M&O Rating

Convert **raw values** into a 0-10 criteria score based on the percentile of the raw value compared to the other raw values.*

Ex: A raw value in the 90th percentile receives a 9, a raw value in the 80th percentile receives an 8, etc. Raw values of 0 receive a 0

Find the weighted sum of the criteria scores using the weights below. For project sets that do not include any combined projects (multiple projects with the same **Need ID**), rank projects based on their weighted sum. For project sets with combined projects, see the next page.

Group	Group Weight	Criteria	Criteria Weight
Proactive	40%	Opportunity cost (per lane mile)	15%
		Change in overall LOS per unit cost dollar per lane mile	25%
Reactive	40%	Time in poor (avg. LOS < 60)	25%
		Change in vehicle operating costs	15%
General	20%	Time since last treatment (overlay+)	10%
		Regional M&O rating	10%

* For gravel roadways, calculate both Change in Overall LOS 0-10 scores: the blading-based score and the LOS-based score. Average these scores together to arrive at the final Change in overall LOS score.

Score Normalization & Weighting - Combined Projects

For combined projects, ensure that the multiple projects all have the same **Need ID**. Final project scores for combined projects are calculated using a rank order weighting methodology. Rank order weighting gives more weight to higher scoring projects within a combined project. If a low scoring project is paired with a very high scoring project, the combined project score will lean more towards the high project score.

To determine the weight of each project within a combined project, the following formula is used where **n = the number of projects within the combined project** and **r_j is the rank of the individual project within the combined project**. For example, the highest scoring project of a combined project will have a r_j value of 1, the second highest scoring project of a combined project will have a r_j value of 2, etc.

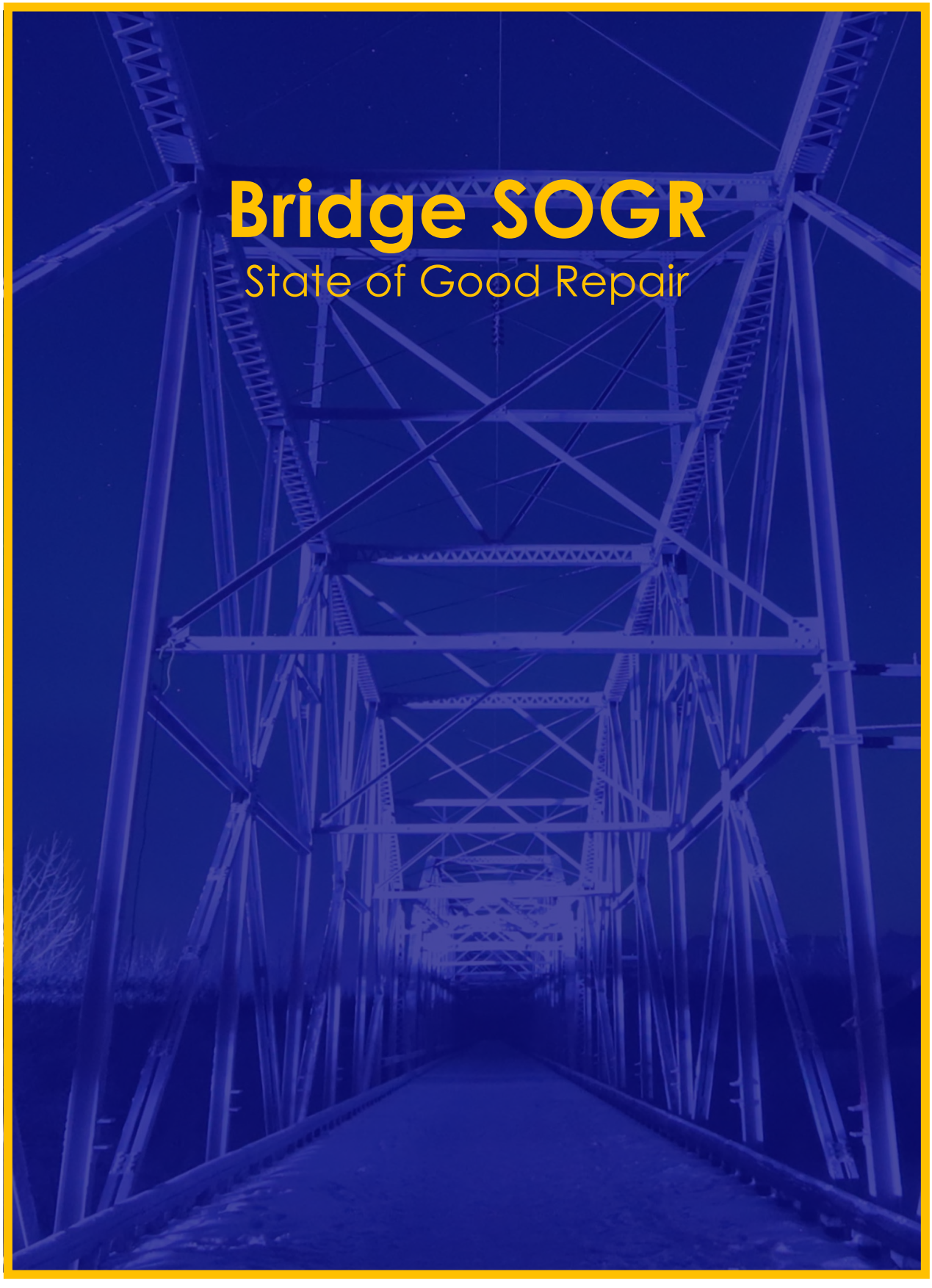
$$w_j(RS) = \frac{n - r_j + 1}{\sum_{k=1}^{n} n - r_k + 1} = \frac{2(n + 1 - r_j)}{n(n+1)} \qquad (6)$$

where r_j is the rank of the $j-$th criterion, $j = 1,2,...,n$.

Source: https://pdfs.semanticscholar.org/f983/e8c4eb7d7c30694dd72c5849dd6fee8a5c79.pdf pg. 20

To get to the final combined project score, a weighted sum is calculated between the **individual project weight**, calculated above, and the **individual project score** (the weighted sum from the previous page).

Need ID	Project	Individual Project Score	Rank within Combined Project	Project Weight	Overall Project Score
101	1	5.0	1	66.67%	4.0
101	2	2.0	2	33.33%	4.0



Bridge SOGR

State of Good Repair

ALL REGIONS POOR CONDITION PRIORITIZATION ---- BASED ON 2023 INSPECTION OF 12/29/2023

Rank	Bridge No.	Bridge Name	Route	Region	Owner	Classification	Posting	Yr Built	Deck Area (SF)	Condition Ratings			Project Status
										Deck	Super.	Substr.	
1	4060	Hardage Creek	Parks Highway	Northern	State	NHS	--	1971	1,046	N	N	3	Design (SD 2022)
2	463	Takotna River	Sterling L/Ophir	Central	State	Off System	Load Posted	1941	3,596	6	3	2	Construction 2024 (On-Hold)
3	666	South Fork Anchor River	Sterling Highway	Central	State	NHS	--	1959	2,691	6	5	4	Design/Replace On Hold
4	2128	Willow Creek	Grubstake-Hatchers	Central	State	Off System	Closed	1945	800	5	2	3	Design/M&O/Bridge Closed
5	805	Skagway Ferry Terminal	Marine Hwy Route	Southcoast	City	NHS	--	1980	2,983	5	5	4	Design (SCMD)
6	216	Nenana River At Rex	Parks Highway	Northern	State	NHS	--	1963	17,898	7	4	6	Planning/Design (SD 2022)
7	797	Water St Viaduct	South Tongass Hwy	Southcoast	State	NHS	--	1955	86,316	7	5	4	Design
8	978	Funny River	Funny River Road	Central	State	Off System	--	1969	1,344	6	4	4	No Project (SD 2023)
9	583	Castner Creek	Richardson Highway	Northern	State	NHS	--	1958	3,963	4	6	4	Design/PEL
10	634	Twenty Mile River	Seward Highway	Central	State	NHS	--	1967	19,366	4	5	5	Construction 23/24
11	578	Gunn Creek	Richardson Highway	Northern	State	NHS	--	1954	2,055	6	6	4	Planning/Replace
12	520	Gerstle River	Alaska Highway	Northern	State	NHS	--	1944	48,951	5	5	4	Design (SD 2022)
13	1336	Hammond River	Dalton Highway	Northern	State	NHS	--	1972	4,186	6	6	4	Design/FLAP Grant
14	544	Kings River	Glenn Highway	Central	State	NHS	--	1961	8,008	4	5	6	Construction/Replace 24/25
15	844	Heney Creek	Point Whitshed Rd	Northern	State	Off System	Load Posted	1936	1,233	5	4	4	Design/New Project
16	747	Ward Creek	North Tongass Hwy	Southcoast	State	Non-NHS	--	1975	6,969	7	6	4	Design/Replace 2025
17	574	Gulkana River	Richardson Highway	Northern	State	NHS	--	1974	14,212	4	7	7	Design/Rehab 2024
18	725	Hoadley Creek	South Tongass Hwy	Southcoast	State	NHS	--	1957	2,728	4	6	6	Design/Replace 2025
19	989	Sargent Creek	Rezanof Drive	Southcoast	State	Non-NHS	--	1980	2,257	6	4	6	Planning/Prelim SSE
20	1431	Calhoun Avenue Poc	Calhoun Avenue	Southcoast	City	Non-NHS	--	1977	542	5	4	4	No Project
21	401	Moose Creek	Petersville Road	Central	State	Off System	--	1974	2,160	6	4	4	Design
22	339	Copper Delta	Copper River Hwy	Northern	State	Non-NHS	Closed	1977	11,575	6	6	1	PEL/Bridge Closed
23	990	Russian River	Rezanof Drive	Southcoast	State	Non-NHS	--	1980	3,362	7	4	6	Planning/Prelim SSE
24	431	Crooked Creek	Irr:Steese Highway	Northern	State	Non-NHS	Load Posted	1957	1,303	6	4	4	Design/Replace 2025
25	433	Barabara Creek	Irr:Jakolof Bay Rd	Central	State	Off System	--	1968	1,744	6	4	4	No Project
26	581	Upper Miller Creek	Richardson Highway	Northern	State	NHS	--	1958	4,625	4	5	5	Design/PEL
27	4128	Seward Lagoon	Fourth Avenue	Central	City	Off System	--	1960	1,144	N	N	3	No Project (SD 2023)
28	593	Bear Creek	Richardson Highway	Northern	State	NHS	--	1952	1,301	4	7	5	Construction/Replace 2024
29	4008	Crab Creek Culvert	Craig/Klawock/Holl	Southcoast	State	Non-NHS	--	1985	884	N	N	4	Planning/Prelim SSE
30	944	Mineral Creek	Mineral Creek Road	Northern	State	Off System	Load Posted	1970	1,227	5	4	4	Planning
31	381	Eyak River	Copper River Hwy	Northern	State	Non-NHS	--	1954	6,774	6	4	5	Design/New Project
32	444	Salmon River	Gustavus Airport R	Southcoast	State	Non-NHS	--	1976	4,047	7	5	4	No Project
33	518	Johnson River	Alaska Highway	Northern	State	NHS	--	1944	26,214	4	5	5	Design
34	1112	Ankau Slough	Irr:Ocean Cape Rd	Southcoast	City	Off System	--	1961	6,497	6	6	4	No Project
35	658	Little Tok River	91 Mile Loop	Northern	State	Off System	Load Posted	1979	2,039	7	4	5	Planning (SD 2021)
36	2057	Little Chena River	Section Line Rd	Northern	Other State	Off System	Closed	1980	1,717	7	4	4	No Project/Bridge Closed
37	295	Noyes Slough (Minnie St)	Minnie Street	Northern	State	Non-NHS	--	1953	4,257	6	5	4	Planning
38	940	Fish Camp Creek	Irr:Northway Road	Northern	State	Non-NHS	Temp. Repair	1987	1,267	6	6	4	No Project
39	1020	Quartz Creek	Quartz Creek Road	Central	State	Off System	Load Posted	1958	1,475	5	4	5	Construction 23/24
40	277	Taylor Creek	Taylor Highway	Northern	State	Non-NHS	Temp. Repair	1977	1,446	9	9	4	No Project (SD 2021)/Temp Br.
41	1755	Cold Bay Dock	Marine Hwy Route	Southcoast	Borough	Non-NHS	--	1980	22,144	5	4	4	No Project (SCMD)
42	726	Ketchikan Creek	Park/Harris St	Southcoast	City	Off System	Load Posted	1957	1,735	6	4	6	No Project (SD 2021)
43	1958	Fortune Creek	Cache Creek Road	Northern	Other State	Off System	Closed	1991	565	2	5	5	No Project/Bridge Closed

ALL REGIONS POOR CONDITION PRIORITIZATION ---- BASED ON 2023 INSPECTIONS AS OF 12/29/2023

Rank	Bridge No.	Bridge Name	Route	Region	Owner	Classification	Posting	Yr Built	Deck Area (SF)	Condition Ratings			Project Status
										Deck	Super.	Substr.	
44	2264	Harriet Hunt Creek	Shelter Cove Road	Southcoast	State	Off System	--	1981	959	5	4	5	No Project
45	2355	Salmon Creek Tributary	Nautical Avenue	Central	Borough	Off System	--	1970	753	6	4	5	No Project
46	473	Gold Creek	Irr: Airfield Rd	Central	State	Off System	Load Posted	1972	496	6	5	4	Construction (On Hold)/Culvert
47	206	Million Dollar Bridge	Copper River Hwy	Northern	State	Off System	Closed	1910	31,353	7	5	4	No Project/Bridge Closed
48	278	Willow Creek	Willow/Fishhook Rd	Central	State	Off System	--	1975	2,740	7	6	4	No Project
49	687	Susitna River	Denali Highway	Northern	State	Non-NHS	Temp. Repair	1956	22,840	7	5	4	No Project (SD 2020)
50	1501	Peters Creek	Starner Road	Central	City	Off System	Load Posted	1989	861	5	4	4	No Project
51	1556	Unnamed Creek, Koliganek	Irr:Airport Road	Central	City	Off System	Load Posted	1980	604	5	7	4	No Project
52	466	California Creek	Sterling L/Ophir	Central	State	Off System	Load Posted	1937	542	6	6	4	No Project
53	485	Spruce Creek	Sterling L/Ophir	Central	State	Off System	Load Posted	1964	388	6	5	4	No Project
54	1663	Goldstream Creek	Standard Creek Rd	Northern	Other State	Off System	--	1994	1,028	7	7	4	No Project
55	1957	Standard Creek	Standard Creek Rd	Northern	Other State	Off System	--	2006	539	8	7	4	No Project
56	2262	Harding Street	Harding Street	Southcoast	City	Off System	Load Posted	1968	348	5	4	7	No Project
57	2263	Peterson Street	Peterson Street	Southcoast	City	Off System	Load Posted	1955	1,251	6	5	4	No Project
58	300	Sinuk River	Irr:Nome-Teller Rd	Northern	State	Non-NHS	--	1967	10,647	6	6	4	Design/New Project
59	324	Snake River	Irr:Nome-Teller Rd	Northern	State	Non-NHS	--	1959	3,822	5	5	4	Design/New Project
60	841	American Creek No 1	Taylor Highway	Northern	State	Non-NHS	--	1988	3,317	7	7	4	No Project
61	1685	Jordan Creek (Amalga St)	Amalga Street	Southcoast	City	Off System	--	1982	1,821	4	5	5	No Project
62	1464	Gravelly Creek	Thorne Bay Road	Southcoast	State	Non-NHS	--	1989	2,899	4	7	7	Planning/Prelim SSE
63	1414	Shageluk Slough	Irr:Airport Road	Northern	City	Off System	--	1978	2,541	5	6	4	No Project (SD 2022)
64	209	Noyes Slough (Aurora)	Aurora Drive	Northern	State	Non-NHS	--	1960	3,588	4	7	6	Construction 2023/2024
65	461	Otter Creek	Happy Creek Road	Central	State	Off System	Load Posted	1947	697	6	5	4	No Project
66	1268	Main Street Pelican	Main Street	Southcoast	City	Off System	Load Posted	1939	34,354	6	7	4	No Project/Need More Repairs
67	1835	Unnamed Creek	Irr:Kolgnk Dump Rd	Central	City	Off System	Load Posted	1980	619	5	6	4	No Project
68	1985	Moose Creek	Oil Well Road	Central	Borough	Off System	--	1998	2,309	6	5	4	No Project
69	2384	Muskeg Creek	Kake Access - Usfs	Southcoast	State	Off System	--	1981	912	9	4	7	No Project (SD 2021)
70	1764	Indian Creek	Irr:Anderson Rd	Southcoast	City	Off System	Load Posted	1985	1,513	7	7	4	No Project
71	1841	Sayles/Gorge Viaduct	Sayles/Gorge St	Southcoast	City	Off System	Load Posted	1960	2,416	4	5	4	Design/Replace 2024

Deck, Superstructure & Substructure Condition Rating Key

	Value	Condition	Notes
Good	9	Excellent	*New*
	8	Very Good	
	7	Good	
Fair	6	Satisfactory	
	5	Fair	
Poor	4	Poor	*Str. Def., 4 or less*
	3	Serious	
	2	Critical	
	1	Imminent Failure	*Bridge Closed*
	0	Failed	*Bridge Closed*

	Number	% Deck Area
Poor Condition Bridges	71	6.25%
Central Region	20	1.74%
Northern Region	30	8.17%
Southcoast Region	21	10.98%

Deck = What you drive on, not asphalt
Superstructure = Girders, Truss, etc.
Substructure = Abutments & Piers

CENTRAL REGION POOR CONDITION PRIORITIZATION ---- BASED ON 2022 INSPECTIONS AS OF 12/29/2023

Rank	Bridge No.	Bridge Name	Route	Region	Owner	Classification	Posting	Yr Built	Deck Area (SF)	Condition Ratings			Project Status
										Deck	Super.	Substr.	
2	463	Takotna River	Sterling L/Ophir	Central	State	Off System	Load Posted	1941	3,596	6	3	2	Construction 2024 (On-Hold)
3	666	South Fork Anchor River	Sterling Highway	Central	State	NHS	--	1959	2,691	6	5	4	Design/Replace On Hold
4	2128	Willow Creek	Grubstake-Hatchers	Central	State	Off System	Closed	1945	800	5	2	3	Design/M&O/Bridge Closed
8	978	Funny River	Funny River Road	Central	State	Off System	--	1969	1,344	6	4	4	No Project (SD 2023)
10	634	Twenty Mile River	Seward Highway	Central	State	NHS	--	1967	19,366	4	5	5	Construction 23/24
14	544	Kings River	Glenn Highway	Central	State	NHS	--	1961	8,008	4	5	6	Construction/Replace 24/25
21	401	Moose Creek	Petersville Road	Central	State	Off System	--	1974	2,160	6	4	4	Design
25	433	Barabara Creek	Irr:Jakolof Bay Rd	Central	State	Off System	--	1968	1,744	6	4	4	No Project
27	4128	Seward Lagoon	Fourth Avenue	Central	City	Off System	--	1960	1,144	N	N	3	No Project (SD 2023)
39	1020	Quartz Creek	Quartz Creek Road	Central	State	Off System	Load Posted	1958	1,475	5	4	5	Construction 23/24
45	2355	Salmon Creek Tributary	Nautical Avenue	Central	Borough	Off System	--	1970	753	6	4	5	No Project
46	473	Gold Creek	Irr: Airfield Rd	Central	State	Off System	Load Posted	1972	496	6	5	4	Construction (On Hold)/Culvert
48	278	Willow Creek	Willow/Fishhook Rd	Central	State	Off System	--	1975	2,740	7	6	4	No Project
50	1501	Peters Creek	Starner Road	Central	City	Off System	Load Posted	1989	861	5	4	4	No Project
51	1556	Unnamed Creek, Koliganek	Irr:Airport Road	Central	City	Off System	Load Posted	1980	604	5	7	4	No Project
52	466	California Creek	Sterling L/Ophir	Central	State	Off System	Load Posted	1937	542	6	6	4	No Project
53	485	Spruce Creek	Sterling L/Ophir	Central	State	Off System	Load Posted	1964	388	6	5	4	No Project
65	461	Otter Creek	Happy Creek Road	Central	State	Off System	Load Posted	1947	697	6	5	4	No Project
67	1835	Unnamed Creek	Irr:Kolgnk Dump Rd	Central	City	Off System	Load Posted	1980	619	5	6	4	No Project
68	1985	Moose Creek	Oil Well Road	Central	Borough	Off System	--	1998	2,309	6	5	4	No Project

Deck, Superstructure & Substructure Condition Rating Key

	Value	Condition	Notes
Good	9	Excellent	*New*
	8	Very Good	
	7	Good	
Fair	6	Satisfactory	
	5	Fair	
Poor	4	Poor	*Str. Def., 4 or less*
	3	Serious	
	2	Critical	
	1	Imminent Failure	*Bridge Closed*
	0	Failed	*Bridge Closed*

	Number	% Deck Area
Poor Condition Bridges	71	6.25%
Central Region	20	1.74%
Northern Region	30	8.17%
Southcoast Region	21	10.98%

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Superstructure = Girders, Truss, etc.
Substructure = Abutments & Piers

NORTHERN REGION POOR CONDITION PRIORITIZATION ---- BASED ON 2022 INSPECTIONS AS OF 12/29/2023

Rank	Bridge No.	Bridge Name	Route	Region	Owner	Classification	Posting	Yr Built	Deck Area (SF)	Condition Ratings			Project Status
										Deck	Super.	Substr.	
1	4060	Hardage Creek	Parks Highway	Northern	State	NHS	--	1971	1,046	N	N	3	Design (SD 2022)
6	216	Nenana River At Rex	Parks Highway	Northern	State	NHS	--	1963	17,898	7	4	6	Planning/Design (SD 2022)
9	583	Castner Creek	Richardson Highway	Northern	State	NHS	--	1958	3,963	4	6	4	Design/PEL
11	578	Gunn Creek	Richardson Highway	Northern	State	NHS	--	1954	2,055	6	6	4	Planning/Replace
12	520	Gerstle River	Alaska Highway	Northern	State	NHS	--	1944	48,951	5	5	4	Design (SD 2022)
13	1336	Hammond River	Dalton Highway	Northern	State	NHS	--	1972	4,186	6	6	4	Design/FLAP Grant
15	844	Heney Creek	Point Whitshed Rd	Northern	State	Off System	Load Posted	1936	1,233	5	4	4	Design/New Project
17	574	Gulkana River	Richardson Highway	Northern	State	NHS	--	1974	14,212	4	7	7	Design/Rehab 2024
22	339	Copper Delta	Copper River Hwy	Northern	State	Non-NHS	Closed	1977	11,575	6	6	1	PEL/Bridge Closed
24	431	Crooked Creek	Irr:Steese Highway	Northern	State	Non-NHS	Load Posted	1957	1,303	6	4	4	Design/Replace 2025
26	581	Upper Miller Creek	Richardson Highway	Northern	State	NHS	--	1958	4,625	4	5	5	Design/PEL
28	593	Bear Creek	Richardson Highway	Northern	State	NHS	--	1952	1,301	4	7	5	Construction/Replace 2024
30	944	Mineral Creek	Mineral Creek Road	Northern	State	Off System	Load Posted	1970	1,227	5	4	4	Planning
31	381	Eyak River	Copper River Hwy	Northern	State	Non-NHS	--	1954	6,774	6	4	5	Design/New Project
33	518	Johnson River	Alaska Highway	Northern	State	NHS	--	1944	26,214	4	5	5	Design
35	658	Little Tok River	91 Mile Loop	Northern	State	Off System	Load Posted	1979	2,039	7	4	5	Planning (SD 2021)
36	2057	Little Chena River	Section Line Rd	Northern	Other State	Off System	Closed	1980	1,717	7	4	4	No Project/Bridge Closed
37	295	Noyes Slough (Minnie St)	Minnie Street	Northern	State	Non-NHS	--	1953	4,257	6	5	4	Planning
38	940	Fish Camp Creek	Irr:Northway Road	Northern	State	Non-NHS	Temp. Repair	1987	1,267	6	6	4	No Project
40	277	Taylor Creek	Taylor Highway	Northern	State	Non-NHS	Temp. Repair	1977	1,446	9	9	4	No Project (SD 2021)/Temp Br.
43	1958	Fortune Creek	Cache Creek Road	Northern	Other State	Off System	Closed	1991	565	2	5	5	No Project/Bridge Closed
47	206	Million Dollar Bridge	Copper River Hwy	Northern	State	Off System	Closed	1910	31,353	7	5	4	No Project/Bridge Closed
49	687	Susitna River	Denali Highway	Northern	State	Non-NHS	Temp. Repair	1956	22,840	7	5	4	No Project (SD 2020)
54	1663	Goldstream Creek	Standard Creek Rd	Northern	Other State	Off System	--	1994	1,028	7	7	4	No Project
55	1957	Standard Creek	Standard Creek Rd	Northern	Other State	Off System	--	2006	539	8	7	4	No Project
58	300	Sinuk River	Irr:Nome-Teller Rd	Northern	State	Non-NHS	--	1967	10,647	6	6	4	Design/New Project
59	324	Snake River	Irr:Nome-Teller Rd	Northern	State	Non-NHS	--	1959	3,822	5	5	4	Design/New Project
60	841	American Creek No 1	Taylor Highway	Northern	State	Non-NHS	--	1988	3,317	7	7	4	No Project
63	1414	Shageluk Slough	Irr:Airport Road	Northern	City	Off System	--	1978	2,541	5	6	4	No Project (SD 2022)
64	209	Noyes Slough (Aurora)	Aurora Drive	Northern	State	Non-NHS	--	1960	3,588	4	7	6	Construction 2023/2024

Deck, Superstructure & Substructure Condition Rating Key

	Value	Condition	*Notes*
Good	9	Excellent	*New*
	8	Very Good	
	7	Good	
Fair	6	Satisfactory	
	5	Fair	
Poor	4	Poor	*Str. Def., 4 or less*
	3	Serious	
	2	Critical	
	1	Imminent Failure	*Bridge Closed*
	0	Failed	*Bridge Closed*

	Number	% Deck Area
Poor Condition Bridges	71	6.25%
Central Region	20	1.74%
Northern Region	30	8.17%
Southcoast Region	21	10.98%

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Superstructure = Girders, Truss, etc.
Substructure = Abutments & Piers

SOUTHCO REGION POOR CONDITION PRIORITIZATION ---- BASED ON 2022 INS TIONS AS OF 12/29/2023

Rank	Bridge No.	Bridge Name	Route	Region	Owner	Classification	Posting	Yr Built	Deck Area (SF)	Condition Ratings			Project Status
										Deck	Super.	Substr.	
5	805	Skagway Ferry Terminal	Marine Hwy Route	Southcoast	City	NHS	--	1980	2,983	5	5	4	Design (SCMD)
7	797	Water St Viaduct	South Tongass Hwy	Southcoast	State	NHS	--	1955	86,316	7	5	4	Design
16	747	Ward Creek	North Tongass Hwy	Southcoast	State	Non-NHS	--	1975	6,969	7	6	4	Design/Replace 2025
18	725	Hoadley Creek	South Tongass Hwy	Southcoast	State	NHS	--	1957	2,728	4	6	6	Design/Replace 2025
19	989	Sargent Creek	Rezanof Drive	Southcoast	State	Non-NHS	--	1980	2,257	6	4	6	Planning/Prelim SSE
20	1431	Calhoun Avenue Poc	Calhoun Avenue	Southcoast	City	Non-NHS	--	1977	542	5	4	4	No Project
23	990	Russian River	Rezanof Drive	Southcoast	State	Non-NHS	--	1980	3,362	7	4	6	Planning/Prelim SSE
29	4008	Crab Creek Culvert	Craig/Klawock/Holl	Southcoast	State	Non-NHS	--	1985	884	N	N	4	Planning/Prelim SSE
32	444	Salmon River	Gustavus Airport R	Southcoast	State	Non-NHS	--	1976	4,047	7	5	4	No Project
34	1112	Ankau Slough	Irr:Ocean Cape Rd	Southcoast	City	Off System	--	1961	6,497	6	6	4	No Project
41	1755	Cold Bay Dock	Marine Hwy Route	Southcoast	Borough	Non-NHS	--	1980	22,144	5	4	4	No Project (SCMD)
42	726	Ketchikan Creek	Park/Harris St	Southcoast	City	Off System	Load Posted	1957	1,735	6	4	6	No Project (SD 2021)
44	2264	Harriet Hunt Creek	Shelter Cove Road	Southcoast	State	Off System	--	1981	959	5	4	5	No Project
56	2262	Harding Street	Harding Street	Southcoast	City	Off System	Load Posted	1968	348	5	4	7	No Project
57	2263	Peterson Street	Peterson Street	Southcoast	City	Off System	Load Posted	1955	1,251	6	5	4	No Project
61	1685	Jordan Creek (Amalga St)	Amalga Street	Southcoast	City	Off System	--	1982	1,821	4	5	5	No Project
62	1464	Gravelly Creek	Thorne Bay Road	Southcoast	State	Non-NHS	--	1989	2,899	4	7	7	Planning/Prelim SSE
66	1268	Main Street Pelican	Main Street	Southcoast	City	Off System	Load Posted	1939	34,354	6	7	4	No Project/Need More Repairs
69	2384	Muskeg Creek	Kake Access - Usfs	Southcoast	State	Off System	--	1981	912	9	4	7	No Project (SD 2021)
70	1764	Indian Creek	Irr:Anderson Rd	Southcoast	City	Off System	Load Posted	1985	1,513	7	7	4	No Project
71	1841	Sayles/Gorge Viaduct	Sayles/Gorge St	Southcoast	City	Off System	Load Posted	1960	2,416	4	5	4	Design/Replace 2024

Deck, Superstructure & Substructure Condition Rating Key

	Value	Condition	*Notes*
Good	9	Excellent	*New*
	8	Very Good	
	7	Good	
Fair	6	Satisfactory	
	5	Fair	
Poor	4	Poor	*Str. Def., 4 or less*
	3	Serious	
	2	Critical	
	1	Imminent Failure	*Bridge Closed*
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	Number	% Deck Area
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Central Region	20	1.74%
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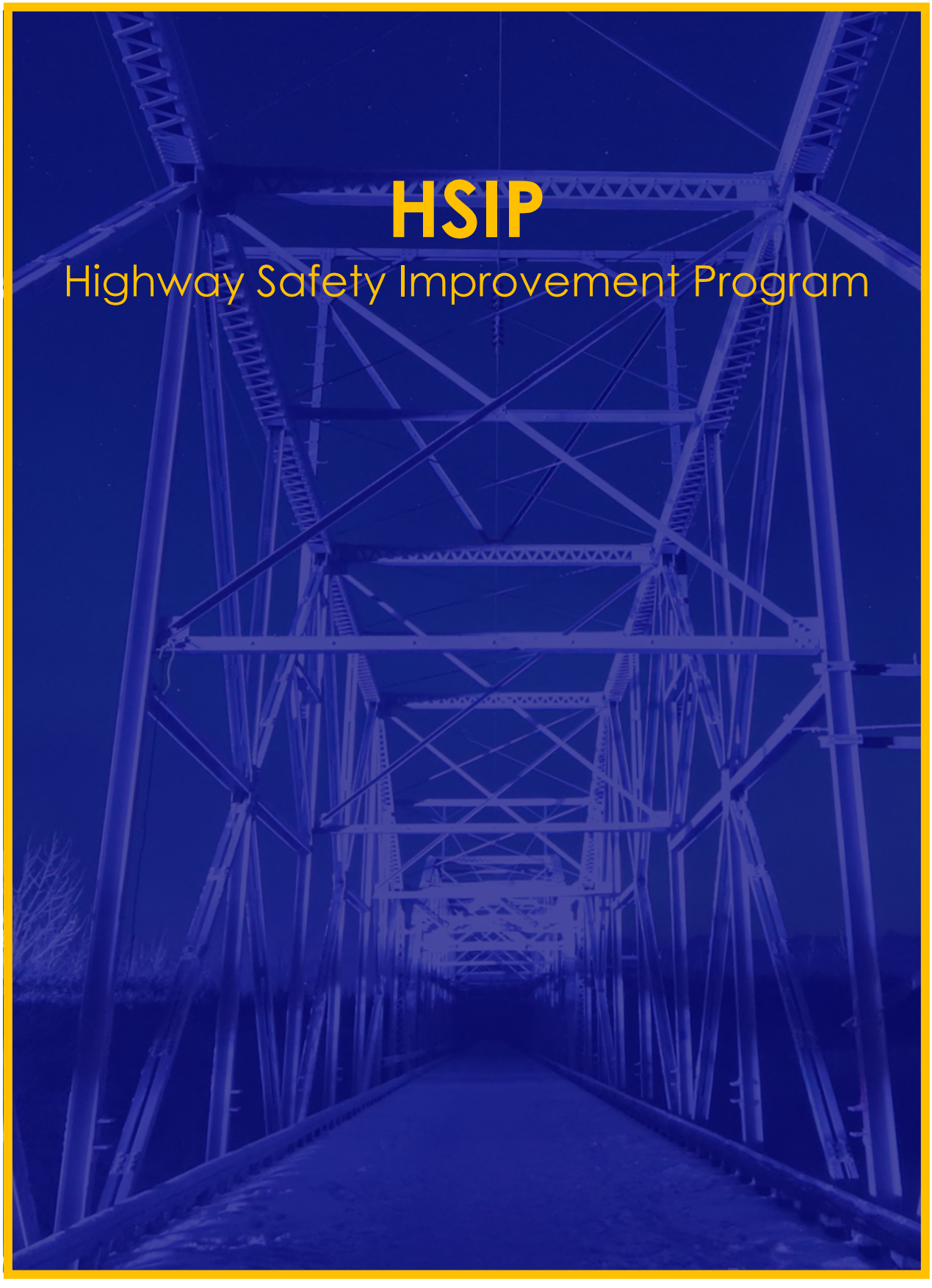
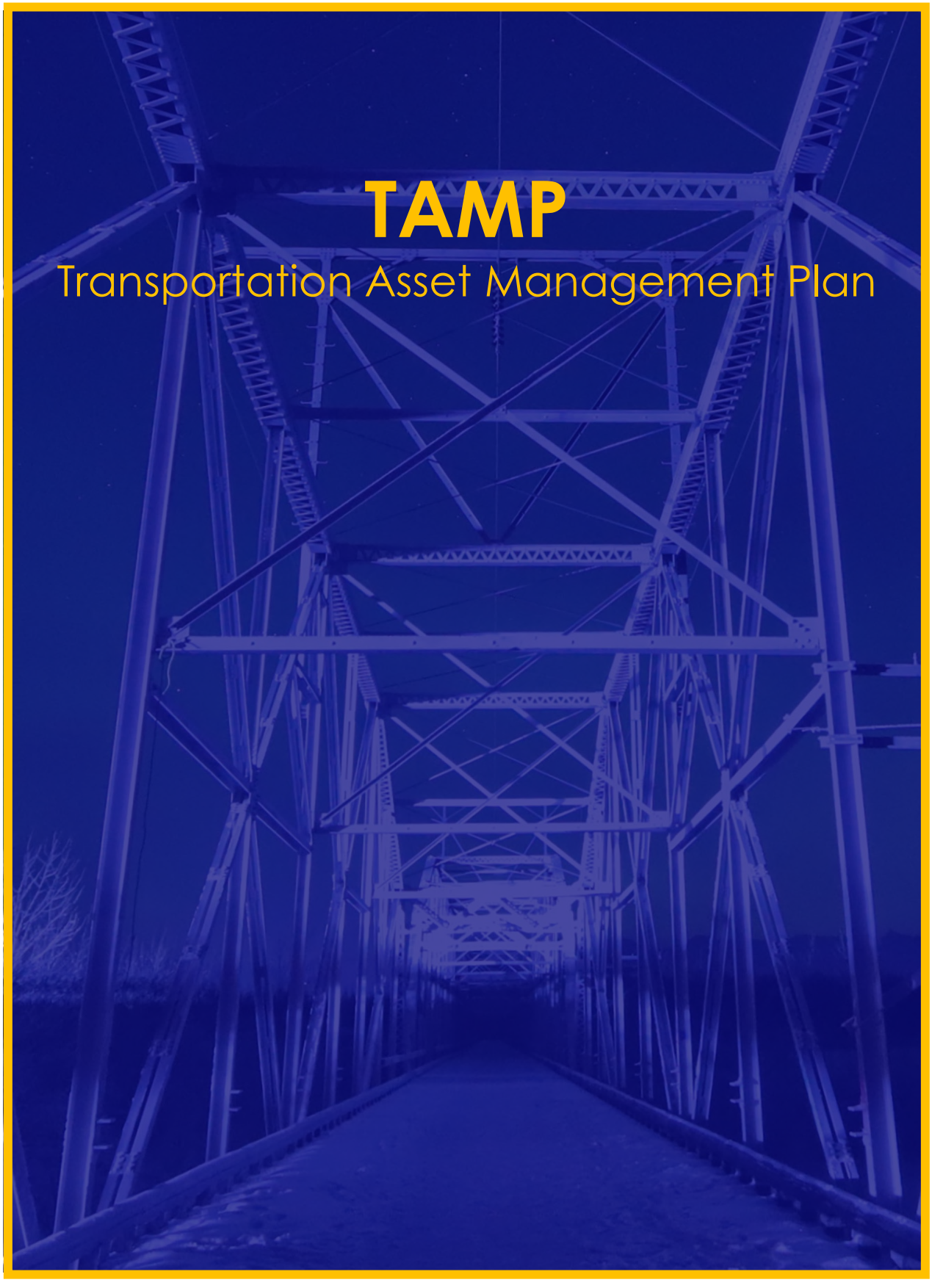
Substructure = Abutments & Piers



HSIP

Highway Safety Improvement Program



TAMP

Transportation Asset Management Plan

Alaska DOT&PF Transportation Asset Management Plan (TAMP)

Implementation Documentation FFY22

June 8, 2023

23 U.S.C. 119 and 23 CFR Part 515 require state transportation agencies to show the following three required elements:

1. Integration of TAMP into transportation planning processes that lead to the Statewide Transportation Improvement Program (STIP) (23 CFR 515.9(h)).

FHWA Alaska Division Office determined on July 18, 2022, that the Department's June 2019 TAMP was integrated into the STIP process as described in Appendices F and I. On December 27, 2022, the Division office recertified the Department's 2022 TAMP developed processes.

2. TAMP available to the public (23 CFR 515.9(i)).

The 2022 TAMP is posted for download or online reading on the DOT&PF's public facing website at http://dot.alaska.gov/stwddes/asset_mgmt/index.shtml

3. State DOT demonstrates through current and verifiable documentation that it has implemented a TAMP meeting requirements of 23 U.S.C. 119 and 23 CFR Part 515 and that the State DOT is following the investment strategies in the TAMP (23 CFR 515.13(b)(2)).

The following table was created to meet the requirements of 23 CFR 515.13(b)(2). The Department follows the process specified in TAMP Appendix I to provide a consistent means of assessing whether the agency's investments are consistent with the TAMP investment strategies in a way that accounts for the natural variation in annual programming and project delivery.

The Department is using a 12-month period preceding the consistency determination for Federal Fiscal Year (FFY) 2022 to determine alignment between the TAMP forecasted and the actual levels of investment for various work types as defined in 23 CFR 515.5. The work types we examined are initial construction, maintenance, preservation, rehabilitation, and replacement/reconstruction. Note that the selected investment strategy for Bridges and Pavements from the 2022 TAMP does not include initial construction.

The "Actual Investment" column summarized the projects that were either awarded in FFY22 or executed by state force account, divided into the Bridge and Pavement

Work Types using Management Reporting Services (MRS), AASHTOWare Preconstruction and Maintenance & Operations records. Information from FFY21 actual investment is included to examine the 2-year investment cycle.

	FFY22 TAMP	FFY22 Actual	FFY21 Actual
NHS PAVEMENT			
Maintenance	$10,000,000	$9,613,008	$12,274,455
Preservation	$45,000,000	$42,352,225	$26,001,318
Rehabilitation	$56,000,000	$102,591,435	$66,005,274
Reconstruction	$67,000,000	$119,692,599	$31,280,326
Initial Construction	Not in TAMP	-	-
Pavement SUBTOTAL	$178,000,000	$274,249,267	$135,561,373
NHS BRIDGE			
Maintenance	$1,400,000	$315,437	$765,951
Preservation	$17,800,000	$3,673,158	$0
Rehabilitation	$9,000,000	$11,360,887	$0
Replacement	$31,800,000	$35,996,784	$56,369,501
New Construction	Not in TAMP	-	-
Bridge SUBTOTAL	$60,000,000	$51,346,266	$57,135,452
TOTAL	**$238,000,000**	**$325,595,533**	**$192,696,825**

Maintenance is still an estimate from our legacy Maintenance Management System (MMS) and the new MMS will provide actual work costs to improve our modelling ability and provide more accuracy for both Bridge and Pavement Management Systems.

The Department's actual maintenance and preservation investments align closely with the FFY22 TAMP levels. Pavement rehabilitation investment is significantly higher for FFY22 than the TAMP level and the average FFY22 and FFY21 investment is 51% over the TAMP investment. Rehabilitation funding are anticipated to be lower in FFY23. The reconstruction investment is significantly higher for FFY22 and lower for FFY21 than the TAMP investment strategy. However, the average reconstruction investment for the two years is within 13% of the FFY22 TAMP investment level.

The Department's actual total Bridge investment is lower than the total TAMP investment strategy by about 15%. The actual Bridge FFY22 investments are not in line with the 2022 TAMP investment strategy for preservation and maintenance. The actual FFY22 investment level aligns more with the 2019 TAMP investment strategy. Coordination with the Division of Planning and Program Development and the bridge

management group for the State of Good Repair (SOGR) call for projects should help in finetuning future spending for bridge work types. The Department has previously programmed bridge work using a “worst first” strategy however the newly updated Highway Preconstruction Manual includes provisions for future bridge work for both preservation and rehabilitation projects. In FFY21, the Department began selecting preservation bridge projects using our Bridge Policy and Procedure developed to promote asset management practices. A list of Structurally Deficient or Replacement candidate bridges has always been prepared and submitted to Division of Planning and Program Development. The Department prioritizes NHS bridges during Project Selection and through the Capital Program Review Team to make sure these investments are included in the STIP. The Department continues to focus on making changes in the STIP to include bridge rehabilitation and replacement required investments. The Department monitors and reports our awarded projects quarterly for the Capital Program Review Team to make sure planned projects that support our targets are delivered to the public.

As of December 2022, there were 22 bridges in poor condition, of which 7 bridges are in various stages of bidding and construction. Design efforts are in progress for 15 of the remaining bridges in poor condition on the NHS.

An emphasis was placed on submitting preservation bridge projects for the 2023 State of Good Repair call. While the Department continues the development of a standardized approach to data-based selection of bridge projects, it is currently focusing on projects that accomplish repairs and preservation in combination. For example, rehabilitation of a bridge deck in poor condition with a polyester concrete overlay reduces poor percentages and accomplishes preservation goals at the same time.

Deviation from Investment Strategies beyond reasonable control

State transportation agencies are required to develop and operate a bridge and pavement management system that meets the minimum standards described in 23 CFR 515.17 for collecting data, implementing decisions, and crafting fiscally constrained strategies based on the data. DOT&PF has both Bridge and Pavement Management Systems that substantially meet these requirements. Both systems’ life cycle planning scenarios were incorporated into the 2022 TAMP.

The Department is still in the final stages of obligating projects developed prior to the 2022 TAMP. The Department and FHWA have made substantial investment in these projects that meet other transportation needs. However, these often affect our capability to meet our bridge and pavement NHS targets. From currently awarded projects in FFY22, bridge and pavement investments are more in line with the investment strategies described in the Department’s 2022 TAMP.

U.S. Department of Transportation
Federal Highway Administration

Alaska Division

June 26, 2023

P.O. Box 21648
Juneau, AK 99802-1648
(907) 586-7418
(907) 586-7420
www.fhwa.dot.gov/akdiv

Ryan Anderson
Commissioner
Alaska Department of Transportation & Public Facilities
P.O. Box 112500
Juneau, AK 99811-2500

Dear Mr. Anderson:

This letter serves as the Federal Highway Administration (FHWA) Alaska Division Office's 2023 consistency determination, which is an evaluation whether the Alaska Department of Transportation and Public Facilities (DOT&PF) has developed and implemented a Transportation Asset Management Plan (TAMP) that is consistent with the requirements established by 23 U.S.C. 119 and 23 CFR part 515.

The DOT&PF's most recent TAMP and its implementation documentation dated June 8, 2023, were received by the Division Office on June 8, 2023. Based on the most recent TAMP and supporting documentation submitted by DOT&PF, to demonstrate implementation of the TAMP for FFY2023, the FHWA has determined **your TAMP complied with the minimum requirements set forth in 23 CFR 515.13(b)(1)**. Therefore, DOT&PF's TAMP has met the following minimum requirements:

1. Was developed with FHWA-certified TAMP processes;
2. Includes the required TAMP content; and
3. Is consistent with other applicable requirements in 23 U.S.C 119 and 23 CFR Part 515.

We also determined DOT&PF implemented its TAMP as provided in 23 CFR 515.13(b)(2).

We would like to commend you and your staff for the broad participation in development and implementation of the TAMP, a risked-based asset management plan, in accordance with 23 U.S.C. 119, to achieve and sustain a state of good repair over the life cycle of the assets and to improve or preserve the condition of the National Highway System (NHS). We look forward to seeing the improvements outlined in your consistency letter.

Should you have any questions, please contact Julie Jenkins, Financial Manager, at (907) 586-7476 or by email at julie.jenkins@dot.gov.

Sincerely,

Sandra A. Garcia-Aline
Division Administrator

Electronic cc:

Katherine Keith, DOT&PF
James Marks, DOT&PF
Stephen Saboundjian, DOT&PF
Michael San Angelo, DOT&PF
Gerald Varney, FHWA
Julie Jenkins, FHWA

MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Design & Engineering Services

TO: Ryan Anderson, P.E.
Commissioner

DATE: September 22, 2022

THRU: Carolyn Morehouse, P.E. chm
Chief Engineer

James Marks
Director, Program Development

FROM: Steve Saboundjian, P.E. SS
Transportation Asset Management Lead

SUBJECT: 2022-2026 Pavement & Bridge Target Recommendations

The following six pavement and bridge performance management targets are recommended for inclusion in the Transportation Asset Management Plan (TAMP).

Performance Measure	2-year Target	4-year Target	Anchorage* MPO	Fairbanks* MPO
Poor Pavement Condition on the Interstate	5%	5%	TBD	TBD
Good Pavement Condition on the Interstate	20%	20%	TBD	TBD
Poor Pavement Condition on the NHS (excluding Interstate)	10%	10%	TBD	TBD
Good Pavement Condition on the NHS (excluding Interstate)	15%	15%	TBD	TBD
Poor Condition of Bridges on the NHS	10%	10%	TBD	TBD
Good Condition of Bridges on the NHS	40%	40%	TBD	TBD

**MPO will set targets 180 days after the Commissioner approves DOT&PF targets*

The targets are applicable to roadways and bridges on Interstate and non-Interstate National Highway System (NHS) only and satisfy the requirements for the Alaska Department of Transportation and Public Facilities under US 23 CFR 490.105.

Approved: _____ Date: 10/3/22

Ryan Anderson, P.E.
Commissioner, Alaska Department of Transportation and Public Facilities

cc: Rob Carpenter, Deputy Commissioner
Wolfgang Junge, P.E., Regional director, Central Region
Joseph Kemp, P.E., Acting Regional Director, Northern Region
D. Lance Mearig, P.E., Regional Director, Southcoast Region
James Marks, Director, Program Development
Michael San Angelo, P.E., Statewide Materials Engineer
Richard Pratt, P.E., Chief Bridge Engineer

TAMP

Transportation Asset Management Plan

Alaska Department of Transportation & Public Facilities

DECEMBER 2022

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

TRANSPORTATION ASSET MANAGEMENT PLAN

DECEMBER 2022

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Unless otherwise indicated, the source of all images in the document is the Alaska Department of Transportation & Public Facilities.

Message from the Commissioner

The Alaska Department of Transportation and Public Facilities (DOT&PF) manages a diverse range of transportation assets and facilities in the largest State in the nation. A sound transportation system is critical to Alaska's economy and communities. DOT&PF, as the state transportation authority designated to plan, construct, maintain, and operate the system, utilizes asset management principles to improve performance, raise customer satisfaction, and minimize cost. These principles are applied to optimize life-cycle planning and overall performance of Alaska's transportation assets.

The Bipartisan Infrastructure Law enacted in 2021 provides funding resources to assist Alaska in maintaining its assets in a state of good repair. Transportation asset management links planning and programming through data informed analysis of funding, desired outcomes, risk, and resilience to provide a strategic investment plan for managing Alaska's transportation infrastructure. This systematic, data-driven, transparent approach supports our mission, our goals, and ultimately the Alaskans that rely on well-maintained transportation infrastructure.

This report is Alaska's second Transportation Asset Management Plan (TAMP). We are excited to continue learning and improving in asset management practices. We believe that a focus to enhance and expand our asset management program will assist us in our mission, to keep Alaska moving through service and infrastructure.

This TAMP tells our story.

I approve this Transportation Asset Management Plan for the State of Alaska, Department of Transportation & Public Facilities.

Ryan Anderson, P.E.
Commissioner

12/22/22
Date

Executive Summary

This risk-based, Transportation Asset Management Plan (TAMP) is one of a series of state plans required by federal rulemaking to achieve the Nation's transportation goals. Transportation Asset Management (TAM) keeps Alaska moving through service and infrastructure by making good infrastructure cost less. TAM provides a long term, systematic approach to cost-effectively sustain Alaska's infrastructure. The TAMP provides a 10-year financial plan that provides the connection between the Long-Range Transportation Plan (LRTP), which covers a span of more than 20 years, and the State Transportation Improvement Program (STIP), with its scope of 4 years.

TAM supports the overall Department vision by strengthening the efficiency and effectiveness of the Alaska Department of Transportation and Public Facilities (DOT&PF) at planning, designing, constructing, operating, and maintaining transportation systems. This vision strengthens transparency and accountability while encouraging innovation and quality of services.

The TAMP includes National Highway System (NHS) bridges and pavements only. As of July 2021, Alaska has 1,080 miles of Interstate and 1,148 miles of non-Interstate roads including 326 miles of unpaved non-Interstate NHS, which represents the nation's only gravel roadways on the NHS. All but twenty-two miles of the NHS are owned and operated by DOT&PF. The remainder are managed by local agencies. Alaska has 425 bridges on the NHS, with five of these bridges owned by other local agency entities and three by Anchorage International Airport. The Department is confident that these eight bridges and 22 miles of NHS pavement will not affect the overall state target or national goals.

States are required by 23 CFR 490.105 to set pavement condition targets for the NHS that include its Interstate and non-Interstate inventory. Alaska's targets for the next four year performance period for Interstate pavement are 5 percent *Poor* and 20 percent *Good*; for non-Interstate NHS, the targets are 10 percent *Poor* and 15 percent *Good*. For bridges, the targets are 10 percent *Poor* and 40 percent *Good*. The cost to keep Alaska's infrastructure in a state of good repair meeting those targets is estimated at an average of **$208 million annually** over the next 10 years. This does **not** include funding needs for mobility, safety, reconstruction, and economic development projects.

DOT&PF staff will lead the coordination with Alaska's two Metropolitan Planning Organizations (MPOs) to evaluate the performance targets the MPOs plan to use for NHS pavements and bridges and to incorporate these targets into their transportation plans. DOT&PF staff will continue to enhance the process for prioritization of projects for the NHS system to help meet these targets.

One of the greatest risks identified is inadequate funding to preserve DOT&PF's assets in a state of good repair while building new facilities, modernizing existing ones, and supporting the ferry system. Additional risks include seismic activity, flooding, coastal erosion, permafrost, and aufeis impacts.

This is DOT&PF's second TAMP with all federally required elements. In the time since the previous TAMP was submitted in 2019, the Department has gained significant knowledge and experience with performance management and asset management. The Department intends to continue refining its practices with pavement and bridge assets as well as expanding this approach to include other asset classes in the future.

1 Introduction

The purpose of this Transportation Asset Management Plan (TAMP) is to describe how the Alaska Department of Transportation and Public Facilities (DOT&PF) will manage the National Highway System (NHS) roads and bridges in a state of good repair (SOGR) by achieving national goals and state-set targets while managing risks in a financially responsible manner. This plan documents the development of a long-term systematic approach for sustaining the NHS pavements and bridges owned and maintained by DOT&PF. Transportation Asset Management (TAM) is a cost-effective program of continuous, collaborative processes to "Keep Alaska Moving Through Service and Infrastructure" by making good infrastructure cost less.

The TAMP is one of a series of state plans required by federal rulemaking to achieve the Nation's transportation goals. In addition to this TAMP, state DOTs are required to develop plans for highway safety, freight, and congestion. Alaska's Strategic Highway Safety Plan was completed and approved on February 28, 2019. Alaska's Highway Safety Improvement Program handbook was updated in April 2022. Alaska's Freight Plan was completed in December 2017 and is currently being updated. Regulations do not require that Alaska have a congestion plan at this time. All these plans will influence the DOT&PF's Long-Range Transportation Plan (LRTP) and the short-term State Transportation Improvement Program (STIP).

The TAMP identifies DOT&PF's asset management practices and methods for assessing current asset conditions and analyzing future conditions. Using a risk-based approach, DOT&PF performed a life-cycle planning analysis for each asset class and a gap analysis between the desired SOGR and available funding. Finally, these steps define the Department's investment strategies for meeting the demands of ensuring the successful management of Alaska's transportation assets.

The DOT&PF's mission and vision for TAM is to support Alaska's surface transportation program through the streamlined and performance-based surface transportation program that was established in 2012 in the Moving Ahead for Progress in the 21st Century (MAP-21) Act. The mission and vision established in this program has continued and enhanced in each long-term federal transportation bill since.

1.1 ASSET MANAGEMENT MISSION, VISION AND GOALS

DOT&PF will manage highway assets using its asset management mission, vision, and goals. In this section, the TAM mission, vision, and its respective goals are described, including a detailed discussion of pavement and bridge assets. Keeping with the DOT&PF's TAM motto, "Start simple, grow smart, and show continuous improvement," only the required NHS bridges and pavement assets are included.

> The term "asset management" means a strategic and systematic process of operating, maintaining and improving physical assets, with the focus of both engineering and economic analysis based on quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the life cycle of the assets at a minimum practical cost [23 USC, Sec. 101(a)(2)].

Mission: TAM keeps Alaska moving through service and infrastructure by making good infrastructure cost less.

Vision: TAM provides a long term, systematic approach to cost-effectively sustain Alaska's infrastructure.

TAM supports the overall "One DOT&PF" vision by strengthening its efficiency and effectiveness at planning, designing, constructing, operating, and maintaining all modes of transportation by strengthening transparency and accountability and encouraging innovation and quality of service.

TAM depends on quality data for informed decision-making to keep infrastructure in a SOGR over the life cycle of the asset.

The principles and goals by which DOT&PF supports the Department's mission are provided.

Principles

- Integration of information systems—using a common language
- Informed decision-making
- Simple, achievable goals
- Measurement of what matters

Goals

- **Goal #1: Predictive Models to "Tell the Future"**—TAM promotes performance of state-owned transportation assets and facilities through performance metrics, risk management, and evaluation of progress. Historical data is collected and analyzed to predict the future condition.
- **Goal #2: Wise Investment Resources**—TAM provides for better access to quality data to support sound investment decisions across all

Considering Resilience in Asset Management Plans

In 2021, Congress passed the Bipartisan Infrastructure Law (BIL) which expanded federal funding and requirements related to resiliency planning and transportation asset management. The BIL requires each state DOT to consider resilience and extreme weather events within their life-cycle planning and risk management practices (23 USC 119(e)(4)(D)). Prior to this requirement DOT&PF had proactively incorporated resiliency planning into its asset management policies over the past several years. This TAMP addresses the new BIL requirements in the following ways.

- Vulnerabilities, such as scour and seismic risk, are considered to determine the appropriate life-cycle strategy for each bridge (Section 3.4.5).
- The influence of risk management and life-cycle planning on DOT&PF's investment strategies is described throughout Sections 5-1 and 5-2.
- DOT&PF uses a subgrade stability index to identify areas of unstable permafrost and determine the most appropriate life-cycle strategy for those locations (Appendix C).
- Life-cycle planning models are divided among five different regions, which allows DOT&PF to properly consider varying effects of storm frequencies and intensity, sea level rise, flooding, and melting/warming permafrost among several other climatological factors (Appendix F).
- The development processes and discussions incorporating extreme weather and resilience within the life-cycle planning section are described in Appendix F.
- DOT&PF manages risks due to seismic activity and flooding through two bridge funding programs: one targeting seismic retrofits, and another targeting scour critical bridges. Both are funded with $950,000 annually (Appendix G).
- The development processes and discussions incorporating extreme weather and resilience within the risk management section are described in Appendix G.

phases of transportation activity and all modes of transportation.

- **Goal #3: A Long-Term Comprehensive Network that Generates Actionable Information**—TAM will support One DOT&PF by maintaining strong, healthy communications internally and externally. TAM supports collaboration through the TAM structure and provides information for stakeholders and decision-makers. System integration is essential to combine data from disparate business systems into information to support decisions.
- **Goal #4: Credibility**—TAM will maximize the impact of every public dollar spent and will serve the needs of Alaskans through the National Performance Measures.
- **Goal #5: Transparency**—TAM will improve transparency by making information readily available and accessible for stakeholders and decision makers. TAM holds DOT&PF accountable through monitoring performance metrics and evaluating progress. TAM supports innovation through alternatives analysis and trade-off analysis.

1.2 FEDERAL REQUIREMENTS

The federal Asset Management Plan regulation (23 CFR 515) requires the Federal Highway Administration (FHWA) to conduct an annual consistency review no later than July 31 of each year to determine whether the state DOT has developed and implemented an asset management plan consistent with the federal rules. If it is determined that the state has not met the federal TAMP requirements, federal project funding will be reduced from the typical ninety percent not to exceed sixty-five percent. Additionally, if a state DOT has not established bridge and pavement targets on the NHS consistent with the National Performance Management Measures (23 CFR 490), FHWA will not approve any further projects using National Highway Performance Program (NHPP) funding.

The National Performance Management Measures legislation (23 CFR 490) requires states to establish targets for bridge and pavement asset conditions and report progress toward those targets. It also requires FHWA to assess biennially whether each state is showing significant progress in achieving the targets the state has established for the NHPP. State progress would be considered significant if the actual condition is equal to or better than the established target or better than the baseline condition.

Failure to meet the minimum Interstate pavement and NHS bridge conditions results in penalties, as described in 23 CFR 490.317(e) for pavement and 490.413(a) for bridge, which are summarized below.

For pavement condition, failure to meet the minimum Interstate condition level for two consecutive calendar years would subject a state to the following penalties:

- The state must obligate NHPP funds in an amount at least equal to the state's federal fiscal year (FFY) 2009 Interstate Maintenance apportionment of $31.7M. For each year after FFY 2013, the amount required to be obligated must increase by two percent over the amount required to be obligated in the previous federal fiscal year.
- The state must transfer Surface Transportation Program (STP) funds that are not sub-allocated based on population to the NHPP in an amount equal to ten percent of the amount of the state's FFY 2009 Interstate Maintenance apportionment, estimated at $3.17 million.

For bridge condition, failure to meet the minimum condition level for NHS bridges for three consecutive calendar years would subject a state to the following penalties:

- The state must obligate and set aside an amount equal to fifty percent of funds apportioned to the state for fiscal year 2009, estimated at $13,753,843 only for eligible projects on bridges on the NHS. The requirements will remain until less than ten percent of the bridges in the state on the NHS, by deck area, have been classified as Structurally Deficient.

1.3 TAM ORGANIZATIONAL STRUCTURE

The TAM Leadership Structure, as shown in figure 1-1, describes how TAM is organized within the DOT&PF. Appendix A further details this structure, coordination with FHWA, the Metropolitan Planning Organizations (MPOs), and the TAMP development for DOT&PF.

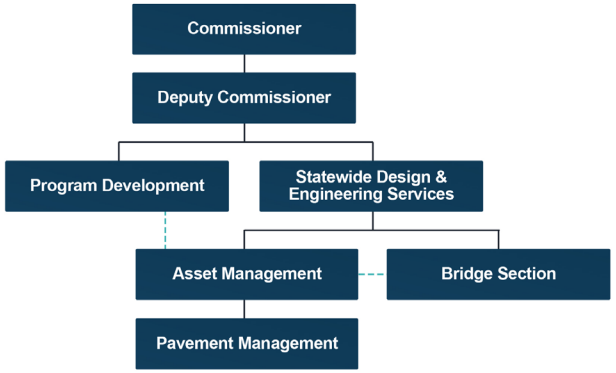


Figure 1-1. TAM organizational structure.

The TAMP provides a 10-year financial plan that describes the connection between the LRTP, which covers more than 20 years, and the STIP. Alaska's STIP currently provides 10 years of programming, but is only required to cover a 4-year period (23 CFR 450.218(a)). Figure 1-2 illustrates the connection between LRTP and STIP.

DOT&PF coordinated with MPOs during the development of the TAMP. The basis for this coordination was established via a Memorandum of Understanding (MOU) signed in 2018 between DOT&PF and the Anchorage Metropolitan Area Transportation Solutions and FAST Planning (formerly Fairbanks Metropolitan Area Transportation System). The MOU outlines data sharing, selection of performance targets and collection of data. Meetings were organized to provide an opportunity to comment on the draft TAMP and to provide condition data for pavement and bridges on the NHS system.

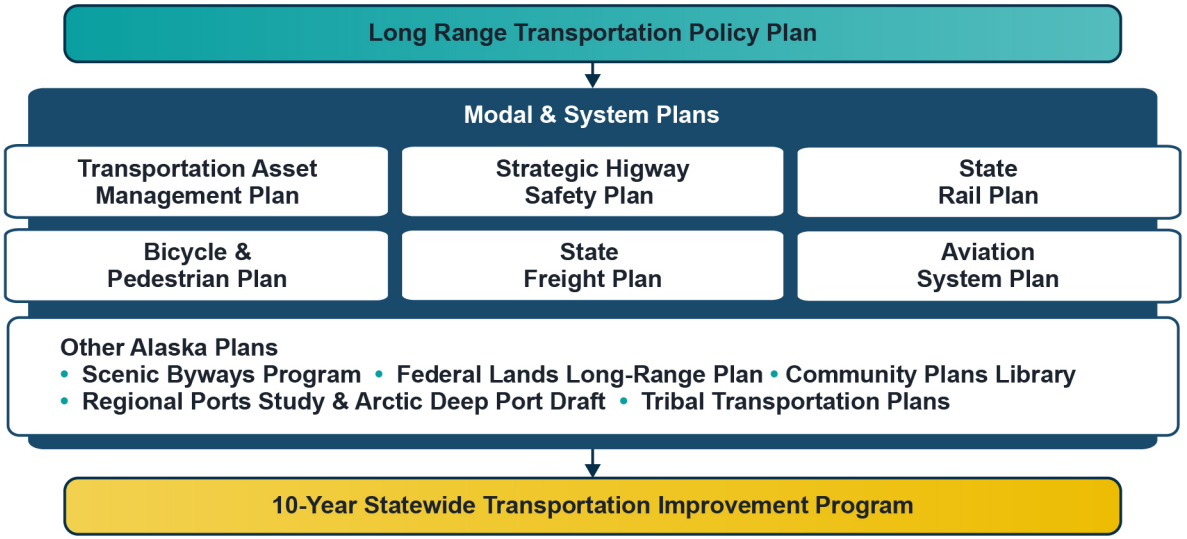


Figure 1-2. Connection between LRTP and STIP.

1.4 FEDERAL PERFORMANCE MANAGEMENT

The FHWA implemented Transportation Performance Management (TPM), which is a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. The application of the TPM approach ensures that investments are performance-driven and outcome based. See Appendix B for more information on Performance Management and state targets.

TPM encompasses the following national goal areas:

- Infrastructure Condition (National Highway System Bridges and Pavements)
- Congestion Reduction
- Safety
- Environmental Sustainability
- System Reliability
- Freight Movement and Economic Vitality
- Reduced Project Delivery Delays

States are required to set targets for performance in these performance areas. Only the infrastructure performance area carries a penalty for not making progress toward established targets, as described in the Penalties and Reporting section above.

1.4.1 National Goals for Pavement and Bridges

23 CFR 490.315(b) requires that the percentage of pavement rated as ***Poor*** **on Alaska's Interstate system not exceed 10 percent**. With a current condition of 0.9% of the Interstate system in *Poor*

condition, the State of Alaska continues to meet the 90 percent *Fair* or better national goal.

23 CFR 490.411(a) requires that the state maintain bridges so that the percentage of **bridges classified as structurally deficient does not exceed 10 percent, by deck area**.

From 2017 to 2021 the percentage of deficient bridges, by deck area, improved from 6.5 percent deficient to 5.7 percent, a trend of -0.2 percent annually. The State of Alaska meets the national goal of less than ten percent of bridge deck area in *Poor* condition.

1.4.2 Infrastructure Targets

23 CFR 490.105 requires that performance targets be set for both Interstate and non-Interstate NHS. Tables 1-1 and 1-2 present the performance targets established for NHS pavements and bridges for the second performance period which began on January 1, 2022 and will end on December 31, 2025. The percentage *Good* and percentage *Poor* targets for pavement and bridge condition were based on historical performance data.

DOT&PF has set declining targets for both pavements and bridges. These targets are equal to the desired state of good repair (DSOGR), which means the DOT&PF is not seeking to achieve better conditions than these targets. Since current conditions do exceed the targets, the DOT&PF's objective is to manage the system to sustain conditions above the targets indefinitely. This approach is reflective of the Department's need to balance competing demands for limited resources.

DOT&PF coordinated with MPOs during the development of the TAMP and target setting activities. Meetings were organized to review pavement and bridge data on the NHS system and to review current and proposed targets for the second performance period. DOT&PF targets can be seen on the Department's asset management website as well as FHWA's TPM Dashboard.

Although the target for the percentage of bridges in *Poor* condition is 10 percent, Alaska will strive to keep *Poor* bridges below 7.5 percent. This provides a buffer for additional deterioration as improvements are designed and programmed, since bridges are complex structures and require time for project development and design.

These targets will be the DSOGR for NHS bridge and pavement assets for the entire 10-year performance period 2022 to 2031.

1.4.3 Other Federally Required Performance Measures

Federal performance management legislation also requires states to set targets for the following programs:

- Safety Performance Measures
- Congestion Mitigation Air Quality Improvement Program (CMAQ)
- Travel Time Reliability
- Freight Movement

These additional targets and measures are discussed in detail in Appendix B.

Table 1-1. Performance targets for Interstate and non-Interstate NHS pavements.

Performance Measures	*2-year Target*	*4-year Target*	*10-year SOGR Target*
Poor Pavement Condition on the Interstate	5%	5%	5%
Good Pavement Condition on the Interstate	20%	20%	20%
Poor Pavement Condition on the NHS (excluding the Interstate)	10%	10%	10%
Good Pavement Condition on the NHS (excluding the Interstate)	15%	15%	15%

Table 1-2. Performance Targets for NHS Bridges.

Performance Measures	*2-year Target*	*4-year Target*	*10-year SOGR Ceiling*
Poor Condition of Bridges on the NHS (by area)	10%	10%	10%
Good Condition of Bridges on the NHS (by area)	40%	40%	40%

2 Pavement and Bridge Assets

The following section summarizes only those pavement and bridge assets that are on the NHS. All Alaska roads and bridges are important to consider for overall management of the transportation system, but for the purposes of the TAMP, the focus is only those on the NHS. More detailed information on DOT&PF's pavement and bridge assets and asset management processes is included in Appendix C for pavement and Appendix D for bridge.

2.1 NHS PAVEMENT INVENTORY

Table 2-1 summarizes Alaska's Interstate and non-Interstate NHS centerline miles based on data collected in 2021.

Table 2-1. Alaska's Interstate and non-Interstate NHS in centerline miles.

Facility Type	*Centerline Miles*
Interstate	1080.2
Non-Interstate NHS (paved)	822.4
Non-Interstate NHS (unpaved)	326.1
Total	**2228.4**

The entire 1080.2 miles of Interstate is owned and operated by DOT&PF. Of the 1148.5 miles of non-Interstate NHS, 21.8 miles are owned and operated by entities other than DOT&PF with 20.4 miles being owned and operated by the Municipality of Anchorage (MOA). The remaining 1.4 miles are intermodal links between the state highway system and a ferry, port, or airport.

2.2 PAVEMENT DATA COLLECTION

Pavement condition data is collected annually on the Interstate system by a third-party contractor. Although non-Interstate NHS data is only required to be collected every 2 years, DOT&PF's contractor collects all segments annually. Pavement condition data is collected using an automated/semi-automated method. A profiler equipped with a laser crack measurement system (LCMS), consisting of cameras and lasers, collects 3D profiles and images that are used for crack detection and to establish transverse profiles for calculations of rut depth. The profiler is certified (AASHTO R56) for data collection to establish longitudinal profiles to calculate the International Roughness Index (IRI). Patching and raveling data is also collected, although not required for reporting. Data is collected and reported to FHWA in 0.1-mile increments annually and is also loaded into the PMS. Faulting data is not collected and reported as DOT&PF does not have any Portland cement concrete roadways.

The only unpaved NHS mileage in the country is located on Alaska's Dalton Highway, which is the gravel haul road to the North Slope. This road required the data collection contractor to build a new 4x4 data collection vehicle to be able to safely navigate portions of the road through unstable permafrost.

Pavement data collection presents unique challenges in Alaska as 130 miles of NHS roadway is located on the Panhandle or on Kodiak Island. This requires the road profiler to be ferried from island to island to complete the condition assessment on the NHS. The collection season in Alaska is limited to between May and September due to seasonal rains and winter conditions.

The state collects pavement condition and other federally required Highway Performance Monitoring System data elements for the entire NHS regardless of ownerships and therefore does not require any special agreements to be put

in place for data collection to comply with 23 CFR 515.7(f). DOT&PF and MPOs developed a memorandum of understanding (MOU) and a Performance Measure Target Setting Procedures document to guide coordination between the two entities related to sharing data, setting targets, and selecting projects in support of targets. DOT&PF will continue to coordinate with the Municipality of Anchorage, as needed, and notes that at only one percent of the overall system, the non-DOT&PF owned NHS is unlikely to affect national goals and state targets.

2.3 PAVEMENT CONDITION

The federal performance measures use the following metrics for asphalt pavements: IRI, cracking, and rutting. Figure 2-1 below shows examples of each of these metrics.

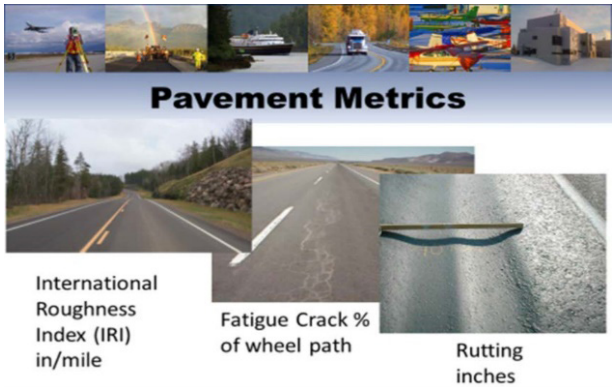


Figure 2-1. Federal pavement condition metrics for asphalt pavements.

Table 2-2 below outlines the values for each metric as *Good*, *Fair*, and *Poor*. Table 2-3 shows how to combine the three metrics to define an overall condition for each HPMS section (~0.1 miles).

Table 2-2. Pavement metrics thresholds.

Rating	*IRI (in/mile)*	*% Cracking*	*Rutting (in)*
Good	<95	<5%	<0.2
Fair	95-170	5-20%	0.2-0.4
Poor	>170	>20%	>0.40

Table 2-3. Pavement condition for HPMS section.

Segment Rating	*Metric Ratings (International Roughness Index [IRI], Cracking, Rutting)*
Good	All three metrics are *Good*
Poor	Two or more metrics are rated *Poor*
Fair	All other combinations

The final federal rule allows, but does not require, the use of Present Serviceability Rating (PSR) for roads with posted speeds less than 40 mph. This calculation does not include IRI. The State of Alaska is not using PSR at this time on the NHS.

Pavement condition data collected in 2021 and submitted to FHWA in 2022 represents the most current condition data. Figure 2-2 below shows Alaska's 2021 Interstate overall pavement condition with 0.9 percent of the Interstate network in *Poor* condition, 69.0 percent in *Fair* condition, and 30.1 percent in *Good* condition. Figure 2-3 shows historic Interstate conditions.

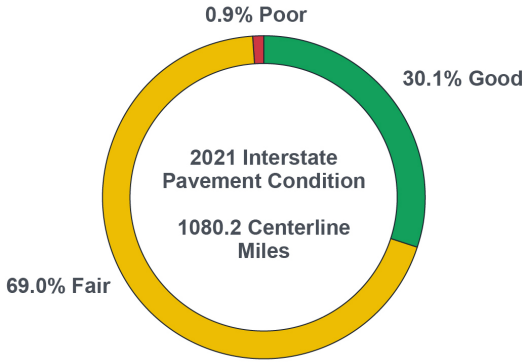


Figure 2-2. Alaska's 2021 Interstate pavement condition.

Alaska has 1,148.5 centerline miles of non-Interstate NHS based on 2021 inventory data. Most of these miles (822.4 miles) are paved. Figure 2-4 shows Alaska's non-Interstate NHS pavement condition in 2021 with 7.6 percent of the non-Interstate NHS in *Poor* condition, 67.0 percent in *Fair* condition, and 25.4 percent in *Good* condition. Figure 2-5 shows historic conditions for non-Interstate NHS pavements.

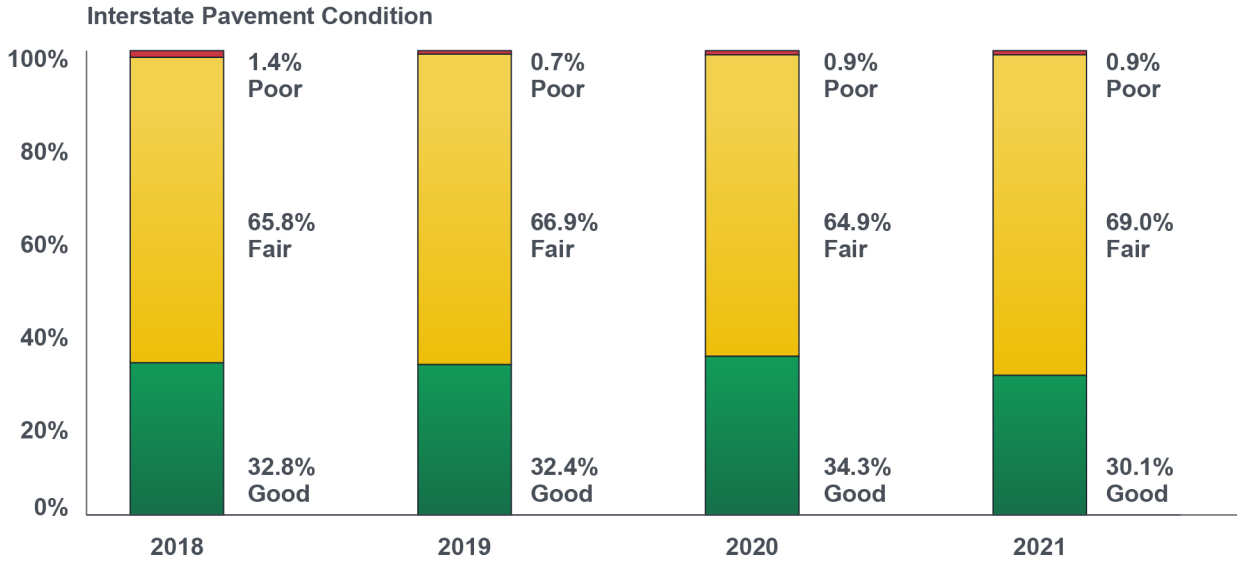


Figure 2-3. Historical overall pavement condition on Alaska's Interstate system.

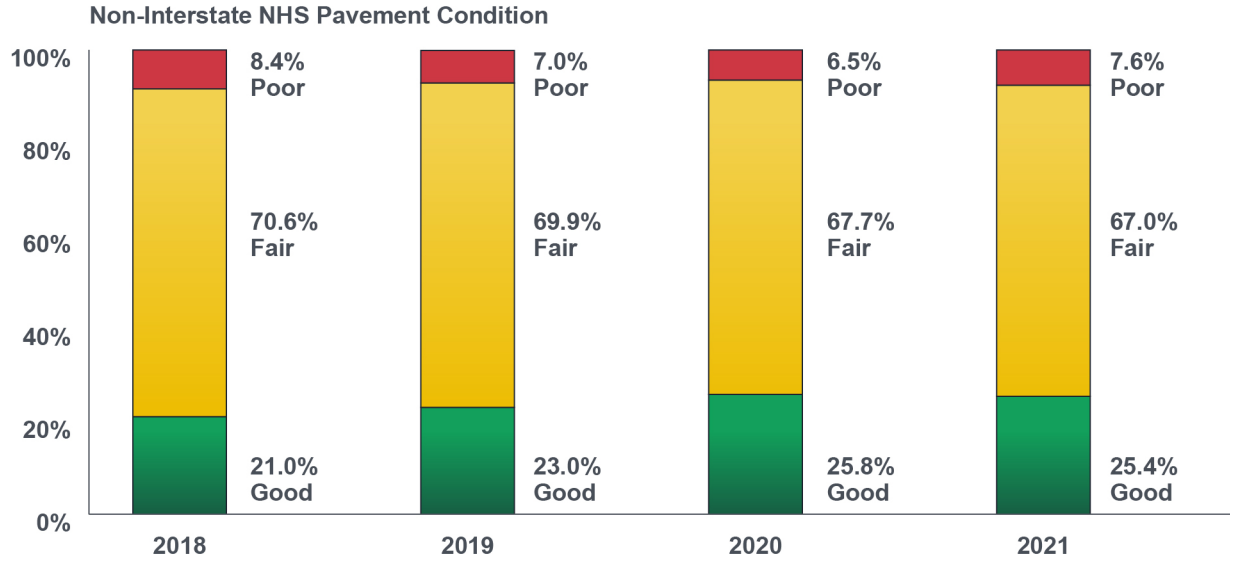


Figure 2-5. Historical overall pavement condition on Alaska's non-Interstate pavements.

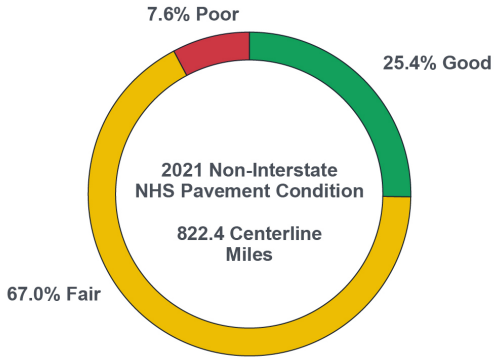


Figure 2-4. Alaska's 2021 non-Interstate NHS overall pavement condition.

The Department utilizes pavement condition data and the following pavement management objectives to effectively manage its pavement network.

- Treat pavements in *Good* and *Fair* condition before they deteriorate to save money over the pavement's life cycle.
- Provide information to allow effective selection and design of future surface treatments, rehabilitation, and reconstruction projects.
- Accurately estimate future conditions under varied funding scenarios to evaluate current pavement funding strategies.
- Display analysis results in understandable formats.

2.4 BRIDGE INVENTORY

In Alaska, the NHS bridge inventory has increased from 411 bridges in 2017 to 425 bridges in 2021. While all structures are referred to as bridges within this document, these bridges also include large culverts. Engineers biennially inspect bridges, and these inspections are subject to requirements established by FHWA. Bridge inventory changes year-to-year with bridge closures, bridge replacements, or changes in road functional class.

2.5 BRIDGE CONDITION

The bridge performance measure uses the following metrics for bridges: Deck Rating, Superstructure Rating, and Substructure Rating. Table 2-4 lists the condition thresholds in the final rulemaking. The lowest rating of all three metrics becomes the overall bridge condition.

Table 2-4. Bridge performance thresholds.

Bridge Metrics			
	Deck	Super	Sub
Good	9-7	9-7	9-7
Fair	6-5	6-5	6-5
Poor	<5	<5	<5

During biennial inspections, DOT&PF bridge inspectors assign a condition rating in accordance with the National Bridge Inspection Standards (NBIS). These ratings describe the existing, in-place condition of a bridge component compared to the bridge's original, or as-new, condition using a 0-9 scale, with 9 as excellent and 0 as failed.

A bridge is structurally deficient if inspection reveals that primary load-carrying elements are in *Poor* (or worse) condition. Primary load-carrying elements include the deck (driving surface), superstructure (the components supporting the deck such as the girders), and substructure (abutments and piers).

While the term "structurally deficient" can imply unsafe conditions, bridges with this classification are in safe operating condition to meet the required level of service, or the bridges are weight-restricted or lane-restricted (reduced to a single lane) to assure safe operation. When weight restrictions fall below 3 tons, the bridge is closed to traffic, in accordance with federal regulations. Closed bridges are considered in calculation of the performance measure. In the 2021 NBI data, there were two closed structures. One of these structures is now open and the other no longer carries NHS.

The DOT&PF measures bridge performance by calculating the ratio (percentage) of deck area of a given condition state (Good, Fair, or Poor/structurally deficient) compared to the total bridge deck area on the NHS. Table 2-5 shows how these condition states align with typical work needs. The percentage of structurally deficient deck area on the NHS became a congressionally mandated performance measure with the enactment of MAP-21. Figure 2-6 shows bridge condition data in 2021 from data collected in 2020.

Table 2-5. Bridge performance.

Condition Rating	***Typical Work Need***
Good	Maintenance or Preservation Candidate
Fair	Rehabilitation or Preservation Candidate
Poor	Rehabilitation or Replacement Candidate

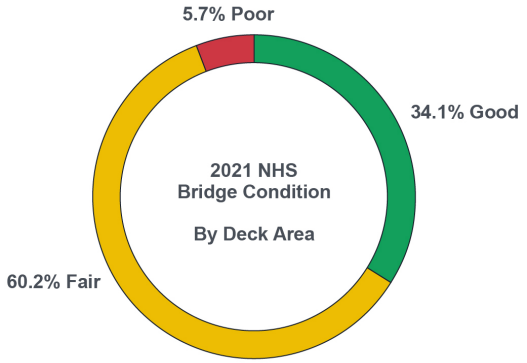


Figure 2-6. Overall bridge condition on NHS bridges in 2021 (by deck area).

MAP-21 contains a performance measure limiting *Poor* rated bridges to no more than 10 percent of all bridges on the NHS, by deck area. Since 2014, Alaska has met this criterion and has an improving downward trend of 0.2 percent annually.

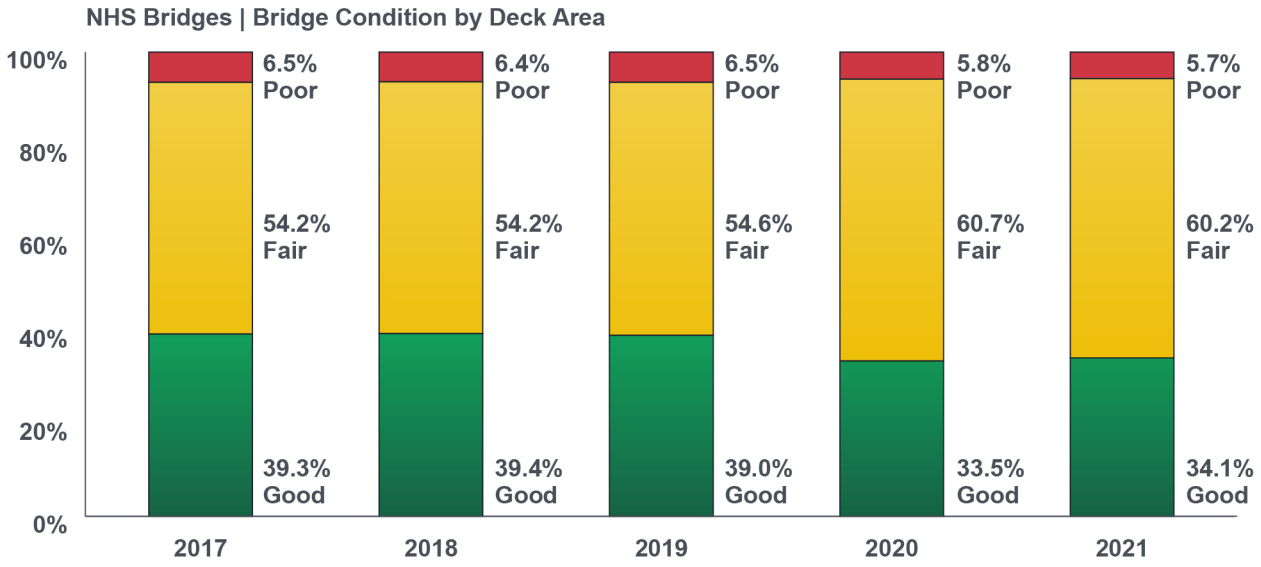


Figure 2-7. Overall bridge condition (by deck area) on NHS bridges.

Figure 2-7 depicts the percentage of NHS bridges in *Good*, *Fair*, and *Poor* condition from 2017 to 2021. Bridges in *Poor* condition decreased from 6.5 percent to 5.7 percent, consistent with the data presented earlier. While this decrease in bridges in *Poor* condition is encouraging, it is somewhat offset by the decrease in bridges in *Good* condition and the overall increase in bridges in *Fair* condition. This trend could be an indication of the need for more investment in preservation treatments aimed at maintaining bridges in *Fair* or better condition.

The 2017-2021 data includes on or off ramps, in accordance with the performance measures final rule, categorizing them as structurally deficient or not deficient. This is good information but is not used to calculate the federal performance measures. The Department uses bridge condition data and the following bridge management objectives to effectively manage its bridge assets.

- Design and construct bridges to last with minimal maintenance.
- Seal decks and expansion joints to protect bridges from road-salt laden runoff.
- Perform maintenance such as cleaning gutters and deck drains, removing debris from bottom chords and bearing seats, and removing drift from piers.
- Invest in preservative treatments for bridges in *Good* and *Fair* condition to slow deterioration. Preservative treatments might include deck seals, joint seals, and repainting structural steel elements.
- Provide information to allow effective selection and design of future maintenance, preservation (i.e., deck treatments), rehabilitation, and reconstruction projects.
- Accurately estimate future conditions versus funding scenarios to evaluate current bridge funding strategies.
- Display analysis results in an understandable format.

3 Performance Management

This section includes the DOT&PF process for assessing asset conditions and analyzing future conditions. DOT&PF, based on asset condition, calculates the funding needed to meet targets and the DSOGR by conducting life-cycle planning (LCP) using several scenarios described in more detail in Appendix F. Using a risk-based approach, a gap analysis is performed between DSOGR and available funding. The gap analysis process is further detailed in Appendix E. The amount of funding available is evaluated by developing a financial plan described in Section 4. Finally, these steps define investment strategies in Section 5 for ensuring the successful management of transportation assets.

3.1 PERFORMANCE GAP IDENTIFICATION

Although the TAMP focuses on infrastructure performance, there are other federal performance measures that affect bridges and pavement. Each of these performance areas contribute to the development of DOT&PF's capital program in support of the agency's LRTP. Several internal processes allow DOT&PF staff to manage delivery of the program to ensure the expected performance is delivered on time and within budget. These internal processes are connected to the TAMP development process to ensure that the TAMP is developed in full awareness of any gaps in the performance of NHS assets. These gaps are considered in the development of TAMP investment strategies which are described in more detail in Appendix I.

DOT&PF monitors and manages the performance of the NHS for all seven TPM National Goal areas:

- Safety
- Infrastructure condition
- Congestion reduction
- System reliability
- Freight movement and economic vitality
- Environmental sustainability
- Project delivery

Safety targets were set in May 2021 for fatalities, fatality rate, major injuries and major injury rate, and non-motorized fatalities. All modernization or expansion projects use safety data for funding prioritization. The HSIP for 2022 contained seven safety projects that will also improve pavement or bridge conditions. DOT&PF preservation projects also include a review of any safety deficiencies which can be corrected.

Alaska's freight transportation system is performing reasonably well today. Alaska's Freight Plan analysis identified the following performance risks that are expected to increase in coming years: congested truck routes and intermodal connectors; limited route and modal service choices, especially for rural communities; unreliability or unavailability of services due to seasonal effects, aging infrastructure, or other disruptions; overall cost of goods; and missing infrastructure links and facility improvements that are needed to serve new industries and population growth.

Measures for travel time and freight reliability represent a new data source for DOT&PF. State targets have been adopted, but DOT&PF is working to incorporate this data into project selection criteria.

Another resource for gap identification is the DOT&PF's LRTP, *Let's Keep Moving 2036*. The plan established the policy goals shown below. Understanding future state needs and visioning not only addresses condition targets but will also help identify system performance gaps.

- **New Facilities**—Develop new capacity and connections that cost-effectively address transportation system performance.
- **Modernization—**Make the existing transportation system better and safer through transportation system improvements that support productivity, improve reliability, and reduce safety risks to improve performance of the system.
- **System Preservation**—Manage the Alaska Transportation System to meet infrastructure condition performance targets and acceptable levels of service for all modes of transportation.

- **System Management and Operations**—Manage and operate the system to improve operational efficiency and safety.
- **Economic Development**—Promote and support economic development by ensuring safe, efficient, and reliable access to local, national, and international markets for Alaska's people, goods, and resources and for freight-related activity critical to the State's economy.
- **Safety and Security**—Improve transportation system safety and security.
- **Livability, Community, and the Environment**—Incorporate livability, community, and environmental considerations in planning, delivering, operating, and maintaining the Alaska Transportation System.
- **Transportation System Performance**—Ensure a broad understanding of the level, source, and use of transportation funds available to DOT&PF; provide and communicate the linkages between this document, area transportation plans, asset management, other plans, program development, and transportation system performance.

The 2022 LRTP update, *Alaska Moves 2050,* will not be finalized before the submission of the TAMP. The LRTP update is based on a performance-based planning framework. Performance-based planning means tailoring decisions to local context and using the best available data to inform them. The benefits of this approach include improved decision making, higher return on investment, better accountability, and improved performance. With the new transportation infrastructure bill[1], increased funding is projected for the next 5 years for all modes. The LRTP will be focused on investing funding strategically to reach transportation goals and to adequately fund maintenance and operations of any new transportation infrastructure.

3.2 PERFORMANCE GAP ANALYSIS

"Performance Gap" is defined in 23 CFR 515.5 to mean both the gaps between the current asset condition and a state DOT's target for asset condition as well as the gaps in system performance effectiveness that are best addressed by improving the physical assets. The gap analysis internal processes shown in figure 3-1 are further detailed in Appendix E. The results of the gap analysis are described in section 4.3 and are included in tables 4-1 to 4-4.

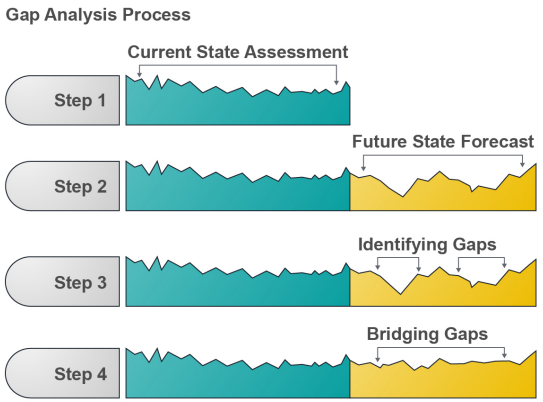


Figure 3-1. Performance gap analysis process.

To begin to identify performance gaps, the current state of assets was determined by reviewing historical data and trends. External factors that could affect the future state, such as a change in volume of heavy truck traffic or safety concerns, were also examined.

Historical data for pavement performance over the last 4 years indicates that conditions are fairly stable on the Interstate with 1 percent of the network in *Poor* condition and 30-34 percent in *Good* condition. The non-Interstate NHS pavement in *Poor* condition remains fairly stable between 7 and 8 percent while the percentage of pavement in *Good* condition has been steadily increasing from 21 percent in 2018 to 25 percent in 2021. The gap analyses for the NHS pavement subnetworks indicate that current and forecasted pavement conditions for both subnetworks exceed all established performance targets, which are also considered the desired states of good repair. DOT&PF is in the fortunate situation that the current and forecasted percentage of pavement in *Good* condition exceeds the NHPP performance targets and the DSOGR. This allows the Department to actively monitor this pavement performance measure and consider reallocating valuable funding resources to other performance areas to improve performance in those areas and better meet state performance management objectives consistent with the LRTP.

Looking at historical bridge structural deficiency revealed that conditions are relatively stable or

1 U.S. Congressional Legislation - H.R.3684 - Infrastructure Investment and Jobs Act

hover around the 10 percent structurally deficient. The gap analysis shows that the percentage of bridges in *Poor* condition at 5.7 percent achieves the target and desired SOGR of a maximum of 10 percent *Poor*. The percentage of bridges in *Good* condition at 34.1 percent does not meet the target of 40 percent. Although the percentage of bridges in *Poor* condition does not exceed the ceiling of the ten percent target that was established, the Department needs to continue programming reconstruction and rehabilitation of bridges to keep bridges at less than 10 percent *Poor.* The Department strives to meet the 10 percent target by using 7.5 percent *Poor* as its internal benchmark level of performance. The Bridge Section submits a prioritized list to Program Development staff for consideration when the bridges require major rehabilitation.

Additionally, the Bridge Section has completed simple retrofits to improve bridge performance during a seismic event. Approximately twenty-five percent of the total bridges in Alaska need improvement to perform better in a seismic event. The Bridge Section provides regional planners with a list of bridges that do not meet seismic standards.

3.3 PERFORMANCE MANAGEMENT AND PROGRAM DEVELOPMENT

DOT&PF is substantially meeting its pavement and bridge targets and expects to be able to continue to do so; however, there are trade-offs related to funding availability and remaining performance gaps both on and off the NHS. For example, as funding is focused on preservation and rehabilitation of pavement and bridges, it will be more difficult to fund modernization-focused improvements and other priorities described in the LRTP. Additionally, funding is needed for the non-NHS routes, Alaska Marine Highway System ferry purchases, high-cost mobility improvement projects such as Sterling Highway: Sunrise to Skilak (aka Cooper Landing Bypass), Dalton Highway paving and gravel road preservation, geo-technical assets, culverts and other highway related appurtenances, and other improvements that will not contribute toward meeting targets. DOT&PF considers alternatives and trade-offs when making funding decisions related to meeting targets and closing or minimizing these performance gaps.

3.4 LIFE-CYCLE PLANNING: ANALYSIS AND MANAGEMENT

The process for conducting LCP required by 23 CFR 515.7(b) is described in Appendix F, and the steps are shown in figure 3-2. This section provides an overview of DOT&PF's LCP capabilities and objectives and summarizes the results of the LCP analysis performed to support and validate the investment strategies described in Section 5.

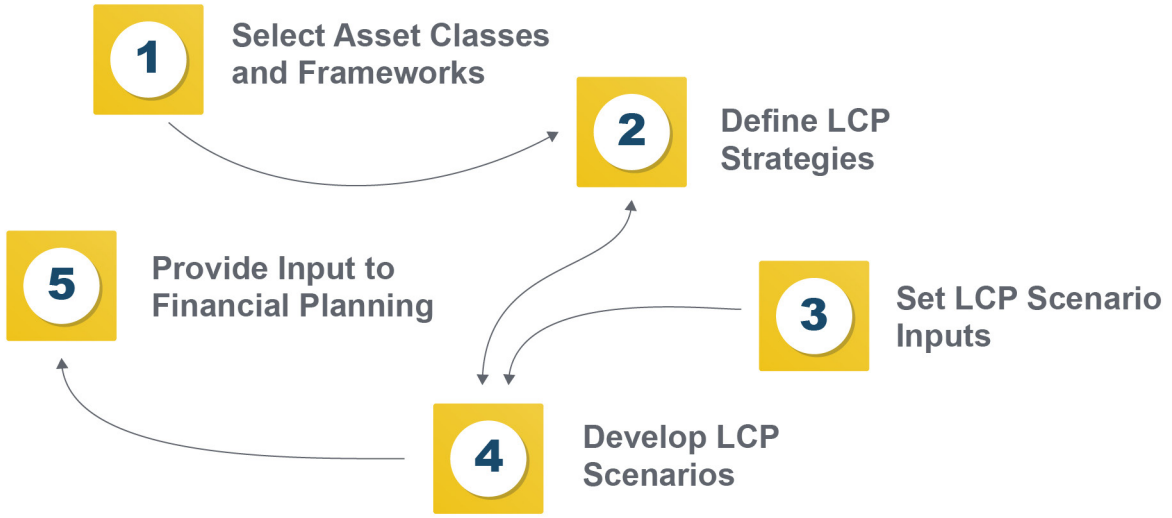


Figure 3-2. Life-cycle planning process.

3.4.1 Background

LCP involves long-term analysis of pavement and bridge performance under different budget and strategy scenarios. As described in Appendix F, this analysis is performed using asset management systems.

In 2020, the DOT&PF completed implementation of its pavement management system (PMS) and bridge management system (BMS). The PMS and BMS that DOT&PF implemented each meet the analysis capabilities required for LCP and are compliant with the federal requirements. The analyses and life-cycle plans described below were developed using the newly implemented PMS and BMS.

3.4.2 Objectives

Staying with the TAM motto to "start simple and grow smart," DOT&PF's LCP objectives are to:

- Continually refine deterioration models to predict future conditions more accurately.
- Refine life-cycle strategies that focus on cost effective preservation on Alaska's connected road system and, when it makes sense, for remote rural communities.
- Develop a plan for every NHS bridge and road segment using age, condition, and demand as the primary criteria.
- Educate internal and external stakeholders on why the preferred LCP strategies are the most efficient use of public funds and how budget changes affect asset condition over time.
- Determine the funding needed in each work type to meet established targets and the DSOGR.
- Reduce the cost of annual expenditures without negatively impacting asset condition using management system outputs and professional judgment.
- Integrate resilience into transportation LCP strategies and the risk management plan.

3.4.3 LCP Analysis Results and Preferred Strategies

Following the procedures described in Appendix F, the DOT&PF used these systems to determine the best overall approaches to managing its pavements and bridges for the long term. Highway assets in Alaska must withstand cold-weather and marine environments that are not typical in other states. As such, each of these management systems has been configured to consider the unique designs, materials, and performance characteristics of Alaska's highway assets.

3.4.4 Pavement Life-Cycle Planning

The PMS was used to model network pavement conditions under different budget scenarios and following different strategies for prioritizing potential work. The LCP process was used to evaluate different strategies and investment levels to ensure long-term pavement performance.

In this analysis, the PMS's approach to maximizing benefit was used to determine the budget necessary to achieve and sustain the DSOGR through the TAMP period. The system's approach represents an ideal set of investments and does

Considering Extreme Weather and Resilience in Pavement Life-Cycle Planning

Thawing permafrost is a significant risk to pavement performance as it compromises the stability of the pavement subgrade. DOT&PF accounts for this risk in life-cycle planning by including subgrade stability in PMS decision trees (Appendix F).

DOT&PF is developing processes for integrating data from other data systems, including twice-damaged emergency repair locations and GAMS high risk locations, to further integrate extreme weather risks and resilience into the LCP analysis process (Appendix G).

DOT&PF considers risk throughout all phases of a pavement's life cycle, from planning through maintenance and operation, including impacts due to extreme weather events and resilience. DOT&PF has developed a design strategy (ACE) to address roadways susceptible to damage due to thawing permafrost (Appendix G).

not consider project or program constraints other than budget. A series of analyses were run for budgets between $110 million and $150 million per year to determine the funding needed to sustain the desired SOGR. This needs analysis assumes that all pavement work would be selected based on PMS recommendations, following the preferred life-cycle strategy. Figures 3-3 and 3-4 compare pavement conditions resulting from various investment levels for the Interstate and non-Interstate NHS, respectively. Based on this analysis, the current budget of approximately $130 million per year is sufficient to sustain the desired SOGR through the TAMP period. However, it should be noted that the percentage of *Poor* pavement is increasing in these scenarios from it's current levels of 0.9 percent on the Interstate NHS and 7.6 percent on the non-Interstate NHS. At these funding levels, the most cost-effective strategy is to maximize preservation and rehabilitation and postpone reconstruction. This would not allow DOT&PF to work through the backlog of pavements needing reconstruction.

The effectiveness of DOT&PF's PMS is demonstrated in figure 3-5. This figure compares the conditions resulting from investing the anticipated $130 million per year according to two different life-cycle strategies. One strategy is triggered by system benefits for different work types and the other strategy places a priority on pavements in the worst condition first. Figure 3-5 shows that a worst-first strategy does not maintain the desired SOGR for the TAMP period and leads to significantly more pavements in *Poor* condition over the long term.

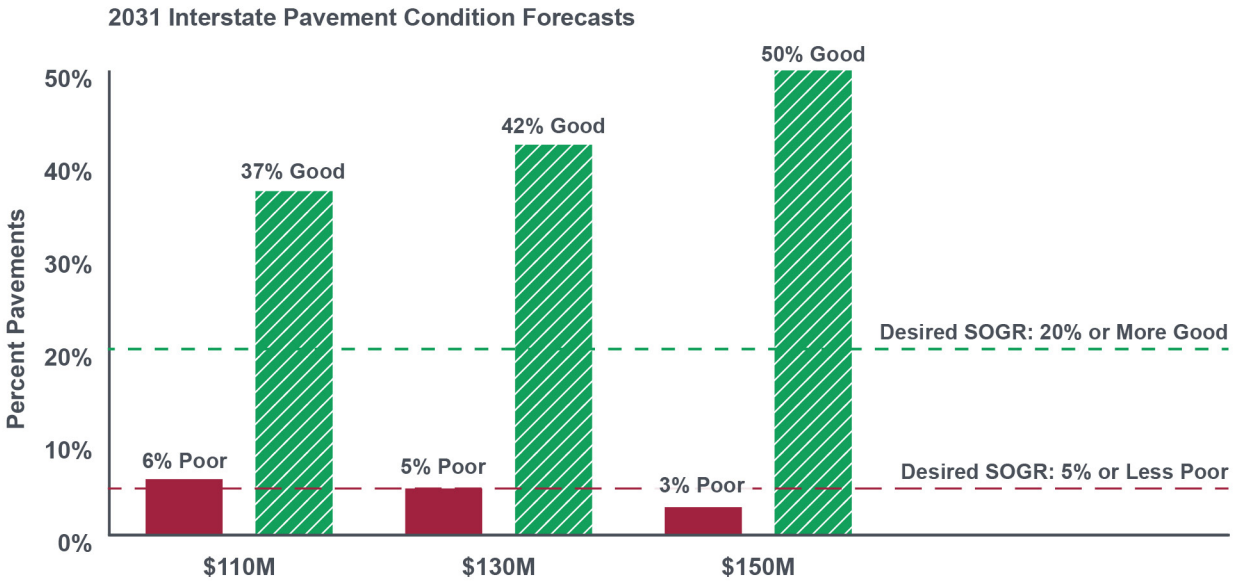


Figure 3-3. Interstate pavement condition forecasts at various investment levels.

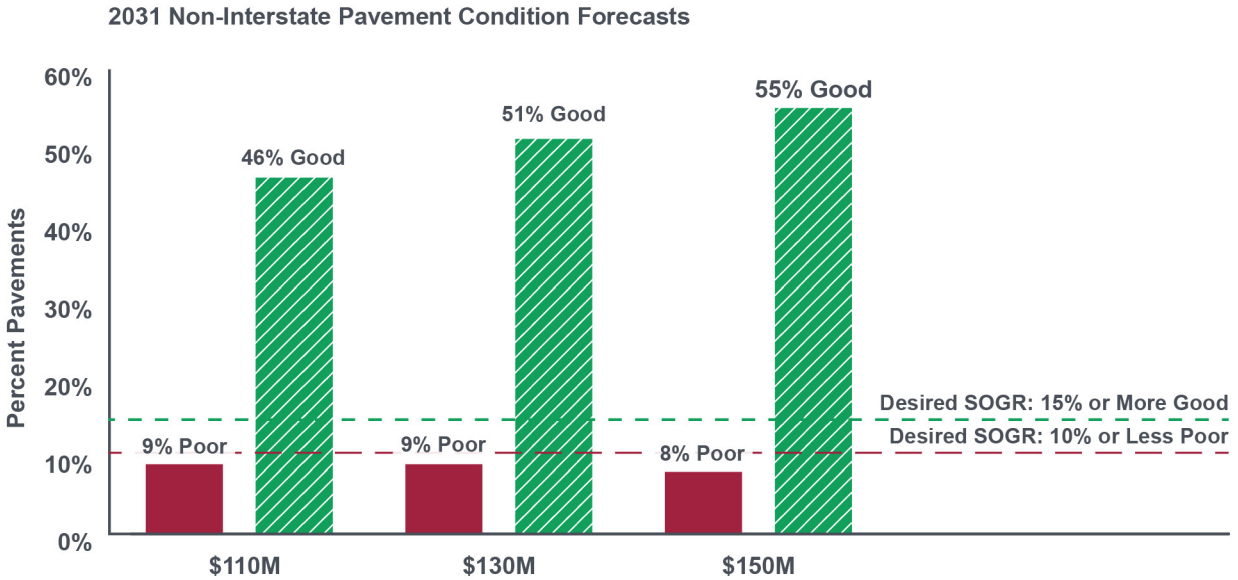


Figure 3-4. Non-Interstate NHS pavement condition forecasts at various investment levels.

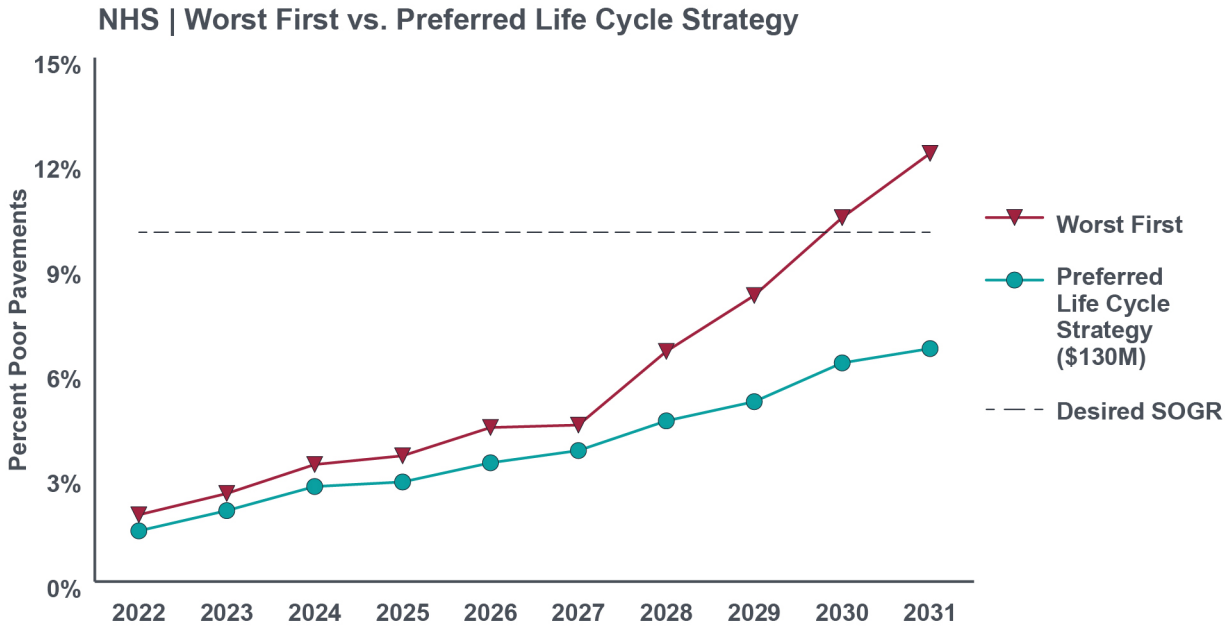


Figure 3-5. Comparison of TAMP investment strategy to worst-first strategy.

3.4.5 Bridge Life-Cycle Planning

The BMS was used to model system performance under different budget scenarios and following different strategies for prioritizing potential work. The LCP process was used to evaluate different strategies and investment levels to ensure long-term bridge performance. The BMS has a multi-objective decision-making framework and uses a utility function that combines condition and risk and life-cycle cost to address bridge needs in all aspects.

Preservation plays a major role in the DOT&PF's preferred life-cycle strategy for bridges. Effective bridge preservation actions are applied while bridges are still in *Good* or *Fair* condition and before the onset of serious deterioration. These early treatments delay the need for more costly rehabilitation or replacement. Bridge preservation includes cyclical and condition-based maintenance activities. Some examples of cyclical maintenance include cleaning drains, cleaning joints, deck sealing and sealing concrete. Some examples of condition-based maintenance include joint repair, concrete deck repair, steel member repair, bearing restoration, pile preservation, and scour countermeasures.

Considering Extreme Weather and Resilience in Bridge Life-Cycle Planning

Extreme weather and resilience are considered within the BMS modeling framework for seismic risks and hydraulic risks including scour, channel protection, and waterway adequacy.

Candidate bridge treatments identify locations where infrastructure can be hardened through the seismic retrofit program, scour protection, and channel improvements (Appendix F, G).

Figure 3-6 shows forecasted 10-year *Good* and *Poor* bridge conditions for the preferred life-cycle planning strategy at budget levels of $48-75 million per year for NHS bridges. The preferred strategy is expected to maintain the desired SOGR through 2031 for *Poor* condition and higher budgets provide better performance. However, the extended analysis in figure 3-7 shows deteriorating conditions over a 20-year period. The 20-year analysis is used in bridge LCP analysis due to the very long service lives, and slow deterioration

rates, of bridges. This analysis period provides enough time to trigger at least one significant action on the majority of bridges in the inventory. Figures 3-6 and 3-7 show that the desired SOGR for *Good* condition cannot be achieved throughout either a 10- or 20-year period, even with increased funding. This is not as critical as the desired SOGR for *Poor* condition. More significantly, figure 3-7 shows that the desired SOGR for *Poor* cannot be maintained over 20 years, even with additional funding. While this is not an immediate issue, it is a concern for long term planning. The preferred life-cycle planning strategy is described in further detail in Appendix F.

3.5 RISK MANAGEMENT

Risk is the positive or negative effect of uncertainty or variability upon agency objectives. Risk management is the process and framework for identifying, analyzing, evaluating, and addressing risks to both assets and system performance. Using the processes described in Appendix G, as required by 23 CFR 515.7(c), DOT&PF has identified, assessed, evaluated, and prioritized relevant asset management risks. Risks identified as being beyond the agency's risk tolerance have been documented and addressed through risk mitigation strategies. A risk management team, made up of staff from multiple program areas, reviews and reaffirms agency risks and mitigation strategies annually. The results of the process are detailed in Appendix G. The most significant risks identified in the register are summarized on the following pages.

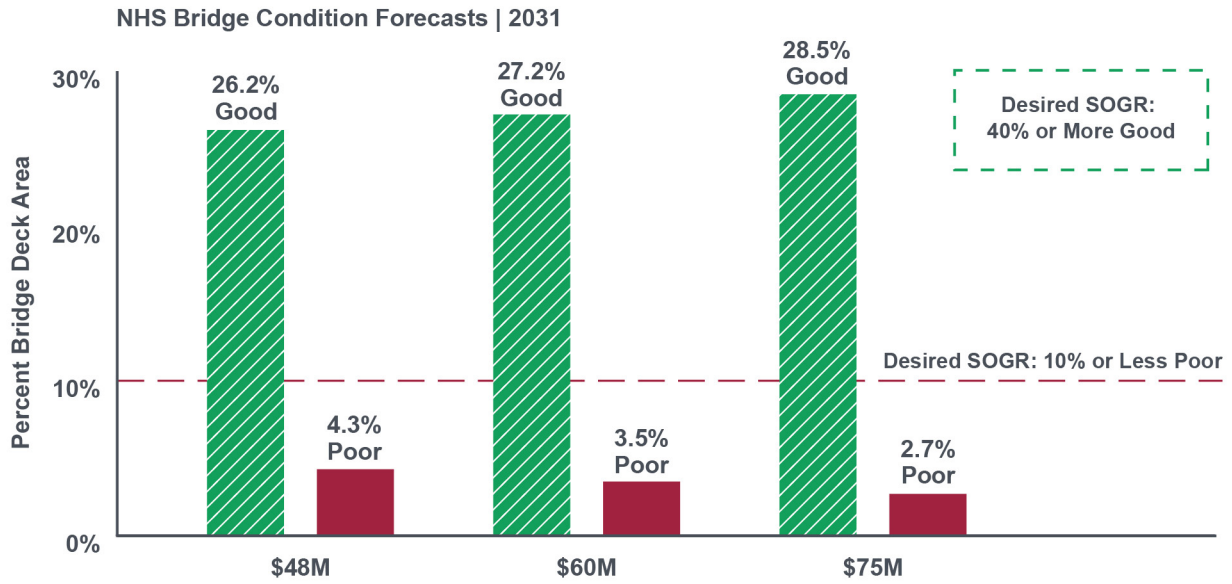


Figure 3-6. Comparison of forecasted bridge conditions at various funding levels for 10-year analysis period.

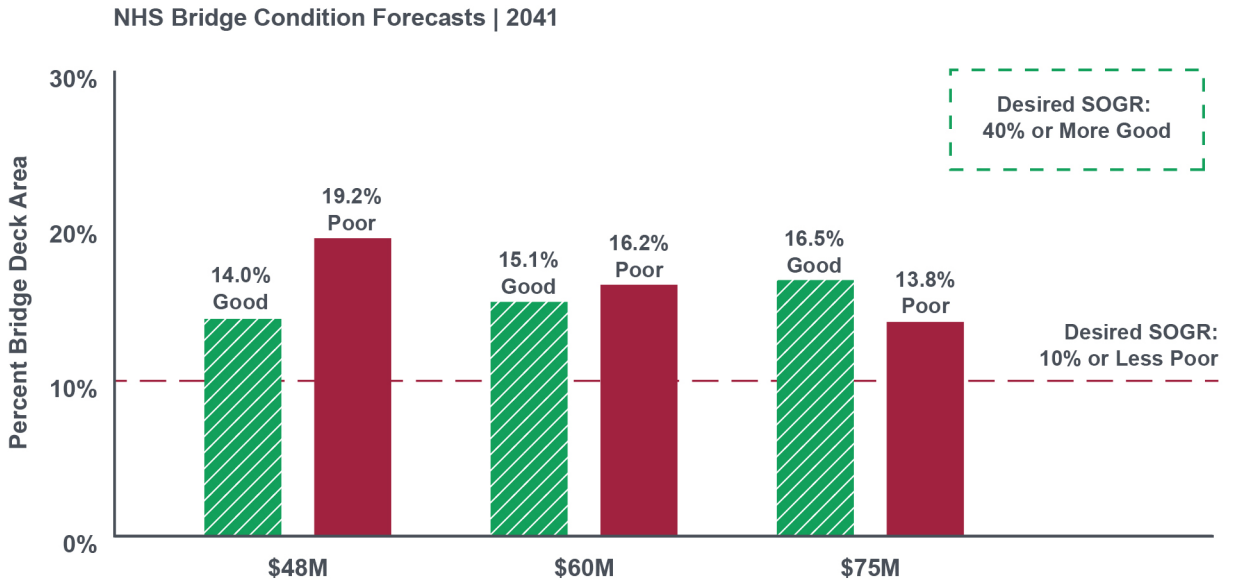


Figure 3-7. Comparison of forecasted bridge conditions at various funding levels for 20-year analysis period.

3.5.1 Funding

A decrease in funding would force some projects to be constructed later, delaying the project benefit to the traveling public and Alaska's economy. The recently passed Bipartisan Infrastructure Law (BIL) has provided significant mitigation of this risk, and the State of Alaska is committed to providing state funds to match all available federal aid.

This category also includes the risk of adding more assets than Maintenance and Operations (M&O) resources can maintain. To mitigate this risk, the DOT&PF is employing a number of strategies, such as considering future maintenance costs in the planning and programming process and optimizing designs to minimize future maintenance costs.

3.5.2 Delivery of the Program

Lack of trained Department staff and other resources can put the delivery of the program at risk. Mitigation strategies include training, succession planning, and knowledge management to help new staff quickly obtain the knowledge they need to perform their duties. Additionally, cost increases from planning to construction were identified as a significant risk. The DOT&PF is continually working to strengthen the connections among financial planning, long-range planning, STIP development, and project delivery to mitigate this risk.

3.5.3 Data and IT Systems

Information systems can be difficult to implement for any agency. Getting the information to Department staff and the public is labor intensive. The DOT&PF is working with the Office of Information and Technology to establish data governance and information system reviews will help to make sure no systems are redundant and free up resources to implement improvements.

3.5.4 Natural Risks

3.5.4.1 Seismic Activity

Alaska is a highly seismic state. DOT&PF is working to change the approach for development of projects. In addition to condition, the life-cycle planning process considers seismic vulnerabilities and recommends treatments to mitigate this risk, rather than postponing improvements until they are warranted based solely on the asset condition.

DOT&PF bridge designers are using a ductility-based approach to bridge design. A ductile bridge moves during a seismic event to avoid collapse. Repair techniques are designed to be rapidly implemented from readily available materials. Utilizing this strategy helps avoid collapse of the bridge, which preserves life and safety. Developing repair techniques prior to a seismic event helps to both respond to and recover from disruptions. In addition, the seismic retrofit program is set up to evaluate, examine, and design enhancements to bridges that are determined to be insufficient in earthquake zones. A seismic database is used to prioritize bridge needs and the program was established to help mitigate risk.

3.5.4.2 Extreme Weather and Climate Change

Alaska has other natural risks besides seismic events. Permafrost is thawing in many areas of the state. In addition, both landslides and rockfall events continue to take place. Extreme weather events are increasingly producing flooding, erosion, and avalanches that cause infrastructure damage and impact system mobility. DOT&PF considers resilience in several ways, including design guidance for roadways susceptible to damage due to thawing permafrost as well as for vulnerable bridges and roadways located in floodways. The Department has implemented enhanced hydraulic modeling and a condition rating system for rock slopes, soil slopes, and retaining walls. DOT&PF is also planning to develop a resiliency workplan for identifying, evaluating, and prioritizing improvements to locations vulnerable to environmental hazards. Appendix G includes more information on resilient infrastructure and DOT&PF's mitigation strategies for extreme weather, such as:

- Roadway design for thawing permafrost
- Material selection for bridge design
- Scour critical program
- Bridge and culvert design for flooding
- Roadway design for flooding
- Unstable slopes
- Research
- Emergency Funding and Part 667

Another mitigation strategy for extreme weather and climate change that the Department has

adopted is tracking **Twice-Damaged Assets** as required under 23 CFR 667. FHWA requires that state transportation departments conduct evaluations to determine if there are reasonable alternatives at road, highway, and bridge locations that have required repair and reconstruction activities on two or more occasions due to emergency events. DOT&PF performed an initial identification of twice-damaged assets (TDAs) in compliance with 23 CFR 667 and DOT&PF Policy and Procedure No. 07.05.100 (P&P).

DOT&PF's twice-damaged assets 2021 report provides a list of locations where Emergency Relief (ER) funding was spent on both NHS and non-NHS routes between January 1, 1997 and December 31, 2019. Appendix G provides a list of these locations. Figure 3-8 shows a summary of these locations in a map format. According to 23 CFR Part 667, an evaluation must consider the risk of recurring damage and cost of future repairs under current and future environmental conditions. The P&P requires each region to complete an Alternatives Evaluation (AE), documented in an Alternatives Evaluation Report (AER), for each TDA location in their respective Region. DOT&PF Program Development assures that an AER is complete before putting a project in the STIP that contains a TDA location. ER expenditures are updated annually and analyzed for new TDA locations. A new TDA list is published annually by January 31. The Regions are responsible for reviewing and updating AEs, as necessary, and completing AEs and AERs for new TDA locations on a quadrennial basis.

Figure 3-8 on the following page shows locations that utilized ER program funds. ER funding is used for the repair or reconstruction of federal aid highways and roads on federal lands that have suffered serious damage. Twice damaged assets are shown in blue.

The Department's Guidance on Emergency Funding and Documentation was completed in 2022. The guide provides contextual information and procedural guidelines for DOT&PF employees to prepare the documentation needed to respond to, and recover from, emergencies/disasters that effect the operations of the Department.

DOT&PF Resilience Mapping Project

The DOT&PF created a risk and resilience storymap to provide extreme weather information for pavement and bridge planning. The storymap includes data from the FEMA Risk Assessment, information about known geohazards, permafrost data, seismic risk information, and flood data related to bridges. The map was created to increase the DOT&PF's ability to anticipate and plan for disruptive events which may affect pavements or bridges.

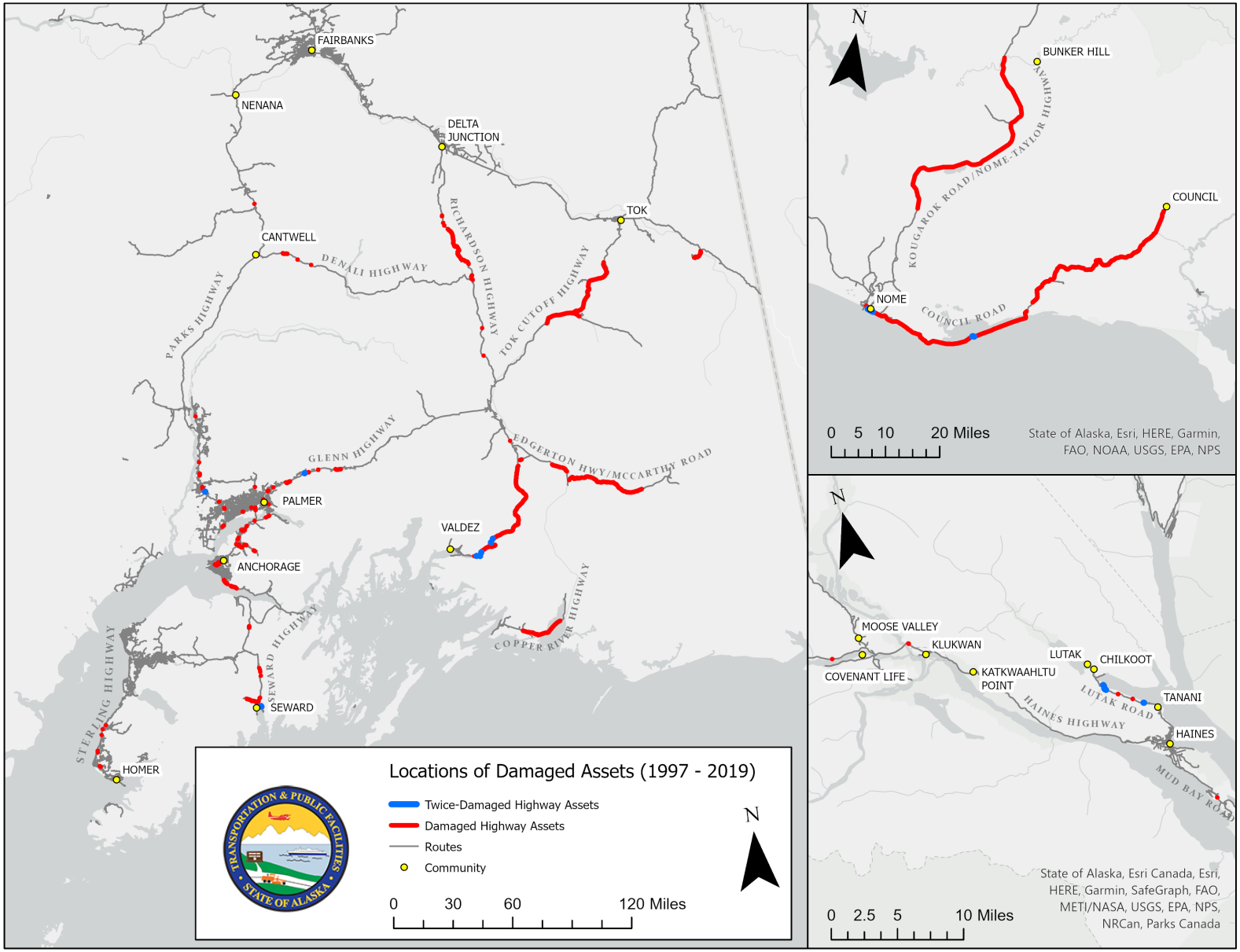


Figure 3-8. Locations of damaged assets.

4 Financial Plan

The following financial plan provides an overview of the resources required to meet the needs of pavements and bridges on the NHS and the resources available to meet those needs. The plan considers:

- Funding needs to adequately manage NHS pavements and bridges
- Funding availability to address pavement and bridge conditions
- The quantity and implications of gaps between needed and available funding levels
- The value of DOT&PF pavement and bridge assets on the NHS

The financial plan provides context for identifying and comparing potential investment strategies for the TAMP period, which are described in Section 5. The processes that DOT&PF followed to develop this financial plan are described in greater detail in Appendix H.

4.1 CURRENT AND FUTURE FUNDING NEEDS

As described in Section 3, DOT&PF uses condition and cost data on pavements and bridges to establish long-term strategies for maintaining and improving asset conditions at the lowest practicable costs. These analyses allow the Department to assess the long-term funding needs. The following subsections provide an overview of the level of resources needed over the next 10 years to achieve the Department's pavement and bridge condition targets and DSOGR while still managing other infrastructure needs and accounting for critical risks.

The connection between system performance and asset condition is discussed in further detail in Section 3.2. Critical risks are explained in Section 3.5, Risk Management, and Appendix G, Risk Management Analysis.

4.1.1 Pavement and Bridge Performance Gap Assessment

The following graphs compare the performance anticipated for pavement and bridge conditions over the TAMP period to the DSOGR for pavements (figure 4-1) and bridges (figure 4-2). Figure 4-1 shows that the pavement network is expected to sustain conditions better than the DSOGR for the entire TAMP analysis period. Figure 4-2 shows that bridge conditions will continue to meet and exceed the DSOGR for *Poor* condition, but the percentage of *Good* condition falls throughout the analysis period and will no longer meet the desired SOGR after the first several years. DOT&PF will work towards improving bridge condition by increasing its selected investment strategy and updating its BrM models.

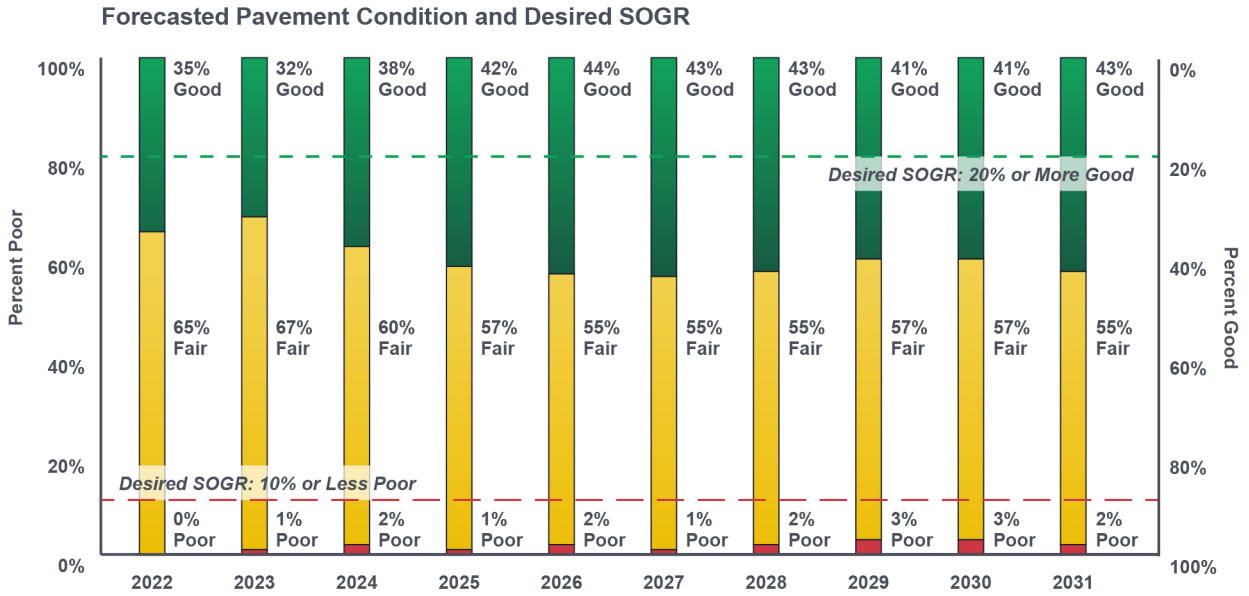


Figure 4-1. Forecasted pavement conditions v. desired SOGR.

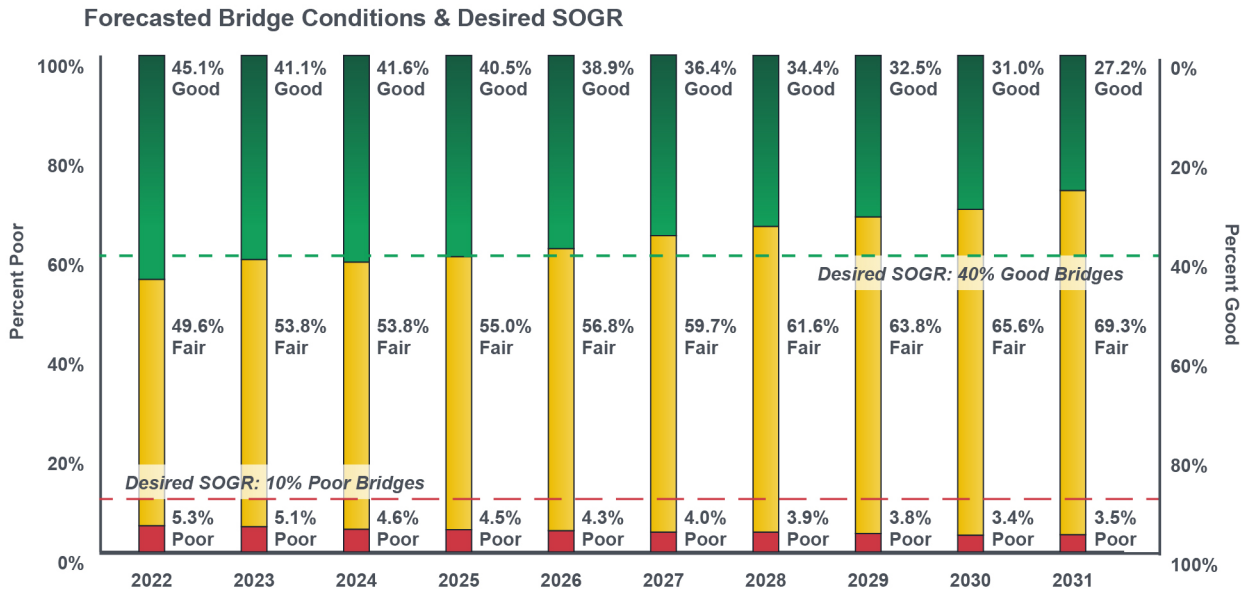


Figure 4-2. Forecasted bridge conditions v. desired SOGR.

4.1.2 Addressing Other Needs

Pavements and bridges on the NHS are the focus of this TAMP but are not the only assets that the Department manages with highway funding. Likewise, pavement and bridge conditions are not the only factors that contribute to safe and efficient highway operations. The following sections describe how other assets, risks, and overall system performance are considered in establishing funding needs. The balance of investments to achieve the Department's various objectives are described in further detail in Section 5, which provides information on the Department's actions to optimize outcomes across asset classes and programs through tradeoff analysis.

4.1.2.1 OTHER ASSETS

In addition to pavements and bridges, the Department manages many other infrastructure assets that are necessary to keep the highway system safe and operable, such as guardrails, culverts, signs, walls, and traffic signals. The agency also manages non-highway assets. While aviation and transit assets have separate dedicated funding streams, ferries rely heavily on highway funding, primarily NHPP funding. Funding needed to address other infrastructure assets are identified from review of the STIP and highway maintenance budgets. These funds are subtracted from the revenue sources described in Section 4.2 before comparing the funding needs for pavements and bridges to available revenue.

4.1.2.2 RISK

Section 3.5 and Appendix G provide details on critical risks that must be managed to minimize threats to system performance and maximize the Department's ability to take advantage of future opportunities. Addressing some of these risks requires investing in ways that are counter to the life-cycle strategies described in Section 3.4, Life-Cycle Planning. An example of this is the Department's investment in retrofitting bridges and other facilities that may be in *Good* condition but are not adequately resilient to damage from potential seismic events. The risk of serious or catastrophic damage from the possible seismic event may be more important than maintaining or improving the condition of other assets.

4.1.2.3 SYSTEM PERFORMANCE

DOT&PF monitors and manages the performance of the NHS in regard to all seven TPM National Goal areas outlined in Section 3.1. Each of these performance areas requires investment through capital projects and maintenance activities. The costs of these actions are accounted for by review of the STIP and maintenance budgets. These funds are subtracted from the revenue sources described in Section 4.2 before comparing the funding needs for pavements and bridges to available revenue.

4.2 FUNDING ASSET MANAGEMENT

Transportation funding in Alaska is a combination of federal funds, state General Funds, and Alaska Marine Highway System revenues. Of these, the Federal Highway Program funds represent the majority of the available funds for managing pavements and bridges on the NHS. State funds are used as federal match money at a rate of typically 9.03 percent and also support maintenance activities.

4.2.1 Federal Funds

On average over ninety percent of the funding of projects on the NHS in Alaska are federal aid. The Bipartisan Infrastructure Law (BIL) provides Alaska with a stable source of funding for transportation infrastructure for the next 4 years. Overall, the DOT&PF expects over $3.8 billion in federal revenue to be available for projects on the NHS during the TAMP period, with the NHPP expected to make up the majority of federal funds for NHS projects. Additionally, the DOT&PF expects to use some earmarked and special funds. For example, the Seward Highway 17-22 project received approximately $11 million in Rural Bridge Grant funding to replace bridges over Victor Creek and the Snow River.

4.2.2 State Funds

State funding relevant to the TAMP is estimated as the level of funding needed to provide matching funds for the federal funds shown in table 4-1 and the amount in the annual highway maintenance and operations budget.

The highway maintenance and operations budget is expected to remain constant, based on historical performance at a level of $6.7 million per year. This funding is used to manage the routine maintenance and operations of the state highway system and does not improve asset conditions but is required to keep assets in a SOGR.

Table 4-1 details the expected state and federal revenue for NHS assets. This is based on funding allocations from the BIL. DOT&PF expects over $4.9 billion in total revenue to sustain and improve these assets. Since the BIL includes only 4 years of federal funding levels from federal fiscal years 2022 to 2025, DOT&PF used a 2.0 percent growth rate to estimate federal funding past federal fiscal year 2025.

Table 4-1. Funds available for managing NHS assets (millions).

Fund Source	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*Total*
NHPP	$313.7	$319.9	$326.3	$332.9	$339.5	$346.3	$353.2	$360.3	$367.5	$374.8	$3,434.4
NHPP Freight Program	$17.0	$17.4	$17.7	$18.1	$18.4	$18.8	$19.2	$19.6	$20.0	$20.4	$186.6
NHPP Exempt	$7.7	$7.8	$8.0	$8.2	$8.3	$8.5	$8.7	$8.8	$9.0	$9.2	$84.1
Highway Infrastructure Bridge Replacement (HIP)	$29.9	$30.5	$31.1	$31.7	$32.3	$33.0	$33.6	$34.3	$35.0	$35.7	$327.1
Highway Infrastructure Bridge (Formula)	$38.3	$39.0	$39.8	$40.6	$41.4	$42.2	$43.1	$43.9	$44.8	$45.7	$418.8
Apportionment Total	$406.5	$414.6	$422.9	$431.4	$440.0	$448.8	$457.8	$466.9	$476.3	$485.8	$4,451.1
State Matching Funds*	$40.4	$41.2	$42.0	$42.8	$43.7	$44.6	$45.4	$46.4	$47.3	$48.2	$441.8
Total Funds Available to NHS	**$446.9**	**$455.8**	**$464.9**	**$474.2**	**$483.7**	**$493.4**	**$503.2**	**$513.3**	**$523.6**	**$534.0**	**$4,893.0**
***State Matching Funds are estimated as 9.93% of the Total Funds Available to NHS based on historical averages.**											

4.3 FUNDING GAPS

Table 4-2 summarizes the total needs for NHS assets based on the current Alaska STIP. The total need for preservation, rehabilitation, and reconstruction of NHS pavements and bridges is summarized as the "TAMP Total," and is estimated to be $4.1 billion. The total need for all programmed work on the NHS is over $7.2 billion.

Table 4-2. Total projected programmed funding for NHS asset needs ($ millions).

Need	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*Total*
System Preservation	$254.6	$243.9	$341.0	$229.9	$204.2	$169.5	$274.1	$169.5	$169.5	$169.5	$2,225.7
Bridge Rehabilitation	$34.2	$41.1	$33.6	$7.5	$8.2	$8.2	$7.5	$7.5	$7.5	$7.5	$163.1
Bridge Replacement	$20.9	$11.9	$37.6	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$70.4
Reconstruction	$71.3	$302.3	$874.1	$299.6	$84.5	$43.4	$2.0	$2.0	$2.0	$2.0	$1,683.1
TAMP Total Programmed	**$381.0**	**$599.2**	**$1,286.3**	**$537.0**	**$296.9**	**$221.1**	**$283.6**	**$179.0**	**$179.0**	**$179.0**	**$4,142.3**
Initial Construction	$211.6	$135.7	$473.0	$51.0	$0.0	$39.5	$0.0	$36.6	$33.3	$0.0	$980.7
Safety	$66.9	$60.4	$60.4	$60.4	$60.4	$60.4	$60.4	$60.4	$60.4	$60.4	$610.2
Planning	$23.1	$21.3	$17.1	$16.6	$16.7	$17.3	$16.2	$16.2	$16.2	$16.2	$177.0
Ferry Boats	$17.9	$20.5	$255.8	$17.7	$17.7	$17.7	$17.7	$17.7	$17.7	$17.7	$418.0
Transit	$26.9	$27.0	$27.0	$27.0	$27.0	$27.0	$27.0	$27.0	$27.0	$27.0	$269.7
ITS	$11.4	$11.0	$5.9	$5.9	$5.8	$5.8	$5.7	$5.7	$5.7	$5.7	$68.8
Congestion	$8.7	$8.7	$8.8	$8.8	$8.8	$6.9	$6.9	$6.9	$6.9	$6.9	$78.3
Railroad	$63.0	$37.1	$32.7	$30.3	$38.5	$36.5	$37.1	$36.6	$36.6	$36.6	$384.9
Research	$2.6	$2.6	$2.7	$2.7	$2.8	$2.8	$2.9	$3.0	$3.0	$3.0	$28.0
Training	$0.6	$0.6	$0.6	$0.6	$0.6	$0.6	$0.6	$0.6	$0.6	$0.6	$5.8
Other	$20.9	$5.4	$5.1	$5.4	$4.8	$5.0	$4.8	$4.8	$4.8	$4.8	$65.4
Total Programmed	**$834.5**	**$929.4**	**$2,175.4**	**$763.3**	**$479.9**	**$440.5**	**$462.8**	**$394.4**	**$391.1**	**$357.8**	**$7,229.1**

Two funding gap analyses are summarized in tables 4-3 and 4-4. As shown in table 4-3, there is sufficient funding for management of NHS pavements and bridges ("Total Funds Available to NHS" compared to "TAMP Total Programmed"). However, as shown in table 4-4, there is a total funding gap of $2.3 billion over the TAMP period when considering all Department needs ("Total Programmed"). This over-programming is currently concentrated in the first 4 years of the STIP. DOT&PF will manage this funding gap by prioritizing projects for delivery within the available resources based on the greatest overall benefit to the highway system, consistent with the process outlined in Appendix I.

Table 4-5 summarizes the investment levels in four of the five federal work types needed to sustain the DSOGR for pavements and bridges. Initial construction is not considered in this evaluation as it does not contribute to achieving the DSOGR. Pavement reconstruction is included in the federal work types that contribute to SOGR, however DOT&PF does not include it in the SOGR budget since it has a limited impact on the network condition and is rarely recommended by the pavement management system as a cost-beneficial treatment (further described in the pavement life-cycle planning section). Comparing the *TAMP Total Need* to the *Total Programmed,* in table 4-5, shows that the programmed funding exceeds the needed funding in the first 5 years, but the opposite is true in the last 5 years. Overall, the total programmed funding exceeds the TAMP need for the 10-year period.

DOT&PF does not manage a specific asset management allocation. The Department prioritizes projects that deliver investments in accordance with the maintenance, preservation, rehabilitation, and (bridge) replacement work types to ensure asset conditions are maintained and to facilitate the annual TAM investment consistency review, per 23 CFR 515.13(b). Initial construction and highway reconstruction are balanced with other transportation system needs, per the process outlined in Appendix I.

Table 4-3. Projected funding gap for NHS assets ($ millions).

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Total Funds Available to NHS[1]	$446.9	$455.8	$464.9	$474.2	$483.7	$493.4	$503.2	$513.3	$523.6	$534.0	$4,893.0
TAMP Total Programmed	$381.0	$599.2	$1,286.3	$537.0	$296.9	$221.1	$283.6	$179.0	$179.0	$179.0	$4,142.3
TAMP Funding Gap	**$65.9**	**($143.4)**	**($821.4)**	**($62.8)**	**$186.8**	**$272.3**	**$219.6**	**$334.3**	**$344.5**	**$355.0**	**$750.9**

(1) From table 4-1

Table 4-4. Projected funding gap for total needs ($ millions).

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Total Funds Available to NHS[1]	$446.9	$455.8	$464.9	$474.2	$483.7	$493.4	$503.2	$513.3	$523.6	$534.0	$4,893.0
Total Programmed	$834.5	$929.4	$2,175.4	$763.3	$479.9	$440.5	$462.8	$394.4	$391.1	$357.8	$7,229.1
Total Funding Gap	**($387.6)**	**($473.6)**	**($1,710.5)**	**($289.1)**	**$3.8**	**$52.9**	**$40.4**	**$118.9**	**$132.5**	**$176.2**	**$(2,336.1)**

(1) From table 4-1

Table 4-5. Detailed NHS pavement and bridge needs by Work Type to attain desired SOGR.

	2022	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*Total*
Pavement Maintenance	$18.0	$18.4	$18.7	$19.1	$19.5	$19.9	$20.3	$20.7	$21.1	$21.5	$197.1
Pavement Preservation	$52.0	$53.0	$54.1	$55.2	$56.3	$57.4	$58.6	$59.7	$60.9	$62.1	$569.4
Pavement Rehabilitation	$60.0	$61.2	$62.4	$63.7	$64.9	$66.2	$67.6	$68.9	$70.3	$71.7	$657.0
Pavement Reconstruction	$67.0	$68.3	$69.7	$71.1	$72.5	$74.0	$75.5	$77.0	$78.5	$80.1	$733.6
Pavement Subtotal	**$197.0**	**$200.9**	**$205.0**	**$209.1**	**$213.2**	**$217.5**	**$221.9**	**$226.3**	**$230.8**	**$235.4**	**$2,157.1**
Bridge Maintenance	$1.4	$1.4	$1.5	$1.5	$1.5	$1.5	$1.6	$1.6	$1.6	$1.7	$15.3
Bridge Preservation*	$17.8	$18.2	$18.5	$18.9	$19.3	$19.7	$20.0	$20.4	$20.9	$21.3	$194.9
Bridge Rehabilitation	$9.0	$9.2	$9.4	$9.6	$9.7	$9.9	$10.1	$10.3	$10.5	$10.8	$98.5
Bridge Replacement	$31.8	$32.4	$33.1	$33.7	$34.4	$35.1	$35.8	$36.5	$37.3	$38.0	$348.2
Bridge Subtotal	**$60.0**	**$61.2**	**$62.5**	**$63.7**	**$64.9**	**$66.2**	**$67.5**	**$68.8**	**$70.3**	**$71.8**	**$656.9**
TAMP Total Need	$257.0	$262.1	$267.5	$272.8	$278.1	$283.7	$289.4	$295.1	$301.1	$307.2	$2,814.0
Total Programmed	$381.0	$599.2	$1,286.3	$537.0	$296.9	$221.1	$283.6	$179.0	$179.0	$179.0	$4,142.3
TAMP Funding Balance	**$124.0**	**$337.1**	**$1,018.8**	**$264.2**	**$18.8**	**$(62.6)**	**$(5.8)**	**$(116.1)**	**$(122.1)**	**$(128.2)**	**$1,328.3**

* Includes funding for scour countermeasures

4.4 ASSET VALUE

DOT&PF uses straight-line depreciation as the standard method for the valuation of infrastructure assets. Many state transportation departments use the Government Accounting Standards Board 34 modified approach, but the DOT&PF prescribed the straight-line depreciation method for state use.

DOT&PF financial statements dated August 31, 2021, show infrastructure assets valued at $10,571,122,084. The book value after depreciation is $3,923,859,287. The infrastructure assets can be broken down as follows:

- Airports Runways: $2,427,181,718
- Bridges: $623,348,757
- Marine Structures: $163,465,511
- Roadways: $7,357,126,097

Table 4-6 and figure 4-3 provide historical values for each of these asset classes, demonstrating the value of the DOT&PF's assets has steadily increased. This suggests the level of investment is sufficient.

Table 4-6. Historical asset valuations.

	2017	2018	2019	2020	2021
Airport Runways	$1,897,078,198	$2,091,567,333	$2,107066,230	$2,291,209,484	$2,427,181,718
Bridges	$411,165,270	$463,294,617	$573,305,737	$591,920,597	$623,348,757
Marine	$317,961,625	$120,839,034	$162,178,683	$164,858,184	$163,465,511
Roadways	$5,798,671,789	$,6,273,102,720	$6,308,433,035	$6,694,108,914	$7,357,126,097
Total	$8.424,876,882	$8,948,803,704	$9,150,983,684	$9,742,097,179	$10,571,122,084
Percentage increase compared to previous year	—	6.2%	2.3%	6.5%	8.5%

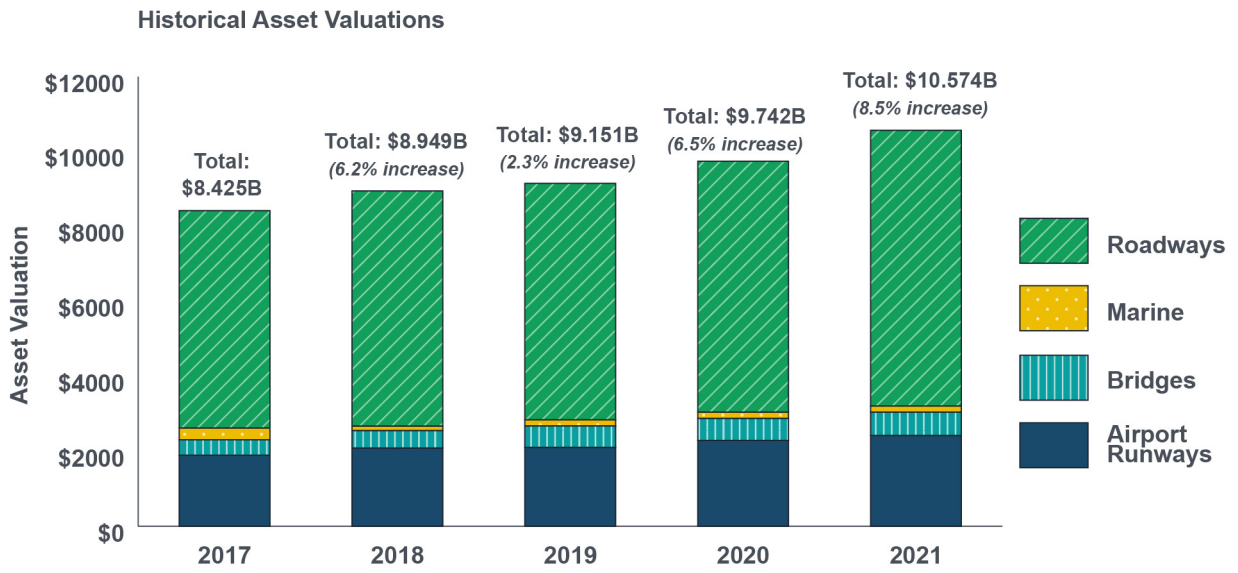


Figure 4-3. Historical asset valuations.

5 Asset Management Investment Strategies

This section describes the investment strategies needed to achieve and sustain the DSOGR of NHS bridges and pavements based on LCP. The DSOGR correlates to preserving the assets, meeting the condition, and performance targets and national goals described in Section 3.

The investment strategies described in this chapter consider the DSOGR for NHS pavement and bridge assets. These investment strategies were developed based on the preferred life-cycle strategy identified in Section 3, *Performance Management,* and the available funding identified in Section 4, *Financial Plan*. Programming projects that match the selected investment strategies will ensure treatments are applied at the appropriate time to minimize the asset life-cycle costs.

The STIP will be the primary mechanism for programming and tracking investments in NHS pavements and bridges. The STIP will identify the asset class and work type associated with each project so it can be correlated to the appropriate investment strategy.

The following subsections provide details on the investment plan for NHS pavements and bridges from state fiscal years 2022 to 2031.

5.1 SUPPORTING LONG-TERM OBJECTIVES

The LCP, risk management, and financial planning processes described in this TAMP, and in consideration of the LRTP, contribute to the investment strategies used to achieve national goals, statewide targets, and the desired SOGR.

- **Continue to invest at historical funding levels:** As described in earlier sections of this document, Alaska's NHS is currently close to meet national infrastructure targets and statewide goals. This suggests that historical investments have been sufficient, and that investment at similar funding levels will continue to keep Alaska's NHS system in the desired SOGR. The Department may have historically been overinvesting in pavement since current conditions exceed performance expectations for all measures, resulting in declining targets. However, forecasted performance at the current funding level, while still meeting or exceeding the SOGR and target requirements, does predict declining conditions. The Department will continue to monitor whether this funding level is sufficient or needs adjustment. Additionally, the Department strives to meet its asset management objectives for each asset class and will continue to balance pavement and bridge investments and performance.
- **Implement LRTP goals and policies:** The Department's investment strategies will consider all policy areas and, as detailed in section 3.1, with an understanding that available funding resources will need to be balanced to target an appropriate level of investment in each area.
- **Select projects using a data- informed approach:** Asset management systems (such as PMS and BMS) and processes will primarily be used to select preservation-focused projects, with the intent of achieving the system preservation policies and actions included in the LRTP, as well as the pavement and bridge condition performance measure areas. A more nuanced approach will be used to select projects on the NHS that are intended to achieve the remaining policy and performance measure areas, such as safety and mobility. For the current STIP, a data-informed approach was used to guide decisions for programming NHS projects. This process is outlined in Appendix I. This process will be further refined and may include multiple sets of criteria and standards related to the various policy areas and/or national performance measures for which a project will primarily contribute.

- **Show how projects contribute to performance management in the published STIP document:** Project work types (system preservation, reconstruction, etc.) included in the STIP will also aid in linking programmed projects to both performance management goals and LRTP policy areas.

Appendix I details the process used to develop this investment plan as required by 23 CFR 515.7(e) and (f).

5.2 INVESTMENT PLAN FOR 2022-2031

The investment plan shown in table 5-1 identifies the annual level of investment expected for pavements and bridges on the NHS. These investment levels reflect decisions made according to the life-cycle strategies described in Section 3.4, in consideration of overall system performance and risk, as described in the financial plan. The planned investments shown in table 5-1 vary from the preferred life-cycle strategies described in section 3.4. This is because the investment plan has been developed in consideration of all system needs and project constraints. Despite these differences, the investment plan is expected to deliver a performance similar to, or exceeding, the DSOGR investment strategy. Figure 5-1 shows a comparison of pavement conditions from the investment strategy needed to meet the DSOGR to the selected investment strategy. The selected investment strategy includes consideration of modernization and capacity needs, which results in a higher investment.

Table 5-1 includes an expected level of investment in initial construction. This estimate has not been separated into pavements and bridges, as the determination of how the funding is spent between asset classes is not made by the pavement or bridge management systems. As that work is completed, the newly constructed assets will be included in the asset inventories and will factor into life-cycle planning analyses. It should be noted that there are currently no expected investments in initial construction in the years 2026, 2028, or 2031.

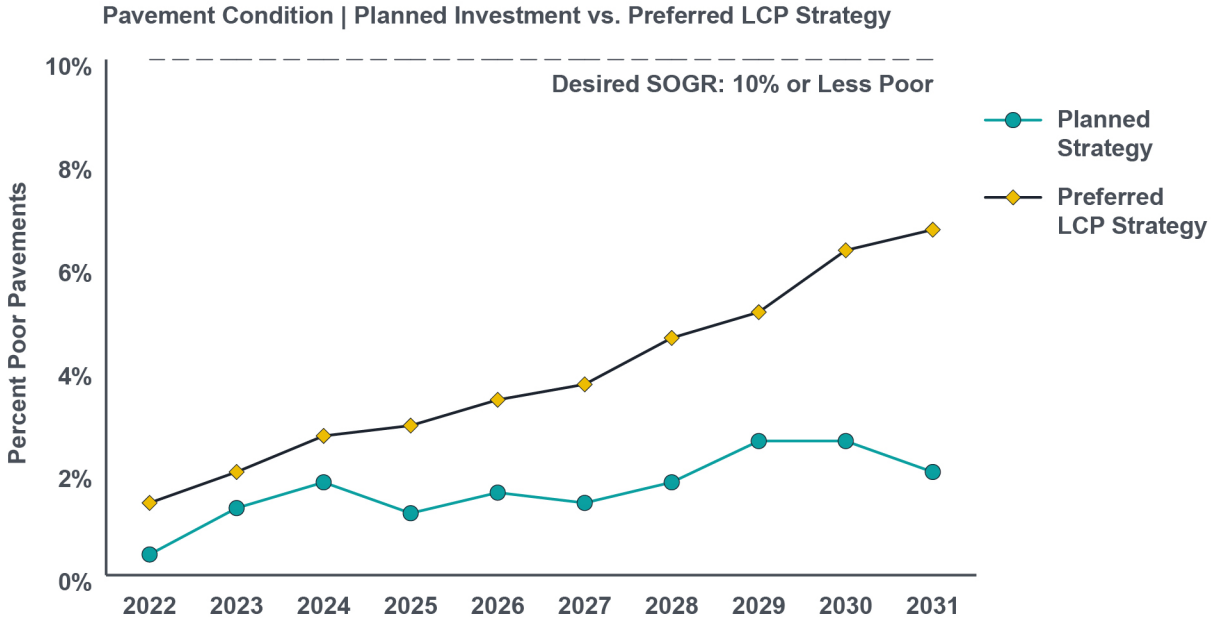
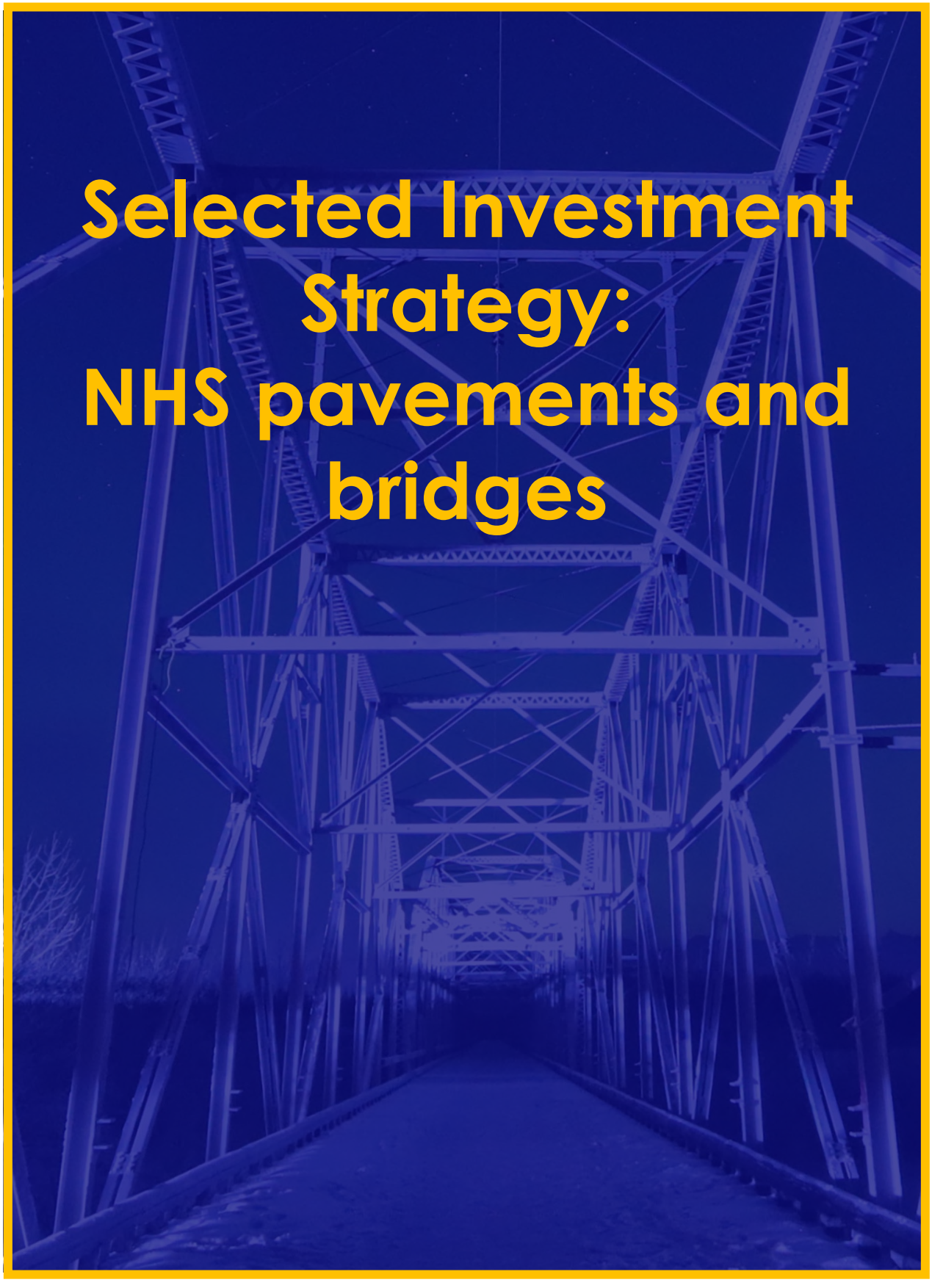


Figure 5-1. Comparison of planned pavement investments to preferred life-cycle strategy.



Selected Investment Strategy: NHS pavements and bridges

Table 5-1. Selected investment strategy for NHS pavements and bridges.

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Pavement Maintenance	$10.0	$10.0	$10.0	$10.0	$10.2	$10.4	$10.6	$10.8	$11.0	$11.3	$104.3
Pavement Preservation	$45.0	$45.0	$45.0	$45.0	$45.9	$46.8	$47.8	$48.7	$49.7	$50.7	$469.5
Pavement Rehabilitation	$56.0	$56.0	$56.0	$56.0	$57.1	$58.3	$59.4	$60.6	$61.8	$63.1	$584.3
Pavement Reconstruction	$67.0	$70.4	$73.7	$73.7	$75.2	$76.7	$78.2	$79.8	$81.4	$83.0	$759.0
Pavement Subtotal	**$178.0**	**$181.4**	**$184.7**	**$184.7**	**$188.4**	**$192.2**	**$196.0**	**$199.9**	**$203.9**	**$208.0**	**$1,917.2**
Bridge Maintenance	$1.4	$1.4	$1.5	$1.5	$1.5	$1.5	$1.6	$1.6	$1.6	$1.7	$15.3
Bridge Preservation*	$17.8	$18.2	$18.5	$18.9	$19.3	$19.7	$20.0	$20.4	$20.9	$21.3	$194.9
Bridge Rehabilitation	$9.0	$9.2	$9.4	$9.6	$9.7	$9.9	$10.1	$10.3	$10.5	$10.8	$98.5
Bridge Replacement	$31.8	$32.4	$33.1	$33.7	$34.4	$35.1	$35.8	$36.5	$37.3	$38.0	$348.2
Bridge Subtotal	**$60.0**	**$61.2**	**$62.5**	**$63.7**	**$64.9**	**$66.2**	**$67.5**	**$68.8**	**$70.3**	**$71.8**	**$656.9**
Planned TAMP Total	**$238.0**	**$242.6**	**$247.2**	**$248.4**	**$253.3**	**$258.4**	**$263.5**	**$268.7**	**$274.2**	**$279.8**	**$2,574.1**
Initial Construction	$ 211.6	$ 135.7	$ 473.0	$ 51.0	$ 0.0	$ 39.5	$ 0.0	$ 36.6	$ 33.3	$ 0.0	$ 980.7

*Includes funding for scour countermeasures

For bridges, the BMS's approach to maximizing overall system utility was used to determine the budget necessary to achieve and sustain the desired SOGR through the TAMP period. A series of analyses were run for budgets between $48 million and $75 million per year to determine the overall need to sustain the DSOGR for NHS bridges. This needs analysis assumes that all bridge work would be selected based on the BMS's recommendation, following the preferred life-cycle strategy. Figure 5-2 and figure 5-3 show percent *Poor* and percent *Good* bridges, respectively, based on analysis results. The current budget of approximately $60 million per year for NHS bridges is sufficient to keep the network at less than 10 percent *Poor* but does not sustain the 40 percent *Good* condition to meet desired SOGR through the TAMP period. Alaska plans to increase spending on bridges for the next ten years. Several reasons for the increase were reviewed by the asset management team, the bridge management team and program development. Preliminary findings from the 2022 summer bridge inspection season show that Alaska will have an increase in poor bridges for the 2023

reporting year. BrM models show a jump in *Poor* bridges in the next 10-20 years. Models for $48 million per year in spending and $75 million per year in spending were reviewed. A calculated $60 million annual spending level was selected to decrease the percentage of *Poor* bridges in the next ten years. From past consistency reviews, four-year total bridge investment amounts show a lower investment level ($124 million) than the recommended TAMP level ($189 million), therefore an increase in annual investment for the next ten years will help mitigate this gap.

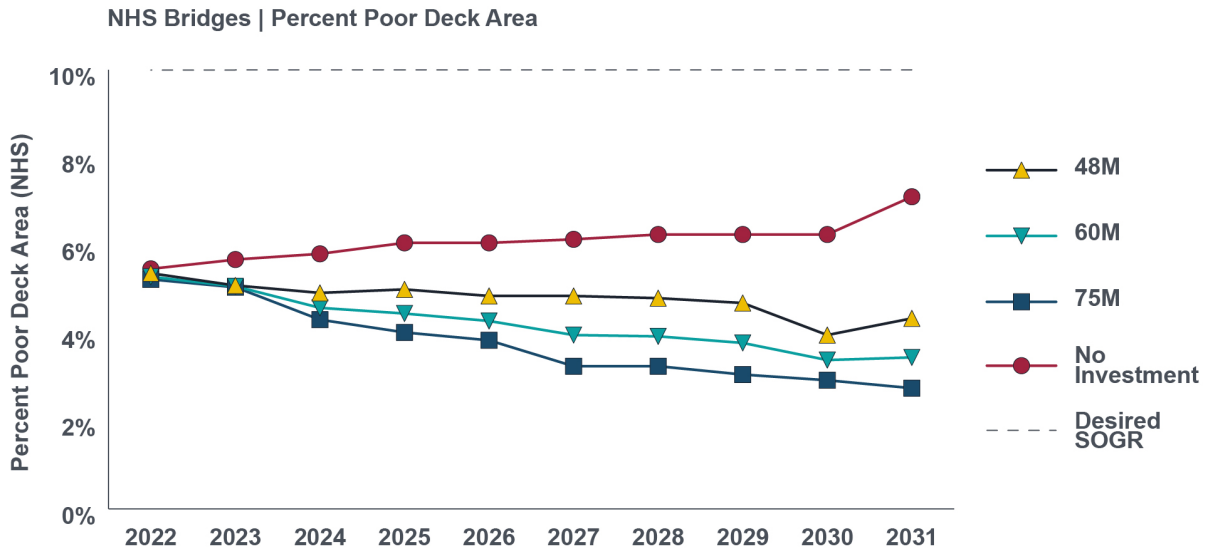


Figure 5-2. Comparison of bridges in Poor condition (by deck area) for different investment levels.

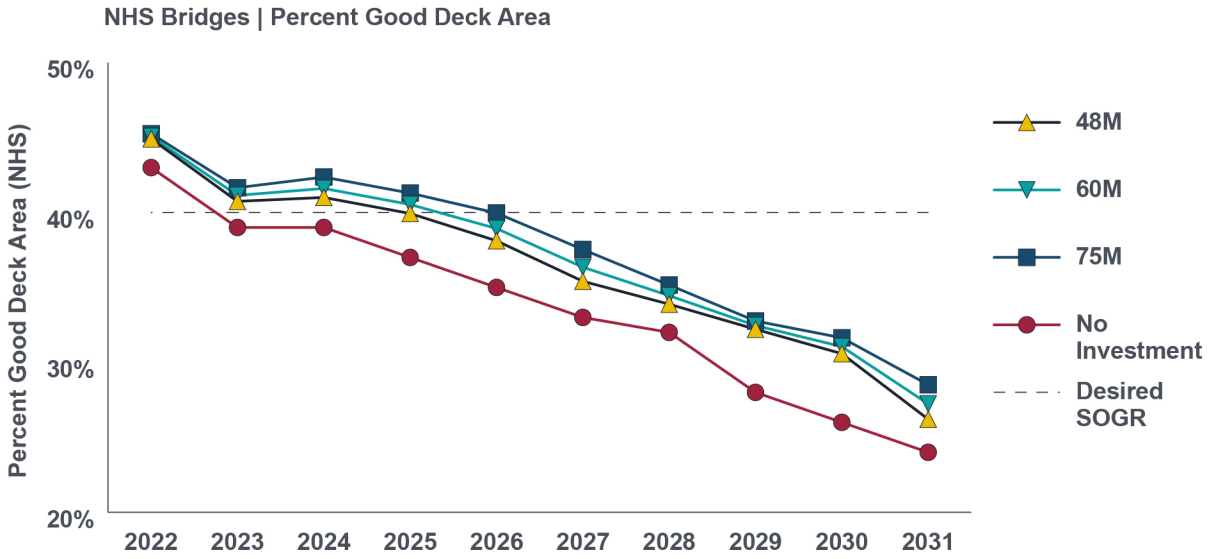


Figure 5-3. Comparison percent of bridges in Good condition (by deck area) for different investment levels.

6 Improvement Plan

6.1 ASSET MANAGEMENT IMPLEMENTATION—BACKGROUND

DOT&PF's TAM implementation started with an FHWA Asset Management Readiness workshop in 2010. In 2013, DOT&PF reviewed the state of its asset management data and systems. DOT&PF started with pavements and bridges first—in the spirit of DOT&PF's motto: Start Simple, Grow Smart, and Show Continuous Improvement.

At that time, DOT&PF was described as being in the "awakening" stage of asset management maturity, as defined in the AASHTO Transportation Asset Management Guide: A Focus on Implementation (AASHTO 2011). This stage is defined as including a "recognition of a need and basic data collection. There is often a heroic effort of individuals" (AASHTO 2011). For DOT&PF, there was a basic set of capabilities in place for a few types of assets, but these were not yet integrated into department-level decision making.

A team of multi-division staff assisted in developing a Request for Proposals (RFP) to procure a contractor for Pavement and Maintenance Management software. The contract is managed by Asset Management staff with a technical co-project manager from Information Systems and Services Division. The staff leads for pavement and maintenance are the Statewide Pavement Management Engineer and a Northern Region Maintenance and Operations District Superintendent, respectively. The PMS was implemented in January 2020. DOT&PF has been continuously refining the models since.

The Division of Program Development & Statewide Planning coordinated with the MPOs to evaluate performance targets used for NHS pavements and bridges within the MPOs and incorporated these targets into MPO transportation plans. Planning and Program Development staff have also worked on a process for prioritization of projects for the NHS system.

Since the last TAMP was prepared, DOT&PF has made significant improvements in the implementation of asset management. The PMS and BMS provide data to track asset condition and performance against their respective targets and national goals. Both systems produce the best available data as required by 23 CFR 515.7(g). The software has been adopted and configured to provide a much more robust pavement management system. Similarly, the current BMS, which utilizes the AASHTOWare BrM software, has been enhanced to provide modeling and forecasting capabilities instead of solely an inventory and condition database. Additionally, changes were made to the organizational structure at the Department to better facilitate the coordination required for effective asset management, and business processes have been modified to promote more data-driven decision-making.

6.2 ASSET MANAGEMENT IMPLEMENTATION—FUTURE IMPROVEMENTS

There are two major types of asset management functions performed by a state Department of Transportation (DOT). The first is single asset management, which focuses on the strategic management of a single asset class such as pavements or bridges. The second is cross asset management, where performance of multiple asset classes are monitored and managed to maximize the performance of the system. The following section describes additional improvements that DOT&PF is pursuing to continue to advance its asset management implementation in both areas.

6.2.1 Single Asset Analysis

DOT&PF is working on expanding asset-specific processes by continuing to enhance the newly implemented PMS and the current BMS. Additionally, the goal is to implement asset management for other asset classes. The Department is also working on developing risk-

based project selection criteria to enhance risk mitigation activities.

6.2.1.1 PAVEMENT MANAGEMENT

To better meet the new risk and resiliency requirements included in the BIL, DOT&PF is updating the subgrade stability data in the PMS to reflect the locations of unstable permafrost more accurately. This update is being performed by working with the Northern Region Materials Engineer and will be reviewed by Maintenance and Operations. Other future updates, including updates to the Alaska Pavement Condition Index (APCI), used within the Pavement Management System are described in Appendix C.

6.2.1.2 BRIDGE MANAGEMENT

DOT&PF uses the AASHTOWare BrM BMS (previously known as PONTIS) for inventory and inspection results. Since 2017, the Department has customized the BMS modeling framework, including deterioration and cost models, to perform life-cycle analysis. The Department has a custom structure criticality formula and utility function that was developed based on Alaska data and bridge asset management priorities. BMS network policies are also customized to reflect bridge management practice and Department objectives. The Department is planning to initiate a research project to develop element deterioration models to update the current models that are based on expert elicitation. Improving cost models is also a continuous effort by the Department, through the collaboration of multiple offices such as planning, design, and bridge. Bridge asset management, national performance goals, and state-established targets are only required on the NHS, which is prioritized in the BMS, but are also critical to keep non-NHS bridges at a condition that meets customer expectations. The Department therefore also uses BMS analysis as input for non-NHS bridges.

6.2.1.3 OTHER ASSETS

There are several other assets that the Department is evaluating to further expand its implementation of asset management principles and practices beyond pavement and bridge assets. The following are the assets under consideration:

- **Geotechnical Assets**—The Department has developed a Geotechnical Asset Management System (GAMS) and is currently using it for rockfall mitigation and slope stability improvements at the project level.
- **Americans with Disabilities Act compliance infrastructure**—The Department has developed an inventory database to support regional compliance upgrade contracts.
- **Culverts less than 20' and other drainage structures**—The Department has developed a database of inventory and condition that is based on inspection data.
- **Tunnels**—The Department has developed an inventory and condition database.

6.2.1.4 STRENGTHEN INFORMATION SYSTEMS AND IMPROVE DATA

The Department will continue to leverage the AASHTOWare software package which enables data management for cost estimation, proposal preparation, letting bids, and construction and material management. AASHTOWare will help to standardize the project management processes and improve accessibility and consistency of data for use by other management systems. The Department will also continue to improve system maturity by linking the capital investments back to the condition data for improved calculation of asset life-cycle cost.

The STIP is a tool for managing long-term programmatic investment strategies. The STIP relies on accurate coding of projects to indicate the contribution of the project to different agency objectives. The Planning Chiefs are working to improve this coding system to improve the accuracy with which project spending can be linked to the achievement of various agency objectives. There is also an effort to develop an electronic STIP (eSTIP) to provide improved access to the most current STIP data.

6.2.2 Cross Asset Analysis

It is the Department's goal to develop multiple individual asset evaluation processes and then utilize the data from these individual asset management systems to support cross asset evaluation. These analyses support overall asset management decisions that lead to desired outcomes, promote wise investment of resources, and promote credibility and transparency of investment decisions. The following types of asset management decisions benefit from cross asset evaluation processes:

- **Programming**—Conducting tradeoff analysis to allocate funds to program areas and establish performance targets
- **Strategy**—Evaluating activities within asset groups (e.g., maintenance)
- **Project**—Prioritizing assets and/or projects
- **Project Development**—Designing projects and evaluating project alternatives (e.g., conducting life-cycle cost analysis)
- **Policy**—Evaluating TAM policy issues (e.g., understanding the implications of increasing truck weight limits)

6.2.2.1 FUTURE IMPROVEMENTS

Modernize Performance Based Project Scoring: Program Development is working with a consultant to evaluate and potentially implement a Multi-Objective Decision Analysis (MODA) tool to enhance data driven program investment decision making. The criteria for comparing projects are increasingly data-driven, outcomes-based, and focus on long term costs and benefits. MODA can help DOT&PF justify decisions by evaluating projects of all types on a level playing field. Optimization techniques can further help inform the final selection process giving financial, performance, equity, and other varying constraints. Project nomination forms can trigger this process and ensure projects are assessed based on their comprehensive benefits given work scope descriptions.

Appendix A: TAM Structure and Processes

TAM LEADERSHIP STRUCTURE

The TAM leadership structure shown in figure 1-1 of the Introduction section displays the initial organizational framework for DOT&PF Asset Management. Once the Department has gained more experience in establishing asset management and life-cycle planning for NHS bridges and pavement, this decision-making process will be extended to other assets in order of importance.

The Asset Management framework provides a rationale and structure for certain workflows, meetings, and working relationships that may or may not already exist but are necessary for the Department to effectively accomplish its mission.

The organizational leadership structure for TAM is meant to be dynamic and collaborative in nature. The Asset Management team was established as part of the Department's Design and Engineering Services division and leads TAM implementation at DOT&PF. Each of the other teams involved in the TAM structure includes several people familiar with TAM principles and practices and at least one subject matter expert who coordinates with the Asset Management team and the other team subject matter experts to advance TAM development and implementation. A representative of the FHWA Alaska Division provides critical input and guidance in the Department's evolving TAM implementation. The Department also collaborates with representatives from Alaska's two MPOs to share asset management strategies and coordinate on performance targets and goals. Asset performance, asset funding needs, and recommendations for TAM enhancements are then communicated to the Executive Leadership for their consideration.

TAM PROCESS

In 2013, the Department's TAM maturity level was characterized as "awakening" (TAM Guide, 2011), which means that a basic set of capabilities were in place for a few types of assets, but they were not integrated into department-level decision-making. Since then, the Department's pavement and bridge asset management capabilities have significantly increased and now routinely support data-driven decision making at the department level.

Through the process of developing the initial and current TAMP, submitting annual consistency determination reports, and setting and monitoring progress toward NHPP targets for NHS pavement and bridges, the Department has steadily increased its asset management maturity level where there is now a department-wide shared understanding, motivation, and coordination in developing asset management processes and tools. DOT&PF will continue to enhance its asset management program consistent with its motto "Start simple, grow smart, and show continuous improvement."

Figure A-1 shows the continuous collaborative improvement process that is a strategic, integrated, and systematic approach to asset management.

Figure A-1. TAM process.

The TAM Process consists of:

- **TAM Policy Goals & Objectives:** These are clearly defined, based on the DOT&PF's Mission and Strategic Plan.
- **TAM Data Collection:** DOT&PF identifies information and data collection needs and communicates that information with the Data Integration team.
- **TAM Planning & Programming:** DOT&PF optimizes planning and programming processes to improve program delivery, identify gaps, and establish investment strategies through a financial plan.
- **TAM Program Delivery:** Measurable performance-based standards and forecasting processes are developed.
- **TAM Performance & Progress:** DOT&PF monitors performance and reports on progress toward both goals and objectives.

TAMP Development within DOT&PF

The initial TAMP was developed in 2017 and 2018 by a TAM team composed of a coordinator and members from Pavement Management, Bridge Management, Planning, and the MPOs. This team used guidance provided by FHWA, Planning, and the financial office to build the TAMP. At that time, the Pavement Management and Bridge Management systems were not yet implemented, and a spreadsheet tool was used for life-cycle planning.

In 2021 DOT&PF started updating the TAMP. By this time, the asset management systems had been implemented for both pavement and bridge life-cycle planning analysis. Agile Assets Pavement Analyst was implemented in 2020 for pavement management and AASHTOWare BrM was implemented for bridge management

The Asset Management Team has taken the lead in preparing the 2022 TAMP in close coordination with the Bridge and Pavement teams, the Planning and Program Development Division. Guidance on TAM and key TAMP components published by FHWA and AASHTO was referenced, and the recently implemented bridge management and pavement management systems were used for the data analysis to support the development of the 2022 TAMP. Updates to the Risk Management section were based on the most recent annual Risk Management Workshop which was held in August of 2021.

The TAM Lead provided an executive briefing where comments were received and addressed prior to approval by the Commissioner and transmission to the FHWA Division office.

Appendix B: Performance Management

SUMMARY OF TRANSPORTATION PERFORMANCE MANAGEMENT

Transportation and planning agencies apply TPM principles in making decisions about where to invest resources. Management plans developed for the various programs document these processes and investment strategies. All management plans are then used in the performance-based planning and programming process to make investment trade-off decisions. Figure B-1 illustrates the TPM approach.

TPM ensures performance targets and measures are developed in cooperative partnerships based on reliable data and objective information and aligned with the national goal areas. DOT&PF considers the following measures when making investment decisions in developing the STIP and capital program:

- Infrastructure Condition (TAM)
- Congestion Mitigation and Air Quality Improvement (CMAQ)
- Safety (HSIP/HSP)
- Travel Time Reliability
- Freight Movement

The TPM program performance measures are set by FHWA, and program targets are set by states.

Figure B-1. TPM approach.

Targets are a quantifiable level of performance, expressed as a value for the measure, to be achieved within a time period required by FHWA. The federal TPM rule requires targets to be set for 2- and 4-year time periods within a 4-year performance period. The first performance period for TPM (except CMAQ) began January 1, 2018, and ended on December 31, 2021. The performance period for CMAQ's emissions reduction measure began on October 1, 2017, and ended on September 31, 2021.

Each of these programs competes for funding to improve the overall performance of the transportation system. Below is a summary of each of the five TPM programs, the associated performance measures for each, and the DOT&PF targets and funding levels for each.

TAM—TRANSPORTATION ASSET MANAGEMENT—BRIDGE AND PAVEMENT

Asset Management is the application of the TPM approach to manage the condition of the infrastructure assets that are needed to provide mobility and safety on the nation's transportation system.

Asset management plans such as this one are the framework for developing the investment strategies

to address infrastructure condition targets, as well as addressing risk and managing assets for their whole life at the lowest practicable cost.

Section 2, Inventory and Condition, and Section 3, Performance Management, detail the performance measures and targets for pavements and bridges.

The recommendations for pavement and bridge funding levels can be found in Section 4, Financial Plan, table 4-4.

CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT PROGRAM

The CMAQ program provides a flexible funding source to the state for projects and programs to help meet the requirements of the Clean Air Act. The goal for these projects is to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are not in compliance (maintenance areas). Table B-1 shows the CMAQ targets established in May of 2018 for the initial performance period. These targets will be reviewed and revised as appropriate for the next performance period.

Table B-2 shows the CMAQ STIP funding for projects around the state for the next 4 years.

Table B-1. CMAQ performance targets (Daily Kilogram).

Performance Measures	*Baseline*	*2-Year Target*	*4-Year Target*
Total Emission Reductions: PM2.5	400.600	0.050	0.050
Total Emission Reductions: NOx	4663.000	0.050	0.050
Total Emission Reductions: VOC	None	None	None
Total Emission Reductions: PM10	1943.000	2.000	4.000
Total Emission Reductions: CO	5023.000	20.000	40.000

All units are daily kilograms

Table B-2. CMAQ 4-year STIP funding.

FFY22	*FFY23*	*FFY24*	*FFY25*
$15.5 million	$12.7 million	$13.0 million	$13.3 million

SAFETY

The Safety Performance Measures are established for the HSIP and are used to assess fatalities and serious injuries on all public roads.

The Safety PM Final Rule establishes five performance measures as the 5-year rolling averages including:

- Number of fatalities
- Rate of fatalities per 100 million Vehicle Miles Traveled (VMT)
- Number of serious injuries
- Rate of serious injuries per 100 million VMT
- Number of non-motorized fatalities and non-motorized serious injuries

The State of Alaska has a vision of zero fatalities and serious injuries but is required by federal law to set "targets" for these metrics. The target shown in table B-3 is not a metric the state is trying to meet but one it is required to forecast—namely the accident rate that will most likely occur based on historical data and trends. The performance measures are included in the HSIP, HSP or both. Table B-3 shows the performance targets set annually by June 30 for the following calendar year.

Table B-3. Targets for forecasting fatalities and injuries.

Metrics	2022	2021	2020	HSIP	HSP
Date Target Set	5/20/21	4/30/20	3/1/19		
Fatalities	≤ 70	≤ 75	≤ 80	✓	✓
Fatality Rate	≤ 1.3	≤ 1.4	≤ 1.5	✓	✓
Serious Injuries	≤ 325	≤ 330	≤ 400	✓	✓
Serious Injury Rate	≤ 5.9	≤ 6.0	≤ 7.5	✓	
Non-motorized Fatalities and Serious Injuries (combined)	≤ 58	≤ 60	≤ 70	✓	

Table B-4 includes Safety STIP from Amendment 2 approved January 30, 2019. This is the level of funding for projects around the state for the next 4 years:

Table B-4. 4-year safety STIP funding.

FFY22	FFY23	FFY24	FFY25
$69.3 million	$74.0 million	$75.5 million	$77.0 million

TRAVEL TIME RELIABILITY

Travel time reliability measures the extent of unexpected delay. A formal definition for travel time reliability is the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.

Travel time reliability is significant to many transportation system users, whether they are vehicle drivers, transit riders, freight shippers, or even air travelers. Personal and business travelers value reliability because it allows them to make better use of their own time. Shippers and freight carriers require predictable travel times to remain competitive. Reliability is a valuable service that can be provided on privately financed or privately operated highways. Because reliability is so important for transportation system users, transportation planners and decision-makers should consider travel time reliability a key performance measure.

Level of Travel Time Reliability (LOTTR)[2] is defined as the ratio of the 80th percentile travel time of a reporting segment to a "normal" travel time (50th percentile), using data from the FHWA National Performance Management Research Data Set (NPMRDS) or equivalent. Data is collected in 15-minute increments during all time periods other than 8 p.m.-6 a.m. local time. The measures are the percent of person-miles traveled on the relevant NHS areas that are reliable. Table B-5 shows the LOTTR targets that were set in May 2018. These targets will be reviewed and updated as needed in the fall of 2022 for the next performance period.

Table B-5. LOTTR performance targets.

Travel Time Reliability	2-year Target	4-year Target
Interstate (LOTTR)	92%	92%
Non-Interstate NHS (LOTTR)	N/A	70%

LOTTR performance measures are a federal requirement but do not drive Alaska projects. Alaska projects need capacity improvements from areas with a growing population. Reconstruction and other projects support capacity improvement projects.

FREIGHT MOVEMENT

The FAST Act established a new National Highway Freight Program to improve the efficient movement of freight on the National Highway Freight Network (NHFN) and support several goals, including:

- Investing in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the

2 FHWA TPM FAQs on Travel Time Reliability

cost of freight transportation, improve reliability, and increase productivity
- Improving the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas
- Improving the SOGR of the NHFN
- Using innovation and advanced technology to improve NHFN safety, efficiency, and reliability
- Improving the efficiency and productivity of the NHFN
- Improving state flexibility to support multi-state corridor planning and address highway freight connectivity
- Reducing the environmental impacts of freight movement on the NHFN

Freight movement is assessed by the truck travel time reliability (TTTR) Index which is a subset of the Travel Time Reliability index that shows only freight travel times. Reporting is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays, weekends (6 a.m.-8 p.m.), and overnights for all days (8 p.m.-6 a.m.). The TTTR ratio will be generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment. Then, the TTTR Index will be generated by multiplying each segment's largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate. Table B-6 shows TTTR targets set in May 2018. These targets will be reviewed and updated as needed in the fall of 2022 for the next performance period.

Table B-6. TTTR Performance Targets.

Freight Travel Time Reliability	*2-year Target*	*4-year Target*
Interstate TTTR Index	2.0	2.0

Table B-7 includes TTTR STIP funding for projects around the state for the next 4 years, which were outlined in the Implementation Guidance.

*Table B-7. 4-year TTTR STIP funding.**

FFY22	*FFY23*	*FFY24*	*After 2024*
$70.0 million	$70.0 million	$70.0 million	$70.0 million

*The amounts for TTTR STIP funding will be finalized after public review of the State Freight Plan.

Appendix C: Asset Overview—Pavements

Only NHS pavement assets are considered for the purposes of the TAMP, and these pavement assets are categorized as Interstate and non-Interstate. DOT&PF owns and operates the entire 1080.2 miles of the Interstate network and 1126.6 of the 1148.5 miles of the non-Interstate NHS in Alaska. In addition, DOT&PF maintains an additional 3475.2 miles of non-NHS roadways. Alaska is unique to the rest of the United States because 325 miles of the Dalton Highway, which is part of the Alaska non-Interstate NHS, is unpaved. The Dalton Highway is the haul road to the North Slope that parallels the Trans-Alaska Pipeline System where large portions of the road are constructed over unstable permafrost. This unstable permafrost is not cost-effective to stabilize and pave over, so large portions of the road remain gravel or receive other maintenance treatments, such as high float surfacing. When these sections of road deteriorate to where they are unable to be addressed through maintenance, a gravel resurfacing project may be performed. Figure C-1 to the right is of the Dalton Highway in an area of stable embankment near Coldfoot.

Figure C-1. Dalton highway stable embankment. Source: Fugro.

NHS INVENTORY

Table C-1 includes the centerline mileage inventory of Interstate and non-Interstate NHS roads in the state based on data collected in summer of 2021.

Table C-1. NHS total centerline miles.

Facility Type	*Total*	*DOT&PF*	*Municipality of Anchorage*	*Other Entities*
Interstate	1080.2	1080.2	0	0
Non-Interstate NHS (paved)	822.4	800.8	20.4	1.2
Non-Interstate NHS (unpaved)	326.1	325.8	0	0.3

Table C-2 lists NHS sections owned/operated by other entities beside DOT&PF. Because the percentage of the NHS that is owned by others is so small, it does not affect the state's overall condition.

Table C-2. NHS sections owned/operated by other entities.

Route	*Jurisdiction*	*Intermodal Type*	*Surface*
Bragaw Street (Anchorage)	County	NA	Paved
Abbott Road (Anchorage) (Hillside)	County	NA	Paved
36th Avenue (Anchorage)	County	NA	Paved
Lake Otis Parkway (Anchorage)	County	NA	Paved
Ocean Dock Road (Anchorage)	County	NA	Paved
Northern Lights Boulevard (Anchorage)	County	NA	Paved
15th Avenue (Anchorage)	County	NA	Paved
Old Seward Highway (Anchorage)	County	NA	Paved
Debarr Road (Anchorage)	County	NA	Paved
Providence Drive (Anchorage)	County	NA	Paved
Dowling Road (Anchorage)	County	NA	Paved
Nenana Street (Nenana)	City or Municipal	Port Terminal	Unpaved
Nenana Street (Nenana)	City or Municipal	Port Terminal	Paved
Front Street (Nenana)	City or Municipal	Port Terminal	Paved
Dock Road (Nenana)	City or Municipal	Port Terminal	Unpaved
Sixth Street (Nenana)	City or Municipal	Port Terminal	Paved
Church/2nd Street (Wrangell)	County	Ferry Terminal	Paved
Wrangell Avenue (Wrangell)	County	Ferry Terminal	Paved
Yandukin Drive (Juneau)	County	Airport Terminal	Paved
Shell Simmons Drive (Juneau)	County	Airport Terminal	Paved
Marine Way (Kodiak)	City or Municipal	Ferry Terminal	Paved

NON-NHS INVENTORY

Although the focus of the TAMP is on the NHS pavement inventory, DOT&PF is also responsible for maintaining a significant network of non-NHS roadways. These roadways are also critical to the Alaska transportation system and in supporting the goals in the LRTP. They also require regular maintenance, rehabilitation, and modernization and therefore compete with NHS facilities for limited funding resources. DOT&PF nominates projects for inclusion in the STIP as needed.

Figure C-2 illustrates the breakdown of DOT&PF's total pavement network including NHS and non-NHS pavements in addition to the NHS pavements owned by others.

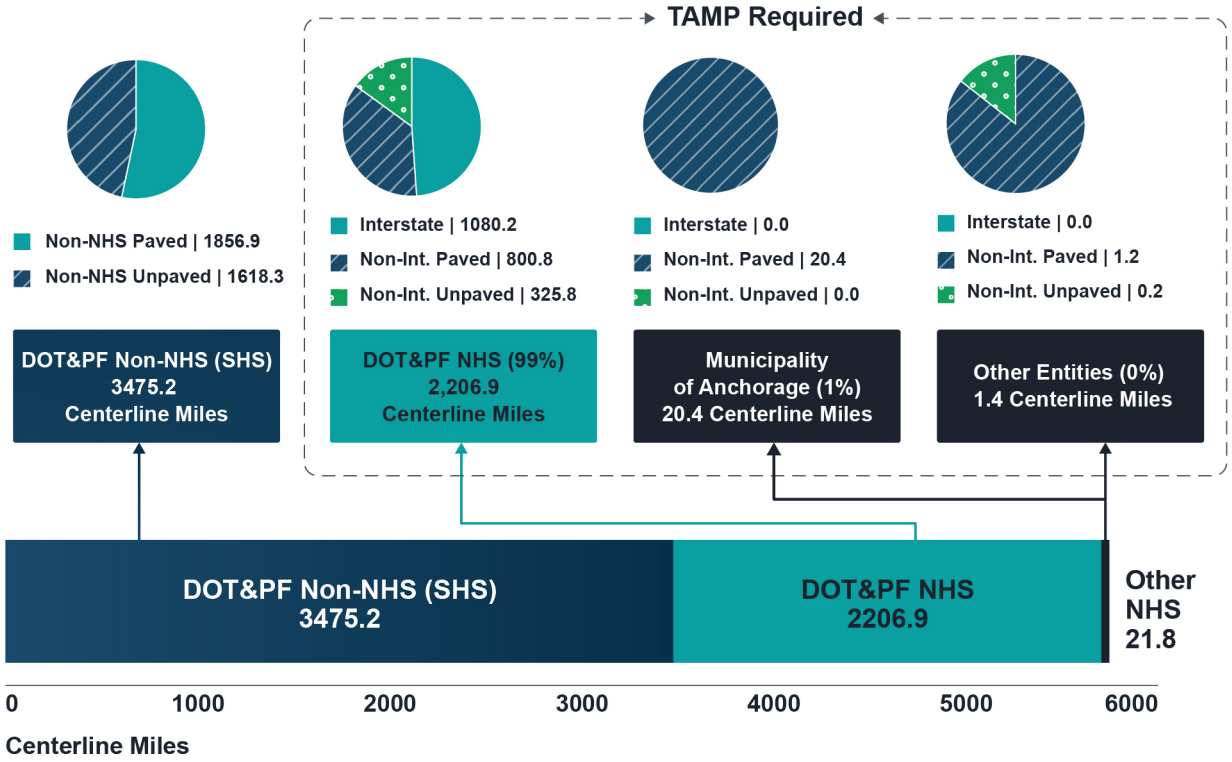


Figure C-2. NHS and DOT&PF non-NHS pavements by centerline miles, category, and owner.

FEDERAL PERFORMANCE MEASURES

As described in Section 2, the federal performance measures use IRI, fatigue cracking, and rutting as metrics for assessing asphalt pavement conditions. As required by FHWA, DOT&PF collects pavement condition data on NHS paved roads annually for rutting and roughness and for longitudinal, transverse, and fatigue cracking.

The DOT&PF has collected many years of rutting and roughness data but began collecting full extent cracking data beginning in 2014. DOT&PF changed data collection contractors in 2018 and now uses Fugro to collect rut, roughness, and cracking data on all paved DOT&PF and NHS roads.

DOT&PF plans to use the federal overall pavement rating defined in the TPM rules and described in Section 2 to classify pavement condition until Alaska develops its own index that better represents its pavement conditions and treatment thresholds. FHWA final rules allow the use of PSR in lieu of IRI for roads with posted speed limits less than 40 mph. DOT&PF does not intend to use PSR on NHS routes.

PAVEMENT CONDITION SUMMARY

Based on the federal metrics, Alaska's NHS and SHS network conditions are summarized in figures C-3 and C-4. The non-NHS was analyzed using the same federal metrics even though non-NHS is not required for inclusion in the TAMP. DOT&PF will continue to track the state non-NHS network by the federal metrics since these routes are included

in the PMS, which uses the federal performance measures and the same modeling and decision trees. Figure C-3 shows that in 2021 all three of DOT&PF's pavement networks are performing similarly, with a slightly larger portion of the non-Interstate NHS in *Poor* condition and a lower percentage in *Good* condition as compared to the Interstate and non-NHS networks. Figure C-4 shows that the historical pavement performance of these three networks remained fairly constant over the last 4 years, with a slightly improving trend in pavement condition on the non-Interstate NHS. The non-Interstate NHS shows the largest percentage of pavement in *Poor* condition due to DOT&PF Northern Region NHS that goes through so much of the unstable permafrost regions.

PAVEMENT MANAGEMENT SYSTEM IMPLEMENTATION

As stated in Section 2, DOT&PF has established the following pavement management objectives:

- Treat pavements in *Good* and *Fair* condition before they deteriorate to save money over the pavement's life cycle.
- Provide information to allow effective selection and design of future surface treatments, rehabilitation, and reconstruction projects.
- Accurately estimate future conditions versus funding scenarios to evaluate current pavement funding strategies.
- Display analysis results in understandable formats.

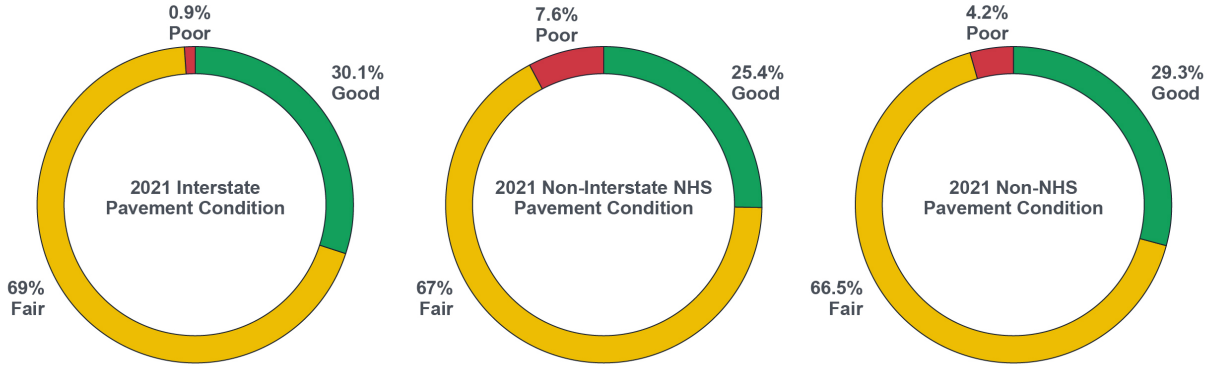


Figure C-3. 2021 Pavement conditions for Interstate NHS, Non-Interstate NHS and Non-NHS DOT&PF roadways.

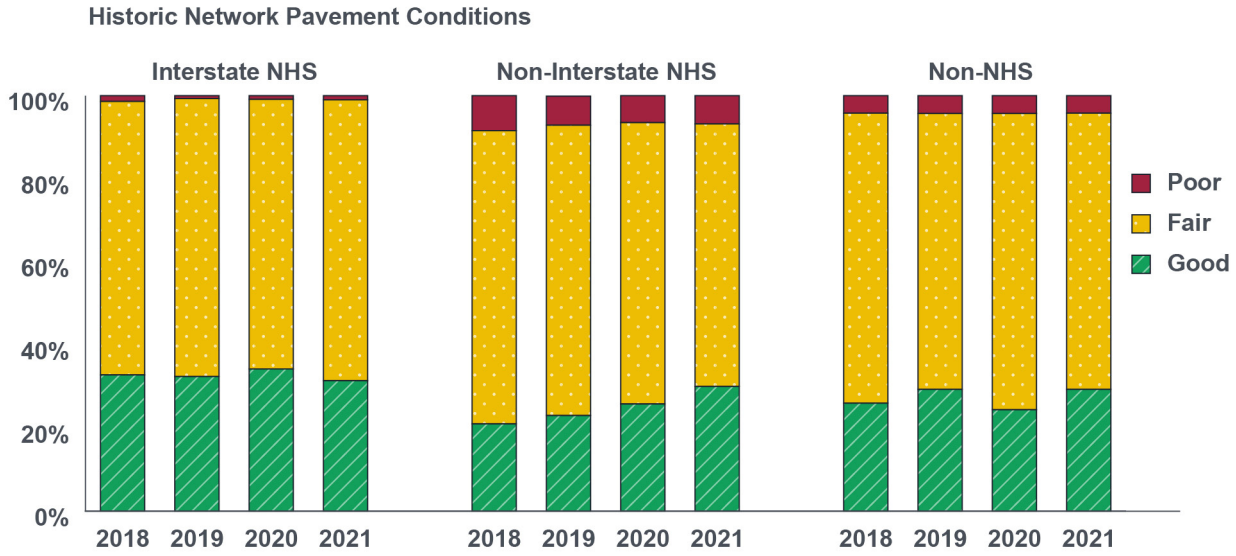


Figure C-4. Historic pavement network conditions for Interstate NHS, Non-Interstate NHS and Non-NHS DOT&PF roadways 2018-2021.

When MAP-21 was signed into law, DOT&PF did not have a PMS that could forecast pavement conditions or track where money was historically spent on the road network relative to pavement condition to fully assist in meeting its pavement management objectives. DOT&PF procured its PMS in May 2016 and implemented the system in January 2020. The Maintenance Management System (MMS) is also being replaced. These systems will provide more accurate data on where the Department is spending money and which maintenance and preservation treatments are most effective.

DOT&PF has implemented AASHTOWare Project, Preconstruction, Civil Rights, and Labor modules and will be implementing Construction and Materials over the next few years. The AASHTOWare system tracks bids, construction costs, time, certified payroll, items, material testing, and more to help analyze patterns and increase the accuracy of project cost estimates and decisions making.

When the Pavement Management System was initially being developed, other states' frameworks were being evaluated. The initial decision trees in the system used by Washington State DOT were used as an outline. The first model was set up using IRI as the main controlling factor, but after discussions with several states, including Washington, the model was changed to use fatigue cracking as the first level of classification. The reasoning was that fatigue cracking could indicate there are some base/embankment failures that preservation techniques will not correct. The next level was IRI since it can also indicate structural issues but can show artificial high values in urban sections. The last item was rutting. Rutting is caused by heavy loads at intersections or studded tires and can be improved by resurfacing and is the last "limb" of the tree for pavement treatment options.

A Pavement Preservation workshop and Peer Exchange was held February 21-22, 2019, in Anchorage with Department of Transportation representatives from Washington, Idaho, Montana, and Minnesota. Pavement decision trees and deterioration modeling were discussed, as well as preservation techniques. At this peer exchange it

Pavement Management System Improvements Since 2019

DOT&PF continues to make technical advances in pavement management since publication of the 2019 TAMP. The most notable change is a migration away from spreadsheet tools and towards robust systems of record which meet the current business needs of DOT&PF and its partners.

The new Pavement Management System can account for condition and serviceability through an assortment of distresses and deterioration curves including rutting, cracking, and IRI. The previous pavement management spreadsheet tool was only capable of condition group models *(Very Good/Good/Fair/Poor/Very Poor)*.

Using these distress models, the PMS can forecast pavement conditions and utilize complex decision trees to identify work candidates. The new decision trees consider costs for each specific treatment type and asset properties, such as subgrade stability. Through these configurations, work planning estimates have a much higher level of precision than before.

On a network level, the PMS can optimize pavement management funds throughout the state. Multiple constraints (typically budgets, performance targets, and currently planned projects) are used within the system to maximize the quality of investments over an analysis period.

The system is customizable, with room for models that improve both accuracy and precision of DOT&PF's pavement management programs. Despite the increased level of effort needed to configure these models, DOT&PF will continue to make improvements to the PMS in the future.

was learned that Alaska's PMS implementation will be an iterative process, where updates to the decision trees and deterioration models will need to annually take place as the system grows and the recommendations provided to the regions are reviewed and feedback is received.

The peer exchange provided an opportunity for regional experts and out of state representatives to review preliminary recommendations from the decision trees and methods being used in DOT&PF's PMS implementation. It was learned that additional weighting factors are needed when making recommendations to prioritize higher functional classification routes over lower ones and the management section length of approximately three miles is a good starting point for the system. It was also learned that there are many more preservation techniques that should be evaluated in Alaska. These include ultra-thin bonded overlays, scrub seals, and cape sealing. These preservation treatments will be considered for use in the following years.

In 2020 a thin inlay was placed on Fireweed Avenue in Anchorage to evaluate the performance compared to a traditional mill and fill treatment. Another preservation treatment currently being evaluated is microsurfacing, which was placed on the ramps of Minnesota Drive, also in Anchorage.

Adjustments have been made to the Pavement Management System since it was implemented in 2020. These include revisions to the decision trees, deterioration models, and evaluations of weighting factors for prioritization of higher functionally classed roads.

Due to the permafrost and other embankment conditions, the Subgrade Stability Index was added to the decision trees. The index comes from Northern Region Maintenance staff and the rating is classified as A, B, or C. Level A indicates a *Good* stable embankment, Level B represents *Fair*, and Level C is a *Poor* condition indicating the presence of unstable permafrost. Any missing data from M&O defaults to a Level of Service A. In 2021, an update to the subgrade stability index was started, with input from the Northern Region Materials Section, that will be implemented in 2022 after additional review.

The intent of PMS is to maintain the network at a desirable performance level with a minimum cost. With the exception of unstable foundation areas, such as permafrost, the PMS uses measured surface condition and pavement performance models to select an appropriate action for each section of paved roadway. In the areas of unstable foundations, it is difficult to model pavement performance as Maintenance and Operations (M&O) performs so many repairs to level out roads from thawing permafrost. Because of this, M&O performs annual field inspections to identify areas of safety concerns which require repair. Tracking of annual maintenance costs in the MMS will identify high-cost maintenance locations where benefit-cost analysis can be performed to verify what repair methods are most efficient for unstable foundation area (routine annual patching, more frequent low-cost short life overlays, or reconstruction). That information will be tracked in the PMS after MMS goes live.

ALASKA PAVEMENT INDEX (IN DEVELOPMENT)

Until 2013, DOT&PF used the PSR as an index only to assess pavement health. PSR computations were completed using rutting and IRI only. DOT&PF has developed a new pavement index (Alaska Pavement Condition Index—APCI) to measure pavement using rutting, IRI, and fatigue cracking data. Each of these three distresses is converted to a 0 to 100 measure where 100 is perfect condition, 50 is the *Poor* value from the federal metrics, and below 50 is a degree of failure. These three measures are then averaged together into the APCI, which is used within the Pavement Management System to assist with project selection.

The APCI is being updated to include a deduct value based on longitudinal and transverse cracking, patching, and raveling. These distresses have a major impact on roads throughout Alaska. Thermal and frost cracks are prevalent across Alaskan roads due to extremely cold temperatures and M&O performs significant patching repairs across roads that need to be accounted for.

Fugro assisted in the development of the updated APCI and built a spreadsheet tool to model rut, IRI, cracking, and the updated APCI using historically collected pavement data. Pavement condition data can be added to the spreadsheet in the future to continue updates to deterioration

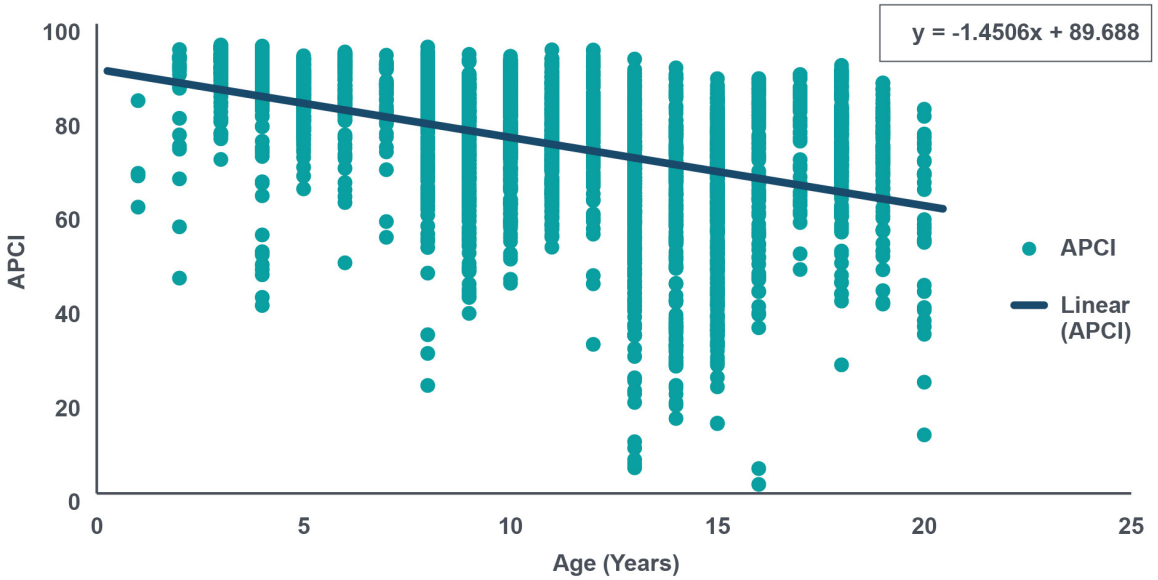


Figure C-5. Deterioration model for APCI.

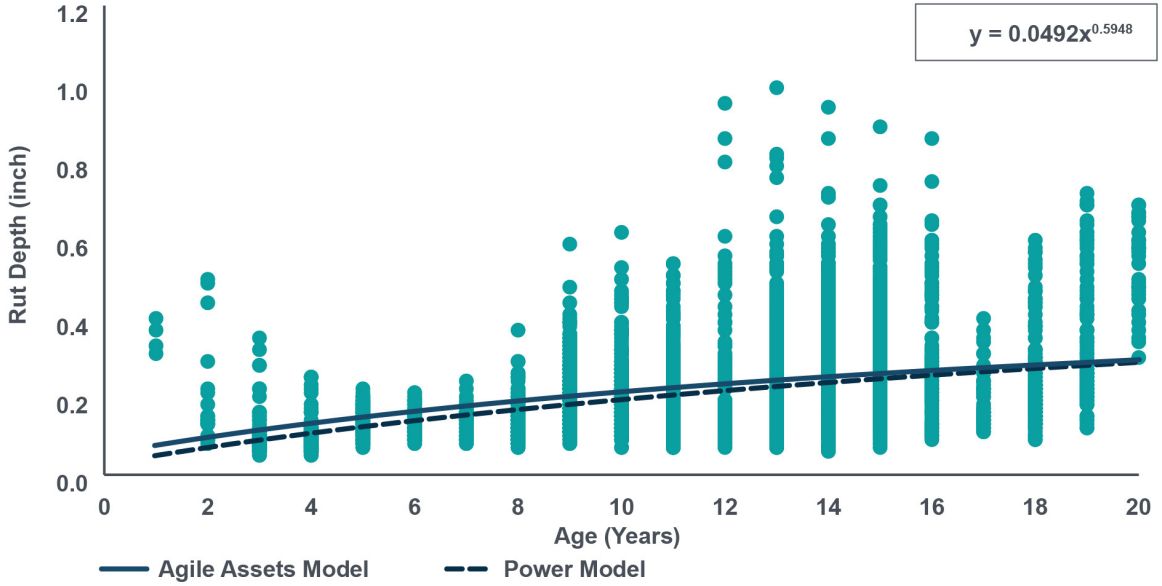


Figure C-6. Deterioration model for rutting.

models. An example of the updated APCI is shown below in figure C-5. This method was used to create deterioration models for the updated APCI in the Pavement Management System and to verify existing deterioration models. Figure C-6 is an example of the verification of the rutting deterioration model from the PMS.

Triggers in the PMS were determined for different treatment categories that include preservation (preventive maintenance and minor rehabilitation), major rehabilitation, and reconstruction. Preventive maintenance treatments include fog sealing, chip sealing, microsurfacing, or other treatments to keep a *Good* road in *Good* condition. Minor rehabilitation includes thin overlays or mill/fill type treatments with possible isolated structural improvements. Major rehabilitation includes full depth reclamation, base stabilization, and structural overlays greater than a 2-inch thickness. It is recommended that reconstruction be triggered upon a road's reaching or passing end of service life. Figure C-7 illustrates these decision points.

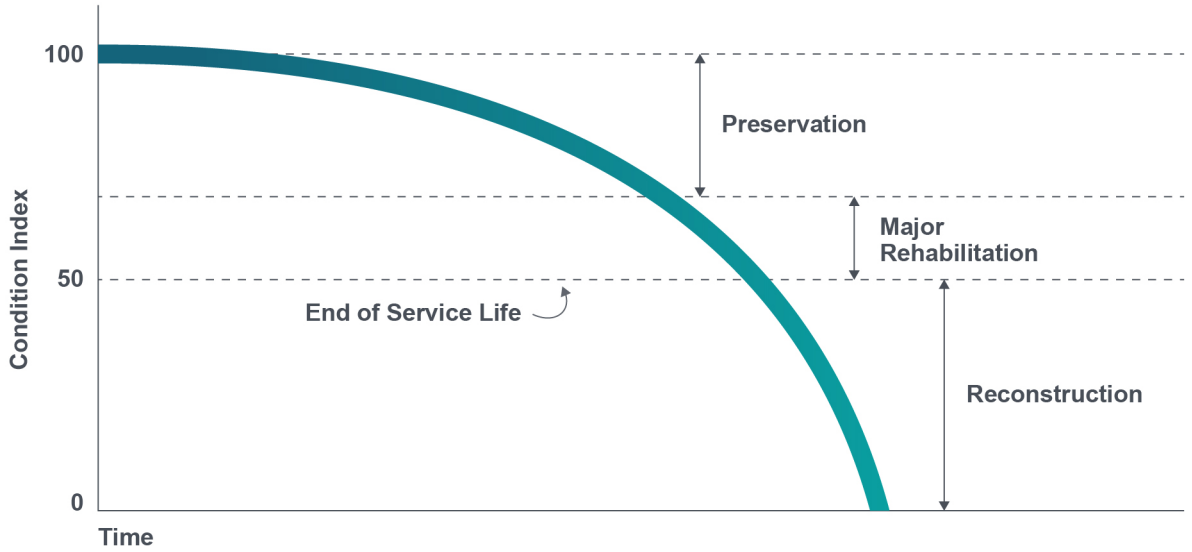


Figure C-7. Condition Index model.

Table C-3. Non-NHS pavement targets.

Performance Measures	*2-year Target*	*4-year Target*	*2021 Condition*
Poor Pavement Condition on the non-NHS	<15%	<15%	4.2%
Good Pavement Condition on the non-NHS	<15%	<15%	29.3%

STATE PERFORMANCE MEASURES FOR PAVEMENT CONDITIONS

In addition to the performance measures for the NHS described in Section 1.4, Alaska has set performance measures for the non-NHS for Pavement Management staff to use as a guide, but they are not required for or included in the TAMP. Table C-3 shows the non-NHS pavement targets set by DOT&PF and the current pavement network conditions.

PERFORMANCE GAP IDENTIFICATION

The goal of pavement management is to meet the established pavement condition targets for both the NHS and non-NHS pavement networks. The NHS gap analysis is described in Section 3.1 and Appendix E. For the non-NHS network (table C-8), pavement conditions currently exceed both established performance goals, with 4.2 percent of the network in *Poor* condition falling below the maximum percent *Poor* goal of 15 percent and 29.3 percent of the network in *Good* condition exceeding the desired goal of 15 percent *Good* pavement.

PAVEMENT ASSET MANAGEMENT STRATEGIES

As part of the DOT&PF's asset management approach, maintenance staff actively performs preventive maintenance on all DOT&PF maintained roadways. The pavement deterioration models include the effects of surface maintenance; therefore, maintenance is considered a critical component of a pavement's life-cycle costs.

Maintenance work is performed by contractors and in-house staff and includes crack sealing, patching, banding, chip seals, and high floats. Without this work the pavement would have a short life expectancy; therefore, it is critical to maintain the current level of effort in the maintenance budget.

PAVEMENT PRESERVATION

Pavement preservation is a program of activities aimed at preserving the nation's highway system, enhancing pavement performance, extending pavement life, and meeting customer needs[3]. It includes work that is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair. It often excludes structural improvements (such as an overlay), capacity improvements, major rehabilitation, and reconstruction.

The DOT&PF's pavement preservation program includes the following actions:

- Review the road system
- Select the road
- Determine the cause of the problem
- Select the appropriate treatment
- Identify the right time to apply the treatment

The Pavement Management System has been used since 2020 to provide annual pavement preservation recommendations to the three DOT&PF Regions. Projects under this program fall in the scope of preventive maintenance or minor rehabilitation. The regions internally evaluate the recommended pavement preservation projects during their annual preservation plan development. During this process, the regions review the recommended projects, evaluate other known needs, and ensure the preservation program is able to adequately address the distresses on the roads. Each region sends their selected projects and feedback regarding the recommendations back to the Pavement Management Engineer. These projects are combined into an annual pavement preservation plan that is reviewed and then approved by a statewide steering committee composed of regional and statewide directors.

Once the Maintenance Management System is live it will send performed maintenance activities to the Pavement Management System to track cost and work performed over the road network. A future enhancement of the system will be to track a 3-year average for expended maintenance cost over sections of road to identify areas requiring high levels of maintenance.

MAJOR REHABILITATION/ RECONSTRUCTION

Project needs from the Pavement Management System beyond the scope of pavement preservation are sent to Planning for review and possible inclusion in the STIP. Selected projects are nominated into categories based on the identified need. These project scopes may include SOGR, Modernization, or Capacity. SOGR projects are pavement-focused to repair pavements and maintain them in a state of good repair. There are no modernization or capacity needs within the project area. Modernization projects may include shoulder widening, turn lanes or passing lanes, and have a broader focus than SOGR projects. Capacity projects are those which focus on expansion. Nominated projects compete for the available funding within the categories. Additional details are outlined in the Highway Pavement Maintenance, Preservation, and Rehabilitation Policy and Procedure #07.05.020.

INNOVATIVE MATERIALS FOR PAVEMENT PRESERVATION

To combat rutting and optimize life-cycle costs on certain roadways, DOT&PF began incorporating hard aggregates in surface course hot-mix asphalt on various roads in the Central and Southcoast regions in 2013 using a hard aggregate policy. Hard aggregates are those with a Nordic Abrasion value of less than 8. As defined in the hard aggregate policy, it must be used in the wearing surface of high-volume roadways (≥ 5,000 AADT/lane) exhibiting studded-tire wear. To determine its cost-effectiveness, DOT&PF evaluated the life-cycle cost on Tudor Road in Anchorage, where one direction was paved with aggregates meeting the hard aggregate policy and the other was paved with locally sourced aggregates in 2005.

3 FHWA Asset Management Program

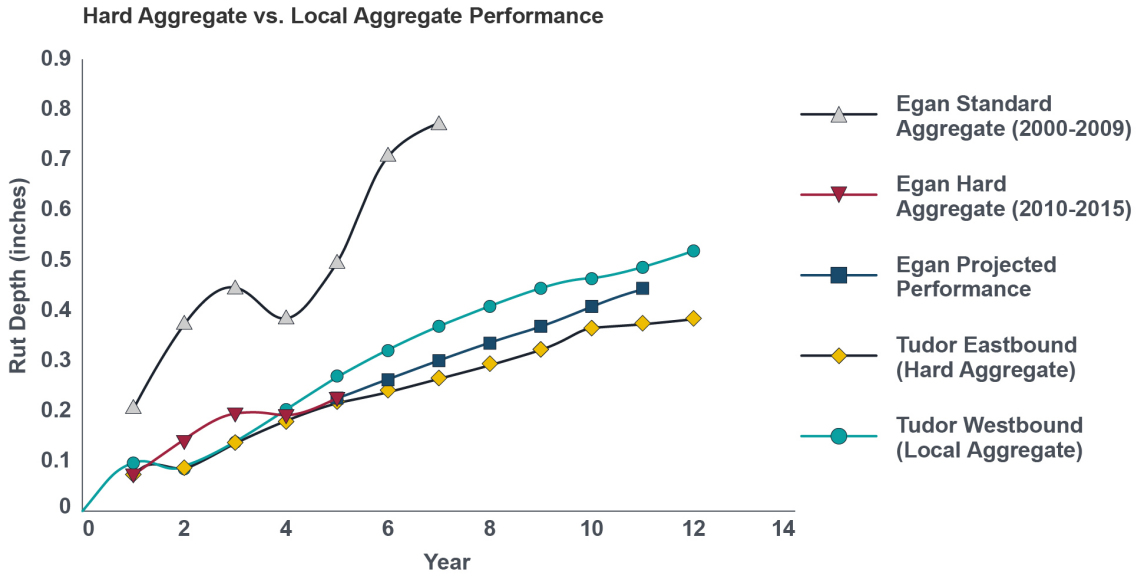


Figure C-8. Initial evaluation of hard aggregates on rut conditions.

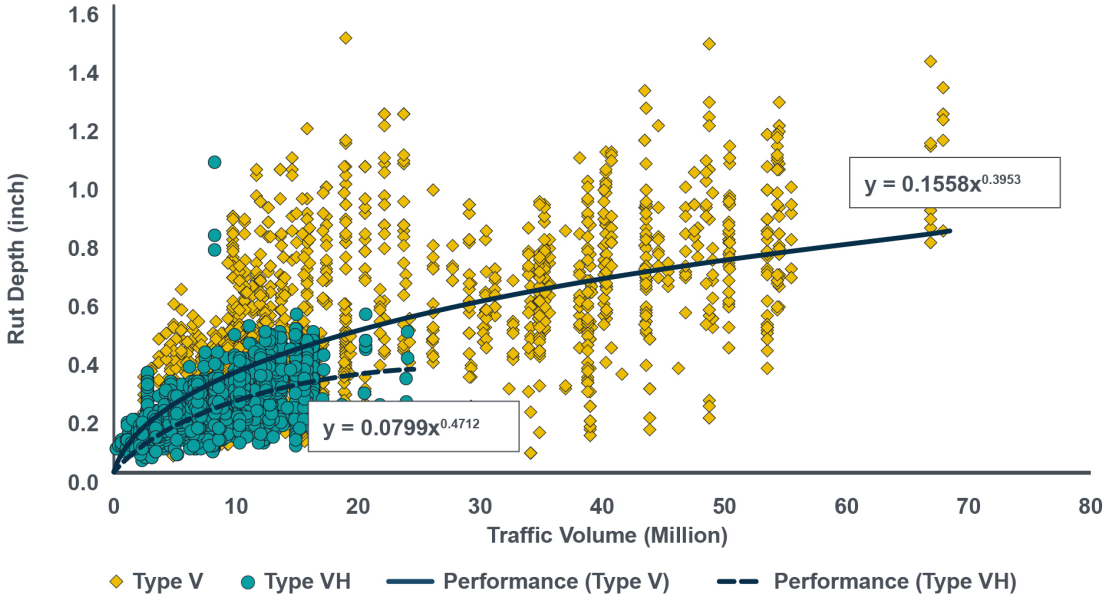


Figure C-9. Impact of hard aggregates on rutting performance in Central Region.

Figure C-8 compares the rut conditions between local and hard aggregates on Tudor Road between 2005 and 2017 and on Egan Drive between 2000 and 2015.

- Tudor Road Project Cost with Local Aggregate Asphalt Mix = $7,500,000 provides 11-year life to ½" rut, cost per year = approx. $682,000/ year.
- Tudor Road Project Cost with Hard Aggregate Asphalt mix = $9,200,000 provides 18-year life to ½" rut, cost per year = approx. $507,000 / year.

The effectiveness of this hard aggregate policy was reviewed in 2021 by comparing collected data on Superpave mixes across the Central Region to evaluate the performance of hot mix asphalts with and without the incorporation of hard aggregates. In figure C-9, the green data displays the performance of roads with hard aggregates (Type VH) while the yellow data indicates the performance of those without (Type V). The X axis is the number of vehicle passes on the lane of the road where the rut depth is measured, and the Y axis is the rut depth in inches. The results verify that the mixes incorporating hard aggregates clearly provide better rut performance than those without.

While the use of hard aggregates has reduced the rate of rutting on highly trafficked roads, in 2014 DOT&PF began evaluating if modifying binders can further improve hot mix asphalt's resistance to studded tire wear. Prall testing, a test used to simulate the effects of studded tire wear on pavements, was performed on a variety of binders modified with polymers and extenders in different ways. This testing indicated that both raising the polymer level within the binder and lowering the bottom end (softening the asphalt binder) improved studded tire resistance.

This testing led to the development of a binder that grades out to PG64-40 and typically incorporates seven percent polymer. This binder is now used in hot mix asphalt with hard aggregates on high traffic volume roads within the Central Region. Figure C-10 displays its performance compared to the previously used PG58-34 binder in Superpave mixes incorporating hard aggregates on roads with speeds less than 55mph.

EXTERNAL FACTORS

External factors are the outside forces, some of which are beyond an agency's control, that can impact the ability to achieve its strategic goals. Each factor impacts the pavement program differently. External factors were identified and considered during pavement target setting.

In summary, twenty external factors were identified that can influence pavement condition forecasting, and they are summarized in table C-4. Pavement condition was anticipated to remain steady based on no changes in funding.

The external factors that may influence pavement negatively are poor drainage, higher precipitation based on extreme weather events, and changing temperatures that increase the number of freeze thaw cycles. Alaska is experiencing warming temperatures, increased precipitation during events, and thawing of permafrost. DOT&PF designs for permafrost, and as long as it remains frozen it will support the roads. However, when the temperatures rise, the permafrost thaws, and the road embankment will fail. This is an area that needs close attention because it is changing rapidly, and treatment selection needs to change to adapt as needed. Additional information on this issue is included in Appendix G.

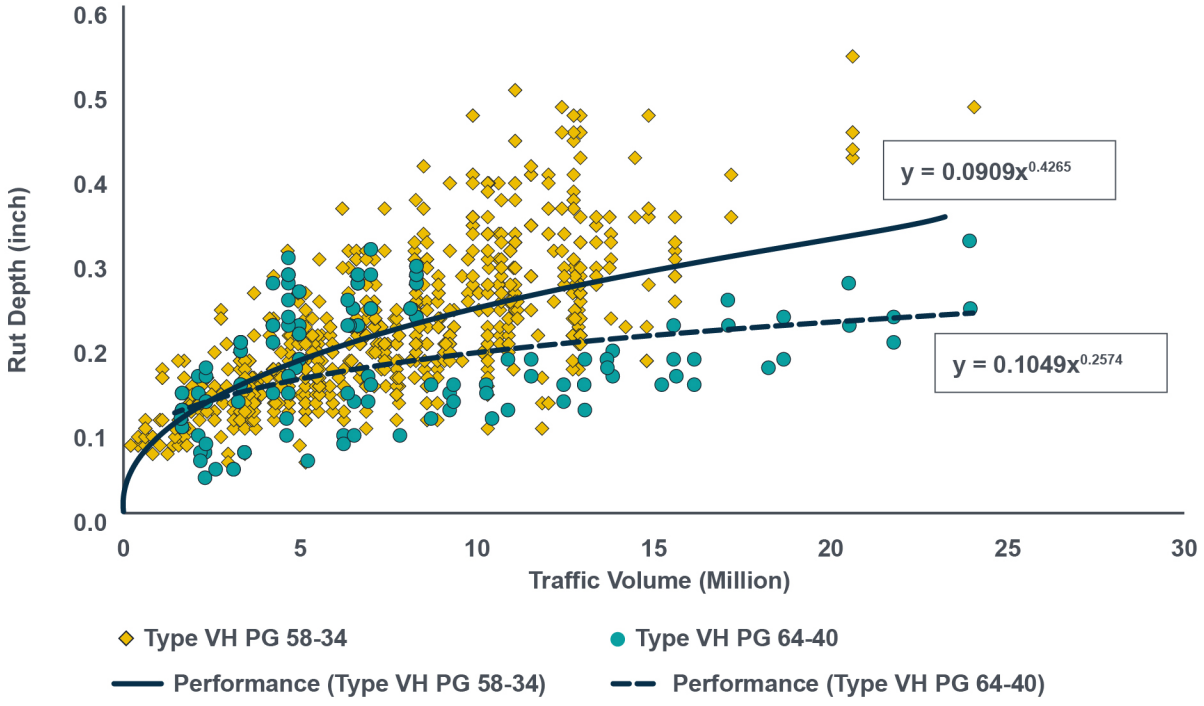


Figure C-10. Impact of PG64-40 binder on rutting performance.

Table C-4. External factors influencing pavement condition forecasting.

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018-2021 Condition Forecast*
Pavement Loading				
Overloaded Vehicles/Axel Configuration and Wheel Load/Repetition of Loads	↓	↔	**Forecast:** No change **Weight:** High Pavement design, certain vehicles exempt for permitting Spring thaw with loaded vehicles	↔
Rutting—Studded Tires/Poor Subbase	↓	↑	**Forecast:** Decrease with **Weight:** High for rutting new non-studded tire options, hard aggregates, and improved binders	↔
Traffic Volume (Heavy Trucks %)	↓	↔	**Forecast:** No change **Weight:** Medium	↔
Tire Pressure	↓	↔	**Forecast:** No change **Weight:** Low High tire pressure buses	↔
Environmental, Hydraulic and Base Considerations				
Poor Drainage	↓	↓	**Forecast:** Increase **Weight:** Low	↓
Freeze/Thaw	↓	↓	**Forecast:** Increase **Weight:** Low Extreme temperature and differential transverse cracks	↓
Temperature	↓	↓	**Forecast:** Increase **Weight:** Low Low temp cause cracks; high temp loses stiffness	↓
Susceptible Foundation (Permafrost)/ Subgrade Type	↓	↔	**Forecast:** No change **Weight:** Low Wheel load on thin pavements causes deformation of subbase	↔
High Precipitation	↓	↓	**Forecast:** Increase **Weight:** Medium Groundwater <1 m pavement. Water intrusion. Caused by extreme weather events	↓
Construction Quality- Substandard Material	↓	↔	**Forecast:** No change **Weight:** Low In some areas, quality material is hard to get/localized	↔

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018-2021 Condition Forecast*
Inadequate Design or Change in Conditions			**Forecast:** No change **Weight:** Low	
Load Factors			**Forecast:** No change **Weight:** Medium If Alaska moves to actual loads instead of axels, load factors would be more accurate and could produce more efficient designs	
Design Mix			**Forecast:** Increase **Weight:** High Continued IR use will improve embankment quality and pavement life. Hard aggregate policy extends pavement life. Rut treatment research	
Geometric Considerations				
Unsafe Curves, Steep Hills Stopping Vehicles at Creep Speeds			**Forecast:** No change **Weight:** Low Low speed. Turning and stop conditions. Elevated grade. Change localized areas	
Intersections (Stops/Starts)			**Forecast:** No change **Weight:** Low Low speed. Turning and stop conditions. Urban areas	
Other Factors				
Funding			**Forecast:** No change **Weight:** High	
Aging Infrastructure			**Forecast:** No change **Weight:** High	
Maintenance			**Forecast:** Increase **Weight:** High Programmatic M&O activities are eligible for federal funding	
Rough Roads			**Forecast:** Increase **Weight:** Low Rough roads (high IRI) damage vehicles, fatigue cracks, breakdown base. Localized	
New Cracking Data			**Forecast:** Increase **Weight:** Medium New cracking data	

Appendix D: Asset Overview—Bridges

As of the last report to FHWA on March 15, 2021, the DOT&PF Bridge Program manages 1,036 bridges (including large culverts) on public roads in Alaska. The Department owns 839 of them; thirty-two are owned by other state agencies, and 165 are owned by local governments. The Department also inspects forty-one ramps to ferry docks, four tunnels, and 87 culverts (single culvert diameter of 20' or greater, or multiple culverts that are spaced no greater than one-half the diameter of the smaller and a combined length along centerline of the roadway greater than 20'). Fourteen of these bridges are closed to the public. Of those 1,036 structures, 425 are on the NHS. Five of these bridges are owned by other local agency entities and three by Anchorage International Airport. The eight non-DOT&PF bridges will not affect the overall state target or national goals.

Relative to the calculation of the National Bridge Performance Measures, there are two classes of bridges based on the functional class of the road the bridges serve.

- NHS-Bridges: bridges that carry the NHS (Interstates, principal arterials, and intermodal connectors including ramps) are included in calculation of the national measure.
- Non-NHS Bridges: bridges that carry highways of all other functional classifications are not included in calculation of the national measure.

INSPECTION PROGRAM

Bridges are inspected at least once every 24 months by DOT&PF bridge inspectors/engineers. Bridge inspectors examine four main components: the substructure, the superstructure, the deck, and waterway characteristics. The substructure includes the foundation, piers, and abutments of the bridge. The superstructure is the overlying framework (trusses or girders) that rest on the piers and abutments. The deck is the portion of the bridge that is visible by the driver. Inspection of waterway characteristics includes inspection of scour and any changes to the waterway since the previous inspection.

Department engineers classify the condition of Alaska bridges according to three different bridge condition categories:

- Structurally Deficient / *Poor* (National Bridge Inventory [NBI]≤4)
- Not Deficient (NBI ≥ 5)

Bridges are "rated" using NBI General Condition Ratings on a scale of 1 to 9. Bridges are considered deficient if they receive an NBI rating of 4 or lower (table D-1). Bridges are considered structurally deficient if their decks, superstructures, *or* substructures are found to be in *Poor* condition.

NBI numbers are used to report the condition of deck, superstructure, or substructure. NBI ratings are a constituent of the bridge condition rating and recommended work type (table D-2). If the deck, superstructure, or the substructure has an NBI rating below 4, then the bridge will require rehabilitation or replacement.

The deck, superstructure, and substructure are considered critical elements of a bridge. Inspections follow the AASHTO Manual for Bridge Element Inspection, 2nd edition, published in 2022.

Table D-1. NBI general condition rating scale.

Scale		Description
N		Not Applicable (railroad underpass and private pedestrian overcrossings of public roads).
Good	9	Excellent Condition.
	8	Very Good Condition—no problems noted.
	7	Good Condition—some minor problems.
Fair	6	Satisfactory Condition—structural elements show some minor deterioration.
	5	Fair Condition—all primary structural elements are sound but may have minor section loss, cracking, spalling, or scour.
Poor	4	Poor Condition—advanced section loss, deterioration, spalling, or scour.
	3	Serious Condition—loss of section, deterioration, spalling, or scour may have seriously affected primary structure components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
	2	Critical Condition—advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
Closed	1	Imminent Failure Condition—major deterioration or section loss present in critical structure components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put bridge back into light service.
	0	Failed Condition—out of service—beyond corrective action.

Table D-2. NBI rating.

Performance Target	NBI Rating	Recommended Work Type
Good	9	No Work Needed
	7-8	Preservation Candidate
Fair	6	Preservation
	5	Minor Rehabilitation/Repair Candidate
Poor	4	Rehabilitation or Replacement Candidate
	≤ 3	Replacement Candidate

The Deck Area Bridge Condition Performance measure uses the following calculation:

$$\frac{\text{100 x Total Deck Area of } \textit{Good} \text{ or } \textit{Fair} \text{ or } \textit{Poor} \text{ Bridges}}{\text{Total Deck Area of Bridges in the State}}$$

Under MAP-21, all state transportation agencies need to collect element condition data on NHS bridges. Superstructure element data includes each beam, stringer, truss, arch, and main cable. DOT&PF will also use this more detailed information to prioritize projects. In 2021, all 1,036 DOT&PF managed bridges were submitted with element-level data.

Bridge element data is being collected for the deck, superstructure, and substructure as well as culverts, bridge rail, joints, bearings, and wearing surfaces[4]. Depending on the bridge type, different element reporting is used. The deck is the structural system that supports traffic and does not include non-structural wearing surfaces such as timber running planks and asphalt, as those are sacrificial. The superstructure includes the girders, beams, or truss that support the deck. The substructure is the foundation of the bridge and includes abutments, piles, pier caps, pier walls, and columns that support the superstructure. The deck, superstructure, and substructure include material types for steel, pre-stressed concrete, reinforced concrete, timber, masonry, and others. The other material type is anything that does not fit into one of the specified material types.

A detailed description of the element inspection can be found in the FHWA Specification for the National Bridge Inventory Bridge Element report dated 01-21-2014.

All NBI and element data collected during inspection are stored in AASHTOWare BrM BMS. This system was previously known as PONTIS Bridge Management System. DOT&PF started using PONTIS for data collection in April 2002 and transitioned to BrM in October 2014.

Prior to PONTIS, data was collected and stored in a DOT&PF programmed Microsoft Access database. In 2018, DOT&PF upgraded to a new version that satisfies 23 CFR 515.17. Those regulations require that management systems have procedures for collecting, processing, storing, and updating bridge inventory on the NHS. DOT&PF Policy and Procedure (P&P) 07.05.025 fulfills this requirement.

The BMS contains an out of the box deterioration model for bridge assets. The standard deterioration model is based on expert elicitation and collaboration of several different states. A future planned research project will develop an agency-specific model to replace the default software model.

DOT&PF developed life-cycle planning scenarios, including a no action scenario and a non-funding restrained option that were configured in the BrM. The system provides a 1-year short term as well as a 10-year long term budget needs estimate for NHS Bridges.

BrM prioritizes bridge work based on bridge condition (a combination of NBI and element condition data), utility, life-cycle cost, risk, and mobility. Utility is how much a treatment improves the condition based on the cost and the criticality of that bridge. Bridge criticality calculation includes traffic volume and detour route if the bridge is closed. Life-cycle cost calculates how deferring work now will cost more later since the structure will continue to deteriorate and will need a more costly treatment to improve condition. Risk considers bridge age, detour length, whether it is fracture critical bridge, has a load posting, does not meet seismic standard, has scour, or other concerns that do not show up in condition. Mobility considers geometric issues and average daily traffic (ADT). Mobility is usually a small factor for bridge prioritization.

FEDERAL PERFORMANCE MEASURES

The bridge performance measure is based on three metrics including Deck Rating, Superstructure Rating, and Substructure Rating. All three ratings are based on a scale of 1-9 and carry the same condition rating thresholds. *Good* is defined as a value of 7-9, *Fair* is 5-6, and *Poor* is less than 5. The lowest rating of all three metrics becomes the overall bridge condition.

The calculation for bridge deck area includes the following:

- Length = Corresponding value of NBI Item 49 (structure length for every applicable bridge)
- Width = One of the two widths described below
- Corresponding value of NBI Item 52 (deck width)
- Value of Item 32 (Approach roadway width for culverts where the roadway is on a fill [i.e., traffic does not directly run on the top slab or wearing surface of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge)

The NBI bridge deficient deck area is the sum of the bridge deck area and the culvert deck area.

4 FHWA Specification for the National Bridge Inventory Bridge Elements

The two areas are calculated using the calculations below.

Bridge Deck Area=Structure Length*Deck Width Out to Out
Culvert Deck Area=Structure Length*Approach Roadway

Bridge deck area includes culverts, typically box culverts, where traffic is driving on the top of the culvert. Culvert deck area includes culverts where traffic is driving on fill carrying the roadway.

A national goal that was part of the MAP-21 legislation requires structural deficiency of deck area to be less than 10 percent. Figures D-1 to D-3 summarize bridge conditions on the three subnetworks of bridges that DOT&PF manages.

3-year Average *Poor* = 6 percent (TARGET 10 percent)

3-year Average *Good* = 35.5 percent

3-year Average *Fair* = 58.5 percent

PERCENTAGE OF NON-NHS AND OFF SYSTEM BRIDGES—BRIDGE CONDITION BY DECK AREA

Non-NHS and off system bridges are not required to meet federal performance measures and are not included in the TAMP. However, their performance is tracked in the BMS (figure D-2 and figure D-3).

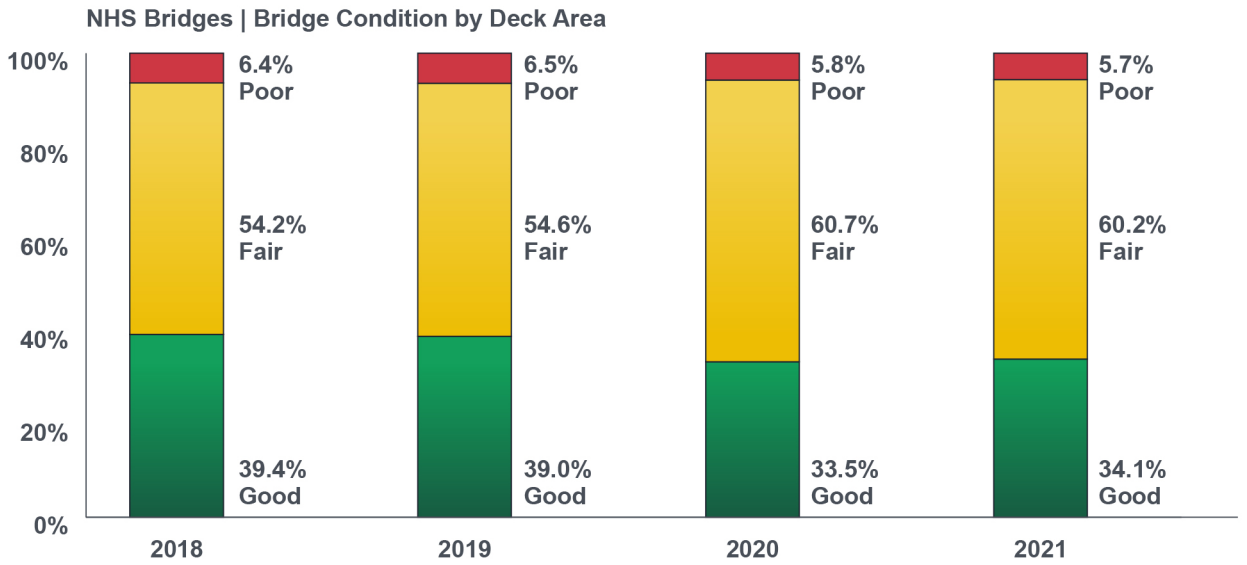


Figure D-1. Average overall NHS bridge conditions (by deck area) 4-year trend.

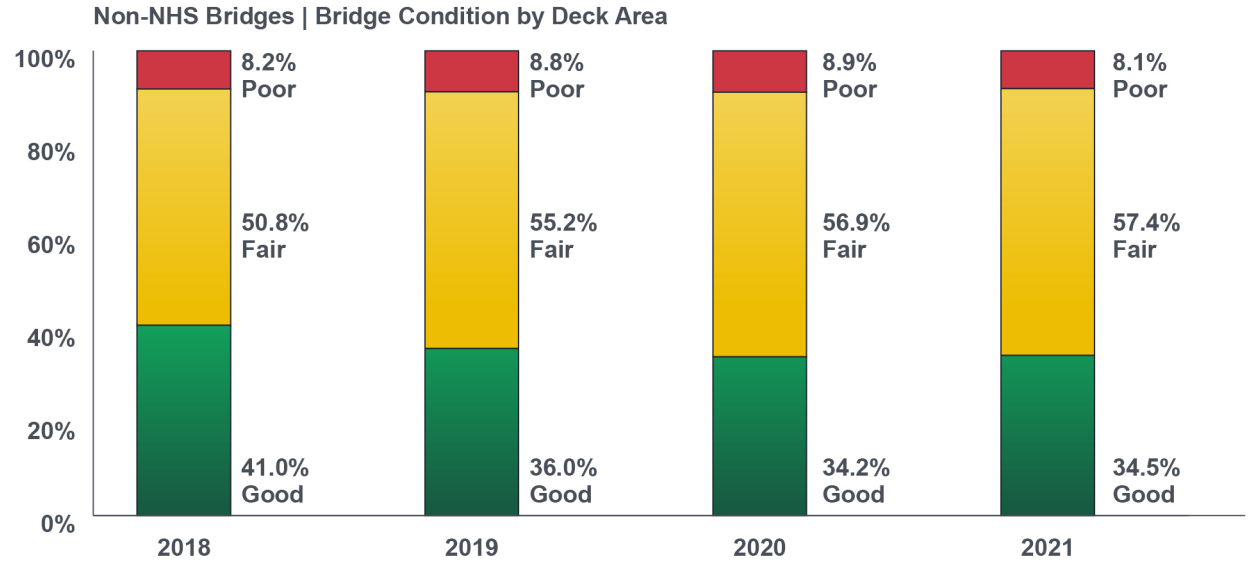


Figure D-2. Non-NHS overall bridge conditions (by deck area) 4-year trend.

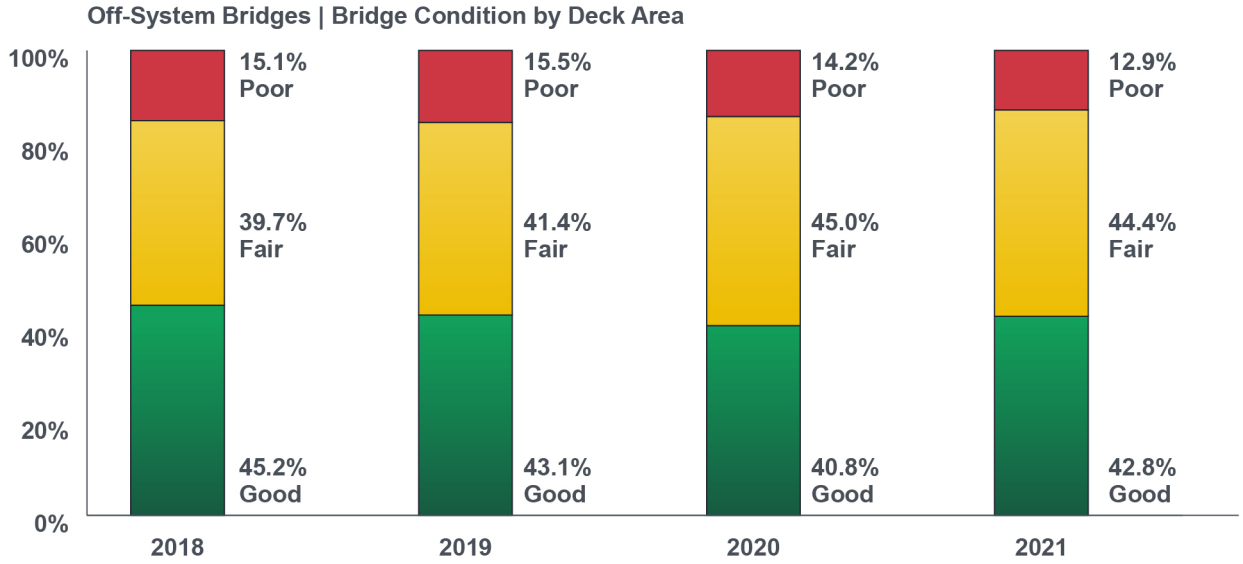


Figure D-3. Off-system overall bridge condition (by deck area) 4-year trend.

Figures D-2 and D-3 do not include closed bridges, which would be classified as *Poor*.

As shown in figure D-2, the percentage of *Poor* bridges, by deck area, on the state non-NHS system declined between 2017 and 2021 but so did the percentage of *Good* bridges. This increase in *Fair* bridges will require work in coming years to avoid a future increase in *Poor* bridges. Non-NHS off-system bridges have had relatively stable conditions, with a slight decrease in *Poor* bridges, by deck area, since 2019.

PERFORMANCE MEASURES

Federal law requires that no more than 10 percent of the total bridge deck area may be designated Structurally Deficient for all NHS bridges.

DOT&PF's goal is to maintain NHS bridges designated as Structurally Deficient at or below 10 percent, which means 90 percent of NHS bridges would be in *Fair* or better condition. Non-NHS bridges have a goal of eighty percent *Fair* or better. The goal coincides with the DOT&PF's Strategic Plan to provide for the safe and efficient movement of people and goods. It is important to keep the deck, joints, and paint in *Good* condition since that is what will keep the super-structure and bearings in *Good* condition. *Good* pavement condition on bridges can help protect the deck and super-structure from water and chemical infiltration.

BRIDGE MANAGEMENT SYSTEM IMPLEMENTATION

The DOT&PF utilizes AASHTOWare BrM, formerly known as Pontis, for the state's BMS. DOT&PF has continued to utilize newer features of the BMS since the 2019 TAMP. While the system itself is not new to DOT&PF, it is serving a much larger role in bridge management planning than in previous years. Alaska's BrM environment contains a foundation of historical bridge inventory and condition data, which has been collected through bridge inspections over many years. Working with this data, BrM is capable of performing the following activities:

- Forecasting deterioration and providing performance forecasts of the bridge inventory at different funding levels
- Determining the cost/benefit of projects and preservation activities over a bridge's service life to evaluate alternatives
- Identifying short-term and long-term budget needs for sustaining current bridge conditions
- Determining investment strategies for identifying potential bridge projects and programs

The 2019 TAMP utilized a spreadsheet tool for estimating the needed funding levels for sustaining bridges in a state of good repair (table 4-4) that met DOT&PF's needs at the time. For the development of the 2022 TAMP, the bridge section and the asset

management section have worked collaboratively to utilize BrM's more advanced capabilities, configuring models to specifically meet Alaska's bridge management needs. Additional data has been incorporated into BrM to further enhance DOT&PF's capacity for bridge management. These include:

- Custom deterioration models for concrete, steel and timber bridges which are more accurate than national average models
- Average project costs from recently awarded bridge projects which allow for more accurate project estimates
- Project data from existing plans (including the STIP and the 12-year plan) which account for already-allocated projects and funds

BrM's predictive modeling helps to forecast future conditions of the state's bridge inventory. While DOT&PF are satisfied with the current deterioration models used, further refinement of element models is an area of need which should be considered for future research. Similarly, the refinement of utility trees, project recommendation criteria, and cost models within BrM is expected to continue throughout the next several years.

BRIDGE GAP ASSESSMENT

The State's bridge inventory continues to age, and the median bridge age is 34 years, past the midpoint of their 50- to 75-year design life. Almost 17 percent are 50 years old or older. It is critical to address the existing inventory of structurally deficient bridges.

The majority of publicly owned bridges in Alaska have been constructed using steel girders, followed by pre-stressed concrete bridges, then timber bridges, which typically compose the older and shorter spans. Because of their relatively low maintenance requirements and relatively low cost, pre-stressed concrete girders are the preferred choice for new construction.

As part of continuous improvement, the bridge section proposes a route-based analysis for project selection by reviewing NHS routes such as the Alaska Highway or the Parks Highway and the sufficiency ratings for each bridge along that route. Maintaining a high-level sufficiency rating on important routes would be a strategy to maintain a high level of access and connectivity. The route analysis strategy is not currently being used by DOT&PF for project selection but could be analyzed further using the BMS.

Bridge Asset Management Goals

- Have a maximum 7.5 percent structural deficiency in bridges in the NHS system.
- Replace or rehabilitate one to three structurally deficient bridges every year.
- Continue the Seismic Bridge Retrofit program.
- Introduce a Bridge Preservation program that is managed through the statewide bridge section.
- Provide a bridge list and coordinate statewide rehabilitation/replacement efforts with regional planners.
- Provide a seismic retrofit candidate list to regional field office planners.
- Coordinate statewide bridge preservation program with regional maintenance crews to plan a systematic maintenance strategy with federal participation.
- Prioritize maintenance work recommendations in Bridge Inspection Reports by assigning high, medium, or low priority where:
  - » High—ideally repair within a year
  - » Medium—ideally repair within 2 years
  - » Low—repairs can wait more than 2 years

Bridge Asset Management Objectives

- Design and construct bridges to last with minimal maintenance.
- Seal decks and expansion joints to protect bridges from road salt laden runoff.
- Perform maintenance such as cleaning gutters and deck drains, removing debris from bottom chords and bearing seats, and removing drift from piers.
- Invest in preservative treatments for bridges in *Good* and *Fair* condition to retard deterioration. Preservative treatments might include deck seals, joint seals, and repainting structural steel elements.
- Provide timely information to allow effective selection and design of future maintenance, preservation (e.g., deck treatments), rehabilitation, and reconstruction projects.

BRIDGE PRESERVATION

Bridge Preservation[5] is defined as the actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements, restore function of existing bridges, keep bridges in *Good* condition, and extend their life. Preservation actions may be preventative or condition-driven (Source: FHWA Bridge Preservation Expert Task Group).

Effective Bridge Preservation actions are intended to delay the need for costly reconstruction or replacement actions by applying preservation strategies and actions on bridges while they are still in *Good* or *Fair* condition and before the onset of serious deterioration.

Preservation activities may include bridge washing, sealing deck joints, facilitating drainage, sealing concrete, painting steel, removing channel debris, protecting against scour, and lubricating bearings. For more information on Bridge Rehabilitation and Preservation techniques, see the FHWA Bridge Preservation Guide.

MAJOR REHABILITATION/ RECONSTRUCTION

DOT&PF identifies and programs bridge rehabilitation and replacement projects in several different ways, as described below. A bridge treatment strategy is identified using life-cycle cost analysis.

- Highway projects per the Alaska Highway Preconstruction Manual:
  - Bridge maintenance work is allowed for Preventive Maintenance projects.
  - Specific bridge criteria are presented for projects that resurface, restore, or rehabilitate (an existing roadway on the same alignment, modified alignment, or relocated alignment). These are referred to as 3R projects.
  - New road and major realignment projects
- Bridge Prioritization List is a function of:
  - Structurally deficient bridges
  - NBI values for deck, superstructure, and substructure
  - Normalized traffic volume
  - NHS or Non-NHS
  - Functional class
  - Available detour length
- Other:
  - A local agency nominates a project.
  - State Maintenance & Operations staff requests a project to address either load limits or on-going high maintenance costs.
  - Legislature writes legislation that results in a bridge project.
  - Extreme events (earthquake, flood, etc.) result in the need for replacement.

PERFORMANCE TARGETS AND EXTERNAL FACTORS

As noted above, the performance target for bridges was revised to a target of no more than 10 percent of the deck area being structurally deficient (for both NHS and non-NHS bridges). The current target was determined through meetings of DOT&PF staff and as part of a TAM team workshop with the MPOs in August 2017. DOT&PF's target setting memo of September 2022 adopted the same bridge performance targets for the new performance period. The workshop identified and evaluated external factors that would influence future conditions and affect the targets. Those factors are summarized in table D-3.

5 FHWA Bridge Preservation Guide

Table D-3. External factors influencing bridge condition forecasting.

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018 Condition Forecast*
Bridge Attributes				
Fracture Critical	↓	↓	**Forecast:** Increasing pressure **Weight:** Medium Inspection of fracture critical bridges have increased costs, which contribute to the overall long-term cost of the bridge. Widening, modifications, or repairs to fracture critical bridges are more involved and have increased costs. In a remote site, a fracture critical bridge may seem like a preferred option until future inspection or repair costs are included	↓
Vulnerable Foundation (Shallow Pile Embedment, Brittle 3-Rail Piles, etc.)	↓	↓	**Forecast:** Increasing pressure **Weight:** Medium A vulnerable foundation does not affect the condition, but the potential for issues after a seismic event is significantly higher. An increase in vulnerable foundations results in increased costs due to increases in required inspections and scrutiny by FHWA. As DOT or local agencies acquire bridges due to development or land exchanges, many bridges are not designed or constructed to code standards, which results in an increase in vulnerable foundations	↓
Load Posting (Reduction Below Legal Loads)	↓	↓	**Forecast:** Increasing pressure **Weight:** High Load postings are installed as a result of bridge condition deterioration. More posted bridges mean that the condition of bridges is deteriorating. Bridges deteriorate with time. As DOT or local agencies acquire bridges due to development or land exchanges, many bridges are not designed or constructed to code standards, which results in posting	↓
Permits (Overweight Vehicles, Above Legal Loads)	↓	↓	**Forecast:** Increasing pressure **Weight:** High As commerce and development increase so does overweight vehicle permits. More permits means the condition of bridges is deteriorating	↓
Seismic Retrofit	↓	↔	**Forecast:** Neutral pressure **Weight:** Medium The need for seismic retrofit does not affect the condition, but the potential for issues after a seismic event is significantly higher. Many bridges have been retrofitted, so it is not expected that this number will increase	↔
Liquefaction Vulnerability	↓	↔	**Forecast:** Increasing pressure **Weight:** High As DOT or local agencies acquire bridges due to development or land exchanges, many bridges are not designed or constructed to code standards, which results in an increase in liquefaction vulnerability	↔

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018 Condition Forecast*
Lead Paint	⇔	⇔	**Forecast:** Neutral pressure **Weight:** Medium Lead paint does not affect the condition, but it does affect the repainting costs of older bridges due to containment costs. As bridges are repainted, the number of bridges with lead paint is expected to decrease	↑
Hydraulic Considerations				
Scour Critical	↓	↓	**Forecast:** Increasing pressure **Weight:** High More scour critical bridges result in increased costs due to increases in required inspections and scrutiny by FHWA	↓
Channel Infilling / Aggradation	↓	↓	**Forecast:** Neutral pressure **Weight:** Low As the channel infills, material has to be removed from the channel to maintain flow	↓
River Ice Jams	↓	↓	**Forecast:** Neutral pressure **Weight:** Medium Exceedingly high flow as a result of an ice jam may result in overtopping of the bridge, erosion of approach fill, or in an extreme case knocking the bridge off of the foundation	↓
Aufeis Flow (Water Flowing on Ice)	↓	↓	**Forecast:** Neutral pressure **Weight:** Medium Aufeis flow is water flowing on top of ice that can refreeze increasing the thickness of the ice and thereby blocking the channel	↓
Fish Culvert	↑	⇔	**Forecast:** Neutral pressure **Weight:** Medium Ongoing need to improve fish passage conditions where blockages have been identified	⇔
Tsunami Risk	⇔	⇔	**Forecast:** Increasing pressure **Weight:** Medium Exceedingly high flow as a result of an earthquake may result in overtopping of the bridge or knocking the bridge off of the foundation	⇔
Log / Debris Jams	⇔	⇔	**Forecast:** Increasing pressure **Weight:** Medium Exceedingly high flow as a result of a log / debris jam may result in overtopping of the bridge, erosion of approach fill, or in an extreme case knocking the bridge off of the foundation	⇔
Geometric Considerations				
Over-height Collisions (Superstructure)	↓	↓	**Forecast:** Neutral pressure **Weight:** High As bridges are replaced and vertical clearance restrictions removed (trusses), vertical under clearances are increased (overpasses), or more advanced warnings are installed at lower vertical clearance bridges, as most recently occurred at Eklutna Overcrossing #1374	↓

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018 Condition Forecast*
Pier Collisions (substructure—Vehicle or Marine Craft)	↓	↓	**Forecast:** Neutral pressure **Weight:** Low Many overpass abutments and piers are protected by traffic safety features. The condition of the bridge with a collision would worsen until repaired. However, the repaired areas are often the source of future spalling and deterioration	↔
Navigation Clearance	↔	↔	**Forecast:** Increasing pressure **Weight:** Low As bridges are replaced, navigation clearances are increased (overpasses). Navigation clearance does not affect the condition, but an increase in clearance may result in lower collision risk at an increase in initial installation cost	↑
Animal Crossing	↔	↔	**Forecast:** Increasing pressure **Weight:** Low More animal crossings are being installed to decrease collisions between animals and cars. Animal crossings do not affect the condition, but they do increase the long-term maintenance costs of the inventory	↑
Pedestrian Crossing	↔	↔	**Forecast:** Increasing pressure **Weight:** Low As bridges are replaced there is an increased demand for pedestrian facilities both over and under the bridge. Pedestrian crossings do not affect the condition, but they do increase the initial installation costs as well as the long-term maintenance costs of the inventory	↑
Other Factors				
Funding	↔	↔	**Forecast:** Increasing pressure **Weight:** High Funding levels fluctuate from year to year, but overall the condition of Alaska's bridges has not significantly changed as a result of current funding levels	↓
Aging Infrastructure	↓	↓	**Forecast:** Increasing pressure **Weight:** High Bridge condition deteriorates with time unless preventative, preservation, or maintenance activities are performed regularly	↓
Railing Collisions	↓	↓	**Forecast:** Increasing pressure **Weight:** Medium Minor railing conditions that result in damage to railing or posts do not affect the condition of the bridge. Significant collisions that result in damage to the deck have a negative impact on condition until repaired. The repaired areas are often the source of future spalling and deterioration	↓

Factors	*Expected Condition Outcome with Factor Increase*	*Current Experience with Factor*	*Notes*	*2018 Condition Forecast*
Detour Length			**Forecast:** Neutral pressure **Weight:** Medium Detour length does not affect the condition, but it does increase the initial installation costs as a result of the requirement for a detour bridge during construction. There is also an impact to the public and commerce for a bridge with a large detour length being posted or closed due to damage or deterioration	
Remote Location			**Forecast:** Neutral pressure **Weight:** Low Remote location does not affect the condition, but it does increase the initial installation costs, long-term inspection costs, and long-term maintenance costs of the inventory	
Evacuation Routes			**Forecast:** Increasing pressure **Weight:** Medium An evacuation route does not affect the condition, but it does increase the initial installation costs as a result of additional requirements to maintain during construction. There is also an impact to the public and commerce for an evacuation route bridge to be posted or closed due to damage or deterioration	
Coast Guard Permitting			**Forecast:** Increasing pressure **Weight:** Medium Permitting does not affect the condition, but it does increase the lead time involved with bridge replacement, rehabilitation, or retrofit work	
Historic Bridge			**Forecast:** Increasing pressure **Weight:** Medium Being historic does not affect a bridge's condition, but it does increase the lead time involved with bridge replacement, rehabilitation, or retrofit work due to increased paperwork and documentation requirements	
Mobilization Cost			**Forecast:** Increasing pressure **Weight:** Medium Mobilization cost does not affect the condition, but it can increase the cost when equipment not regularly used in Alaska must be mobilized from the lower forty-eight to an urban area, much less a remote location	
Climate Change			**Forecast:** Increasing pressure **Weight:** Medium Changing conditions may influence design selection processes	
Extreme Events			**Forecast:** Increasing pressure **Weight:** Medium Projects may be delayed as a result of earthquake damage, road washouts, or other damage that leads to a bridge's need to be repaired prior to another project	

Appendix E: Gap Analysis

This appendix describes the process that DOT&PF uses for conducting the performance gap analysis [GAP 515.7(a)] as defined in 23 CFR 515.5 and depicted in figure 3-1.

GAP ANALYSIS—IDENTIFYING PAVEMENT AND BRIDGE CURRENT STATE AND FUTURE NEEDS

DOT&PF identified the current state for asset conditions by reviewing historical data and trends for pavement and bridges using the federal rulemaking standard for *Good*, *Fair*, and *Poor* conditions. Figures 2-3, 2-5, and 2-7 (Section 2) depict recent pavement and bridge condition history. Both pavement and bridge conditions are fairly stable and meet the current SOGR criteria.

Future needs were identified as the DSOGR and the 2-year and 4-year NHPP targets for bridge and pavement conditions. New NHPP targets were developed using knowledge gathered from the NHI Effective Target Setting training in March 2017, performance data from the previous 4-year TAMP period, and planned STIP investment levels. NCHRP 23-07 target setting web-based workshops were held in July 2022. For pavements, the targets for the percentage of *Poor* pavements on both the Interstate and non-Interstate NHS subnetworks were lowered from 10 percent to 5 percent and 15 percent to 10 percent respectively. For bridges, the intent was to keep the performance target flat from historical levels because it is an acceptable condition performance level for the NHS assets and represents a state of good repair for the system.

GAP ANALYSIS FOR PAVEMENT AND BRIDGE

Performance gaps for pavement and bridges were evaluated by comparing current conditions and condition forecasts from the PMS and BMS to the DSOGR and 2-year and 4-year targets for each asset.

Pavement Gap Analysis—10-Year Forecast

Figures E-1 through E-3 display the current and projected 10-year pavement conditions on the Interstate, non-Interstate NHS, and non-NHS pavements compared to the DSOGR, which are also the NHPP targets. These forecasts were run using an anticipated annual pavement budget of $185 million. This represents the total pavement budget, which includes the SOGR funding that was used in the LCP analyses as well as the pavement reconstruction budget, which provides additional funding for other capital projects that include pavement work but is initiated to address other performance areas such as safety and capacity. These additional projects will have a marginal impact on overall pavement condition. They are not selected or prioritized by the pavement management system, but they are included in the gap analysis to capture the impacts of this additional investment on the pavement network.

These figures show that the Department does not have a performance gap. It should be noted that in forecasting conditions in terms of the federal pavement performance measures, the PMS models data differently than is done by FHWA for HPMS reporting. HPMS stores pavement condition data for IRI, rutting, cracking, and faulting for each tenth-mile section of NHS pavement and calculates the pavement condition measure for each section. The PMS models store pavement condition data based on project-length sections, typically 3-5 miles long. This is because the PMS is being used to produce recommendations for future project locations, where it is not economical to construct unless the project is of a sufficient length. This difference in length between HPMS sections and PMS segments leads to a different result for the percentage of *Good*/*Fair*/*Poor* pavement between the two systems. The reason for this is that many *Good* and *Poor* HPMS sections are averaged together in the same PMS segment. As a result, the PMS will tend to show the system having more *Fair* pavement, with less *Good* and less *Poor* overall than HPMS. Using 2021 as an example, instead of the 7% percent *Poor* on the non-Interstate NHS that is reported for HPMS, the

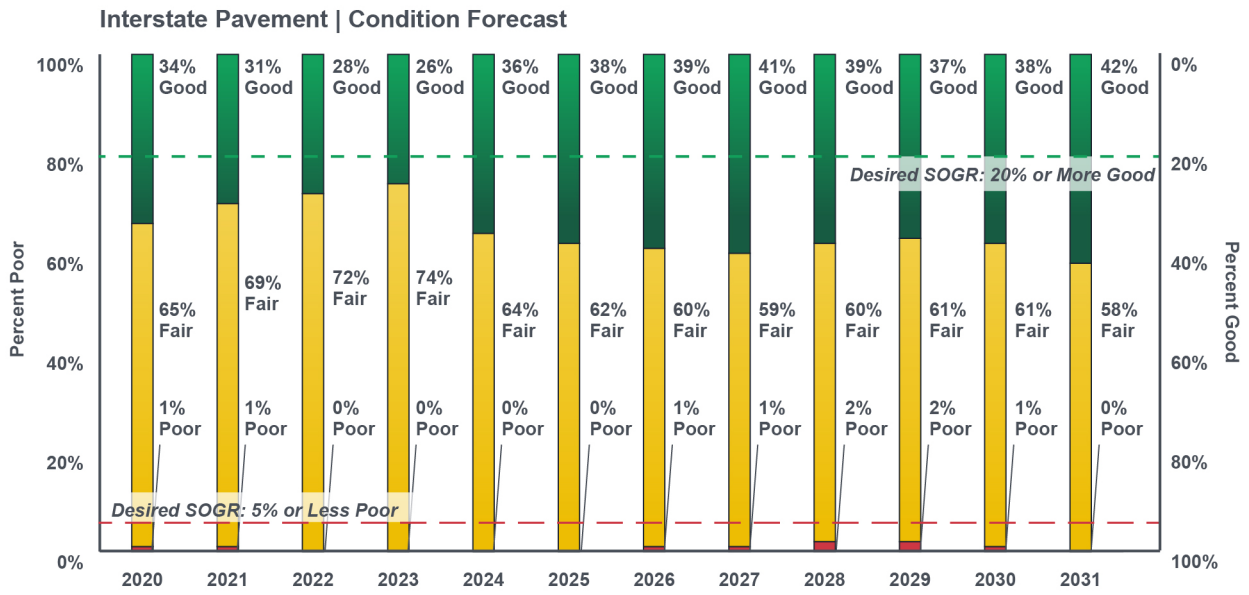


Figure E-1. 10-year pavement condition forecast on Interstate NHS pavements.

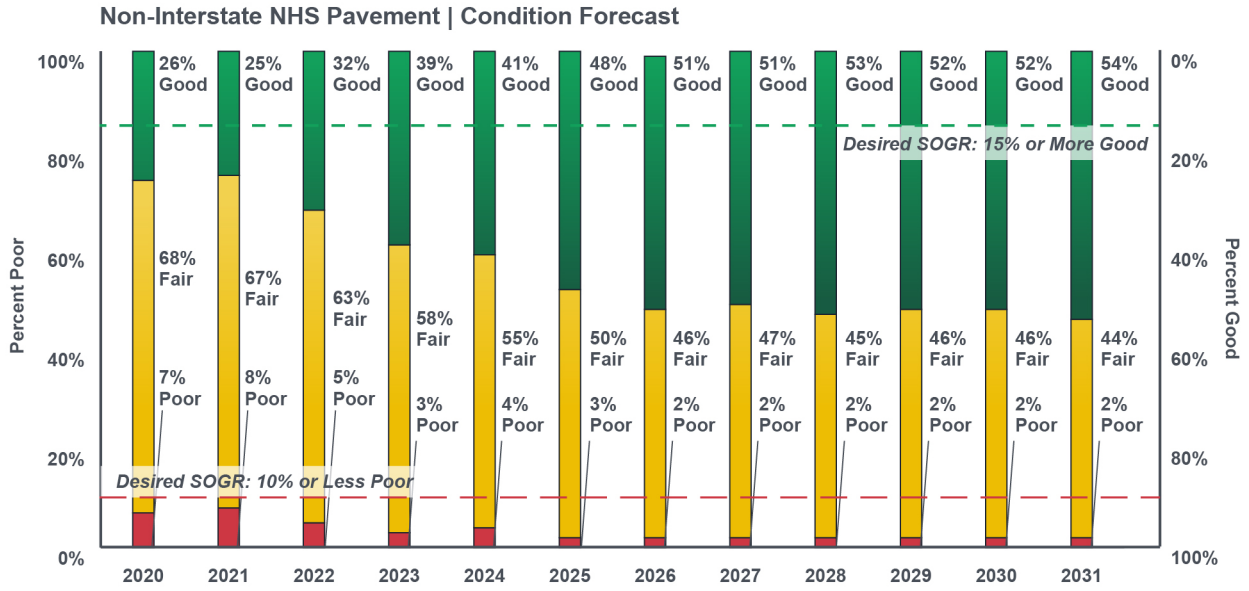


Figure E-2. 10-year pavement condition forecast on non-Interstate NHS pavements.

value shown in figure E-2 is 4.5% percent *Poor*. The same is true for sections of road being reported as *Good* in HPMS.

As described in Appendix C, DOT&PF also maintains a significant non-NHS pavement network primarily using Surface Transportation Block Grant Program (STBGP) funding. Figure E-3 shows the predicted performance of the non-NHS network based on an estimated budget of $165M annual investment of STBGP funding.

Bridge Gap Analysis—10-Year Forecast

Figures E-4 and E-5 display current and projected 10-year bridge conditions on NHS and non-NHS bridges compared to the DSOGR, which are also the NHPP targets.

These figures indicate that the Department does not currently have a gap on NHS *Poor* bridge condition but needs to continue programming reconstruction and rehabilitation of bridges to keep bridges at less than 10 percent *Poor*. NHS bridge conditions do not currently meet the percent *Good* target, but increased investment for NHS bridges will help to mitigate this gap for the next performance period through 2025. Non-NHS bridge conditions do not currently meet the DSOGR and are also predicted to decline throughout the analysis period. Asset Managers strive to meet the target by using 7.5 percent *Poor* as their internal benchmark level. The Bridge Section submits a prioritized list to the field planning staff for consideration when the bridges require major rehabilitation or replacement.

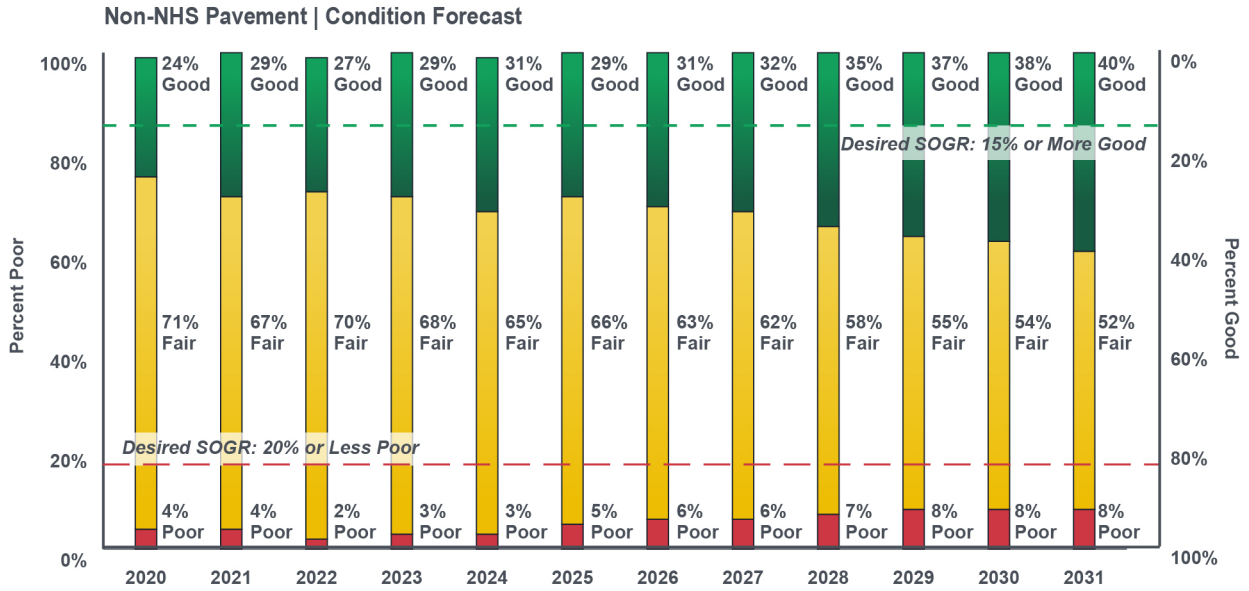


Figure E-3. 10-year pavement condition forecast on non-NHS pavements.

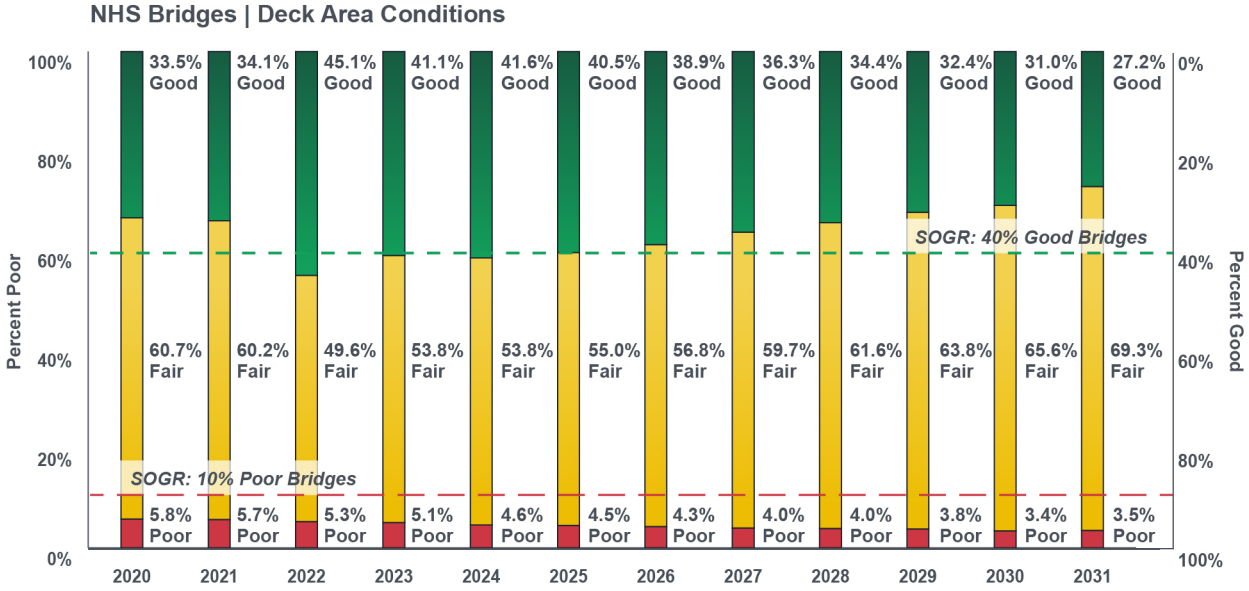


Figure E-4. 10-year bridge condition forecast on NHS bridges.

Considering Risk

Department and MPO staff identified external factors that could improve or worsen physical asset conditions. These factors are listed in Appendix C for pavements and Appendix D for bridges.

Considering Extreme Weather and Resilience in Infrastructure Gap Analysis

Changing climate patterns also pose a high, and almost certain, risk to the transportation system. For example, thawing permafrost causes major settlement to roads that requires frequent reconstruction and expensive mitigation measures. Earthquakes pose seismic risks to bridges and require preemptive mitigation to reduce seismic risk. These risks affect system performance and require significant resources for mitigation. They are discussed in more detail in section 3.5 and Appendix G covering risk management.

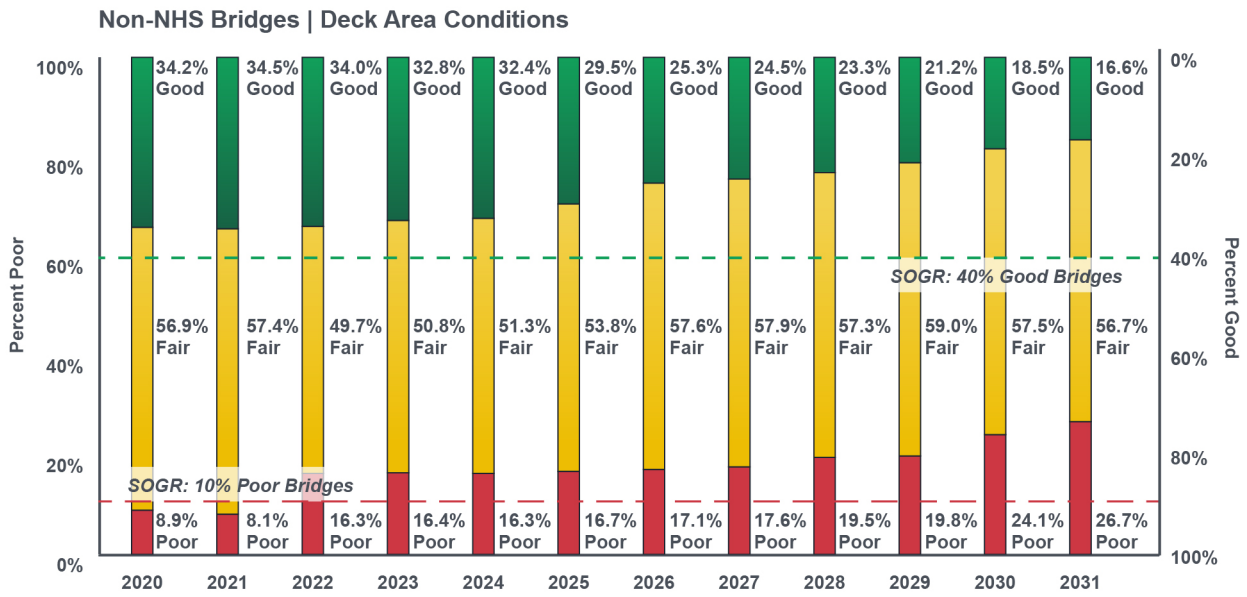


Figure E-5. 10-year bridge condition forecast on non-NHS bridges.

GAP ANALYSIS—SYSTEM PERFORMANCE

DOT&PF monitors and manages the performance of the NHS in regard to all seven TPM National Goal areas: safety, congestion, system reliability, freight movement and economic vitality, environmental sustainability, and project delivery. Each of these performance areas contribute to the development of DOT&PF's capital program, in support of the agency's LRTP. Appendix I describes the internal processes DOT&PF utilizes to manage delivery of the program and ensure the expected performance is delivered on time and within budget.

Using asset management principles and systems, DOT&PF strives to minimize costs to keep assets at target conditions to focus on other assets and new expansion needs. DOT&PF recognizes that in recent years a significant amount of project off-set and de-obligation funding was re-invested to the NHS to maximize funding opportunities.

DOT&PF is meeting pavement and bridge targets and expects to be able to continue to do so; however, there are trade-offs related to funding availability and remaining performance gaps as well as investments in other priorities both on and off the NHS as described in Section 3.1.

The LRTP and this TAMP recognize that the Department must distribute limited funding resources among these multiple priorities. Projects may be categorized as new construction, modernization, capacity, or system preservation. The PMS and BMS will be used to determine system preservation priorities while project selection criteria will be used to select modernization, and to a limited extent, new construction projects.

Modernization of the transportation system to address safety, capacity, and other user expectations represents a significant performance gap that will likely always exist and require resources. For modernization projects on the NHS, the Department will use the strategies listed in Section 5, Asset Management Investment Strategies and Appendix I.

Additionally, the Department is beginning to use Planning and Environmental Linkage (PEL) studies to help identify performance gaps and refine alternatives to cost effectively modernize the transportation system.

Finally, as travel time and freight travel time data are analyzed and compared to targets, more refined performance gap information will need to be integrated into project selection and funding decisions.

Appendix F: Life-Cycle Planning

In conducting its life-cycle analysis, DOT&PF used the following references as guidance for this appendix:

- Using an LCP Process to Support Transportation Asset Management: A Handbook on Putting the Federal Guidance into Practice. FHWA-HIF-19-006. Federal Highway Administration, January 2019
- AASHTO TAM Guide

The LCP processes described in this appendix use the PMS and BMS to determine the benefit/cost ratio of alternate treatment strategies over an analysis period to determine the optimal strategy for maintaining DOT&PF's bridge and pavement networks. The strategies developed through this process are used to support a needs assessment, performance gap analysis, and the development of investment strategies for pavements and bridges. These same strategy inputs are then used annually in the development of DOT&PF plans and programs. The following sections summarize DOT&PF's LCP analysis process and provide analysis results relevant to this TAMP.

Table F-1. DOT&PF Asset class subgroups.

Asset Class	*Subgroups*		
Pavement	Stable Subgrade	AADT < 2000	Very Low Traffic
		2000 ≤ AADT < 5000	Low Traffic
		5000 ≤ AADT < 25000	Moderate Traffic
		AADT ≥ 25000	High Traffic
	Unstable Subgrade	No Traffic Levels	All Very Low Traffic
Bridge	Steel		
	Concrete		
	Timber		

STEP 1. SELECT ASSET CLASSES AND NETWORKS

DOT&PF performed an LCP on NHS bridges and pavement. To support analysis in the management systems, DOT&PF identified asset subgroups and subnetworks that represented different performance characteristics. The asset classes and networks are described below and summarized in table F-1.

Pavements

Under federal regulations 23 CFR 490, DOT&PF must set 4-year condition targets for pavements in two subnetworks: Interstate and non-Interstate NHS highways. These targets are described in Section 1 of the TAMP. While DOT&PF tracks and reports conditions for pavements separately for these two subnetworks, the subnetworks are not separated when making pavement LCP or investment decisions.

For LCP Analysis, pavements are grouped into five subgroups—four groups based on AADT stable subgrades and a separate group for unstable subgrades containing thawing permafrost. These subgroups are defined in table F-1.

Bridges

Due to differences in performance, the bridge inventory was divided into three asset subgroups based on materials and design attributes: concrete, steel, and timber. DOT&PF uses the bridge elements as defined in AASHTO Manual for Bridge Element Inspection for separating deterioration and cost models for these subgroups.

STEP 2. DEFINE LCP STRATEGIES

Before 2019, the DOT&PF applied a "worst first" strategy for identifying projects. This strategy resulted in a *Good* overall condition of the state's Interstate and non-Interstate NHS network pavement and a low percentage of *Poor* bridges and Interstate IRI around less than 10 percent *Poor*.

As described in the LCP objectives, DOT&PF desires to move away from worst-first to maximize the potential of maintaining conditions with projected funding. With few assets currently in *Poor* condition, the DOT&PF is in an excellent position to maintain *Good* infrastructure for a longer period using preservation strategies.

Pavements

DOT&PF evaluated the following LCP pavement strategies:

- **Worst First**—This strategy applies the available budget to pavement segments prioritized based on condition, with pavement segments in the worst condition receiving the highest priority. The PMS is used to model a worst first strategy by applying this prioritization approach to the anticipated budget.
- **Current Strategy**—This strategy is modeled by loading project information for major rehabilitation and reconstruction projects from the current 10-year STIP into the PMS. The system is allowed to select treatments for any remaining budget amounts. It primarily consists of heavy reconstruction treatments and is divided between the treatment categories as follows:
  - » 40 percent reconstruction
  - » 25 percent minor rehabilitation (preservation program)
  - » 30 percent major rehabilitation
  - » 5 percent preventive maintenance treatments (preservation program)
- **Optimized Preservation**—This strategy prioritizes treatments based on the PMS recommendations for maximizing the benefit/cost ratio of improved pavement conditions over the analysis period. The benefit is calculated by the PMS as a function of condition improvement from a potential treatment over the analysis period. This approach recognizes the additional benefit of treatments that not only improve conditions but lead to a sustained improvement. Treatment cost is also considered in the analysis, as the system seeks to maximize the total benefit of the pavement over the analysis period within the available budget.

Bridges

AASHTOWare BrM uses a multi-criteria utility function for resource allocation. DOT&PF considered alternative LCP strategies with alternative utility functions in previous analyses and settled on the following LCP bridge strategy as defined below, aligned with agency bridge management objectives:

- **Current Strategy**—Higher Weight for Condition: In this strategy, the BMS uses a utility function that weighs condition at forty-five percent and life-cycle cost at thirty-five percent. Weight for risk is fifteen percent and mobility is five percent. The condition utility gives element condition twice the weight of the General Condition Rating (GCR) condition. Under this strategy, the average percentage of annual expenditures by treatment category are:
  - » 15 percent major rehabilitation
  - » 30 percent preservation
  - » 53 percent replacement
  - » 2 percent scour

STEP 3. SET LCP SCENARIO INPUTS

This section summarizes the LCP scenario input source data, the data variability, and any sensitivity issues.

Current Conditions

The initial pavement conditions used for LCP analysis were based on DOT&PF's 2021 collection

cycle data. The initial bridge conditions were determined based on the NBI data set, collected in 2020-2021, and submitted to FHWA in March of 2021.

Desired State of Good Repair

DOT&PF targets are the DSOGR, and there is no differential between urban and rural. DOT&PF's targets are summarized in table F-2.

Table F-2. DOT&PF targets for desired SOGR.

Asset	% Good	% Poor
Interstate pavements	20%	5%
Non-Interstate NHS pavements	15%	10%
NHS and non-NHS bridges	40%	10%

For LCP analysis, the performance target for bridges was revised to a target of no more than 10 percent of the deck area being structurally deficient (SD), as per the federal definition, for both NHS and non-NHS bridges. This target was determined through conversations with DOT&PF staff and as part of TAM team workshop with MPOs in August 2017 and was adopted again in DOT&PF's target-setting memo of September 2022. The workshop identified and evaluated external factors that would influence future conditions and effect the targets.

Analysis Period

The following analysis periods were used for initial LCP analysis. The use of longer analysis terms provides the DOT&PF with a better understanding of the long-term implications of each potential LCP strategy and funding scenario. As the DOT&PF gains additional experience with the PMS and BMS, longer analysis terms will be considered.

- Pavements—10 years
- Bridges—20 years (50 years for long-term life-cycle cost calculations)

Treatment Definitions and Unit Costs

PAVEMENT TREATMENTS

DOT&PF uses a variety of treatments that consist of different materials and techniques to construct, maintain, preserve, rehabilitate, and replace pavements. For the purposes of pavement management and LCP, those treatments are summarized into a set of budget groups. Each budget group represents a treatment that can be used to repair pavements at a given condition. Table F-3 lists budget groups used for LCP analysis and their unit costs.

Table F-3. Pavement treatment unit costs.

	Unit Cost ($ per square yard)		
Treatment	Average	Urban	Rural
Preservation	$15	$15	$15
Minor Rehabilitation	$78	$78	$78
Major Rehabilitation	$186	$276	$125
Reconstruction	$622	$738	$448

The pavement treatment unit costs were determined using historic bid data and asphalt price data. This information is reviewed annually, and unit costs are updated as appropriate.

BRIDGE TREATMENTS

Table F-4 shows the bridge treatment unit costs developed by DOT&PF based on past project data. The unit costs were further refined based on analysis results. The number of bridge projects per treatment category and allocated budget amounts were reviewed to assess whether the estimated costs led to an accurate amount of work. Some unit costs were then updated or customized to achieve better accuracy. DOT&PF will continue refining and updating the unit costs based on project data and future analysis results.

Table F-4. Bridge treatment unit costs.

Treatment	*Treatment Category*	*Unit Cost*
Place RipRap	Scour	$6,518 * (bridge deck width / cos(bridge skew))
Paint First Time	Preservation	$35/sq. ft (element)
Repaint Superstructure	Preservation	$67/sq. ft (element)
Substructure Spall Repairs	Preservation	$15,000/column OR $400/ ft (element)
Deck Preservation	Preservation	$162/sq. ft (deck area)
Strengthening	Major Rehab	$500,000/bridge
Bridge Rehab	Major Rehab	$486/sq. ft (deck area)
Culvert Rehab	Major Rehab	$250,000/bridge
Replace Running Planks	Preservation	$50/sq. ft (element)
Add Guide Banks	Preservation	$500,000 / bridge
Substructure Timber Repairs	Preservation	$2500/pile (element)
Bridge Replacement	Replacement	$1454 sq. ft (deck area)
Culvert Replacement	Replacement	$450/sq. ft
Seismic Retrofit Phase 1	Major Rehab	$300,000/bridge
Seismic Retrofit Phase 2	Major Rehab	$250,000/bridge

Inflation Rate

Inflation is the rate at which the prices for goods, products, and services increase over time. For LCP, the term inflation rate is used to describe an assumed average rate of annual cost increases for treatments. DOT&PF assumes an annual inflation rate based on historic trends. For the purposes of the analyses, and in alignment with the TAMP Financial Plan, inflation is assumed to be 2.25 percent and is accounted for with corresponding assumed increases in available funding and is accounted for with corresponding assumed increases in available funding (per Alaska Department of Revenue, Tax Division).

Assumed Funding

The DOT&PF's LCP processes aim to identify the best overall strategy or strategies to support sustainable long-term achievement of the DSOGR. The process allows for multiple budgets to be used as scenario inputs to determine the sensitivity of strategy effectiveness to funding levels. This approach allows the agency to determine the most effective strategy for budget levels close to the actual anticipated funding as well as identifying strategies that are likely to be more effective should the agency's funding increase or decrease.

The base funding for LCP analysis is assumed at the approximate level of funding identified in the current STIP. Additional scenarios can be run at increased and decreased levels of funding to evaluate the potential impacts on performance. The funding levels used for the analyses are shown in section 3.4.

Strategy Rules and Details

The following subsections describe the strategy rules and details for pavement and bridge LCP analysis.

PAVEMENTS

The PMS uses data on pavement conditions related to rutting, cracking, ride quality, and subgrade stability relating to permafrost to select appropriate treatments. The system uses decision trees with trigger values based on these three distresses and subgrade condition to ensure that appropriate treatments are recommended to address the causes of pavement distress and to not simply cover up those distresses. The PMS compares the expected future conditions with and without treatment for each section to determine which recommended treatments will provide the greatest benefit for prioritization.

The PMS uses a multi-constraint optimization analysis to optimize investment strategies by simulating future conditions using deterioration models and maximizing an observed "benefit" given a constrained budget. The benefit being used is based on the overall pavement APCI as defined by rut, IRI, and cracking metrics. More information on APCI is available in Appendix C, Alaska Pavement Index. This is used within the PMS as a value to maximize the overall improvement to sections of the road.

To support LCP, the system is run without consideration for programmed projects. This allows the PMS to evaluate the impacts of different treatment rules, changes in performance models, and changes in costs on overall life-cycle performance. However, the system can also run scenarios that consider planned or programmed projects to forecast expected conditions.

Considering Extreme Weather and Resilience in Pavement LCP Analysis

DOT&PF has identified thawing permafrost as a significant risk in that it compromises the stability of the pavement subgrade. DOT&PF accounts for this risk in pavement life-cycle planning by including subgrade stability in PMS decision trees. Where the subgrade stability indicates the presence of unstable permafrost, the PMS will not recommend a treatment beyond minor rehabilitation. This is because even a major rehabilitation or reconstruction project may not be able to cost effectively address the underlying subgrade. It may remain more cost effective to resurface the road at a more frequent interval or allow M&O crews to place temporary surfacing (high floats, chip seals, etc.) through these areas. The regions evaluate these areas on a project-by-project basis to determine if they are able to address the unstable subgrade issues, and if they are, they may choose to initiate a major rehabilitation or reconstruction project to stabilize the embankment.

BRIDGES

AASHTOWare BrM selects bridge projects using multi-objective analysis and incremental benefit-cost ratios. Within the BMS prioritization algorithm, multiple performance measures (e.g., condition, life-cycle cost, risk) can be combined into an overall utility function, by applying different weights to the performance measures as aligned by the agency's bridge management goals. For this analysis, DOT&PF chose condition, life-cycle cost, risk, and mobility as performance measures.

Within the BMS, each performance measure is converted to a unitless 0-100 index by scaling or a formula. Every treatment alternative has predefined benefits (e.g., set all GCR to 9, set vertical clearance to 19-feet, and set scour rating to 7 after bridge replacements). DOT&PF's Bridge LCP Team defined their treatments by relevant costs and benefits in the BMS modeling framework. Table F-4 summarizes the treatments that are applied to bridges, along with the treatment unit costs. The BMS prioritization process calculates potential utility improvements for alternative treatments, based on treatment benefits and the relative weight of performance measures in the utility

function (e.g., forty-five percent condition, thirty-five percent life-cycle cost, fifteen percent risk, and five percent mobility). DOT&PF's network policies define which treatment alternatives can be considered for structures with different conditions or characteristics. For example, deck preservation can only be considered for structures with deck GCRs of 6 to 9.

DOT&PF's BMS can also apply a criticality weight to structures to account for their relative importance (figure F-1). DOT&PF's criticality formula includes deck area, detour length, NHS designation, and traffic volume as variables. This formula was developed as an index to have a value between 0-100. For the bridges in Alaska inventory, the criticality formula weight values vary between 10 and 100, with a median of 54.8.

Deterioration Models

Deterioration models provide predictive capability to forecast future pavement and bridge conditions. DOT&PF has developed deterioration models for pavements and bridges based on actual condition data. Additional details are provided below.

PAVEMENT DETERIORATION MODELS

DOT&PF models pavement performance in terms of the federal performance metrics for cracking, rutting, and ride quality as defined in 23 CFR 490. Performance curves have been developed using historical performance data. The agency will routinely update performance curves as determined necessary from the review of annual performance data.

DOT&PF is continually evaluating new treatments and materials for improved pavement performance. To evaluate a new treatment, an experimental feature is initiated to document the construction methods and post construction performance. The agency is currently following this process for Microsurfacing by evaluating installations in the Anchorage area. If the treatment is not considered experimental, but needs to be modeled within the PMS, then the treatment location will be documented and monitored for performance.

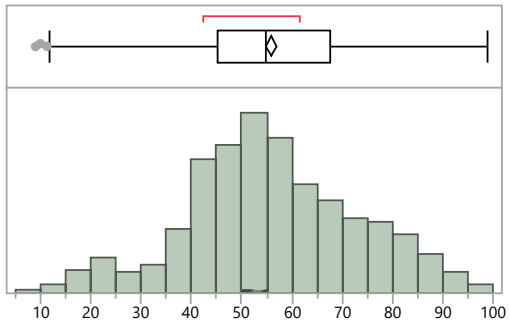
In either case, when a new treatment is to be modeled the pavement distresses including rut, IRI, and cracking will be tracked for a minimum of 3 years to develop performance curves for treatment performance. If the treatments are being constructed in different conditions, then location, existing pavement condition, and traffic volumes will be considered when developing performance curves for the treatment.

BRIDGE DETERIORATION MODELS

DOT&PF's BMS can perform deterioration modeling for both components and elements. Users may choose using element deterioration models for their analysis and then convert forecasted element conditions to component conditions using an NBI conversion profile, which can be customized. DOT&PF uses element deterioration models for LCP and uses a custom conversion profile to convert forecasted element conditions to GCR condition. The custom conversion profile was modified iteratively to reach a conversion profile with sufficient predictive accuracy for Alaska bridges.

Element deterioration models consist of median transition times that specify how long that element

NEWWEIGHT



Quantiles

100.0%	maximum	98.705326935
99.5%		96.72889848
97.5%		88.904017163
90.0%		79.635919843
75.0%	quartile	67.521675489
50.0%	median	54.784130728
25.0%	quartile	45.214542325
10.0%		36.642747799
2.5%		20.027673706
0.5%		12.382085369
0.0%	minimum	9.0248683669

Summary Statistics

Mean	55.930337
Std Dev	16.952998
Std Err Mean	0.5420971
Upper 95% Mean	56.994146
Lower 95% Mean	54.866528
N	978

Figure F-1. Alaska structure criticality weighting statistical distribution.

stays at each condition state (CS1-CS4). The element models also have a Weibull shaping parameter to control the slower CS1 to CS2 transition rate. DOT&PF reviewed and customized default element models to reflect Alaska deterioration rates. DOT&PF plans to reevaluate the deterioration models based on future analysis results and would like to incorporate different deterioration models by environment to more accurately model regional deterioration. DOT&PF would like to initiate a research project in the future to further develop these models.

RISKS & RESILIENCE

LCP uses historic data and performance models to forecast future performance. This involves numerous assumptions and uncertainties that represent risk, or the likelihood that actual performance will vary from the forecast. Additionally, there are many unknowns that cannot be directly modeled. To account for these risks, DOT&PF performs multiple variations of LCP analyses varying both strategy and budgets. This helps inform the agency on the sensitivity of current or desired strategies to unforeseen events. For example, including analysis runs at lower investment levels informs the agency of the potential impact on pavement and bridge conditions should the budget be reduced, regardless of the reason for that reduction.

Pavement Risks

Beside risks due to extreme weather and climate change, an additional risk to pavement conditions is the increase in system size over time. Increases in the pavement inventory lead to greater future need for maintenance, preservation, and eventual rehabilitations and replacements. The current STIP includes approximately 90 lane-miles of new pavement, which represents approximately a 2.5 percent increase over the current inventory. This increase will not impact pavement needs during the STIP period, as this pavement will be new, but it will create a need for additional investment in later years.

Based on the recent economic climate, increasing inflation became a concern as a potential risk to sustaining the DSOGR and achieving NHPP targets. The pavement management group ran an inflation analysis modeling a sustained eight percent inflation rate compared to the original two percent inflation rate that was used for the LCP analyses. This scenario was run for the 10-year analysis period at the anticipated total pavement budget of $185M. Although the percent of pavement in *Poor* condition increased from 1.1 percent to 3.3 percent over the 10-year period, it was still significantly lower than the target of 10 percent. These results are shown in figure F-2 and demonstrate that although inflation at first appeared to be a significant risk, even at a sustained elevated level, it did not significantly jeopardize the achievement of NHPP targets or DSOGR.

Considering Pavement Risks Due to Extreme Weather and Climate Change

In addition to incorporating unstable subgrade due to thawing permafrost into the PMS decision trees, DOT&PF considers risk throughout a pavement's life cycle—from planning through design, construction, and maintenance and operation, including impacts due to extreme weather events and climate change. The Department has developed a data set for twice-damaged emergency repair locations and geotechnical asset management system (GAMS) sites. DOT&PF is developing processes for using these data sets to incorporate risks into the analysis process. Additionally, DOT&PF has developed a design strategy to address roadways susceptible to damage due to thawing permafrost. Both risk mitigation strategies are described in greater detail in Appendix G. DOT&PF will continually improve the risk data identification, data quality, and incorporate future identified risks.

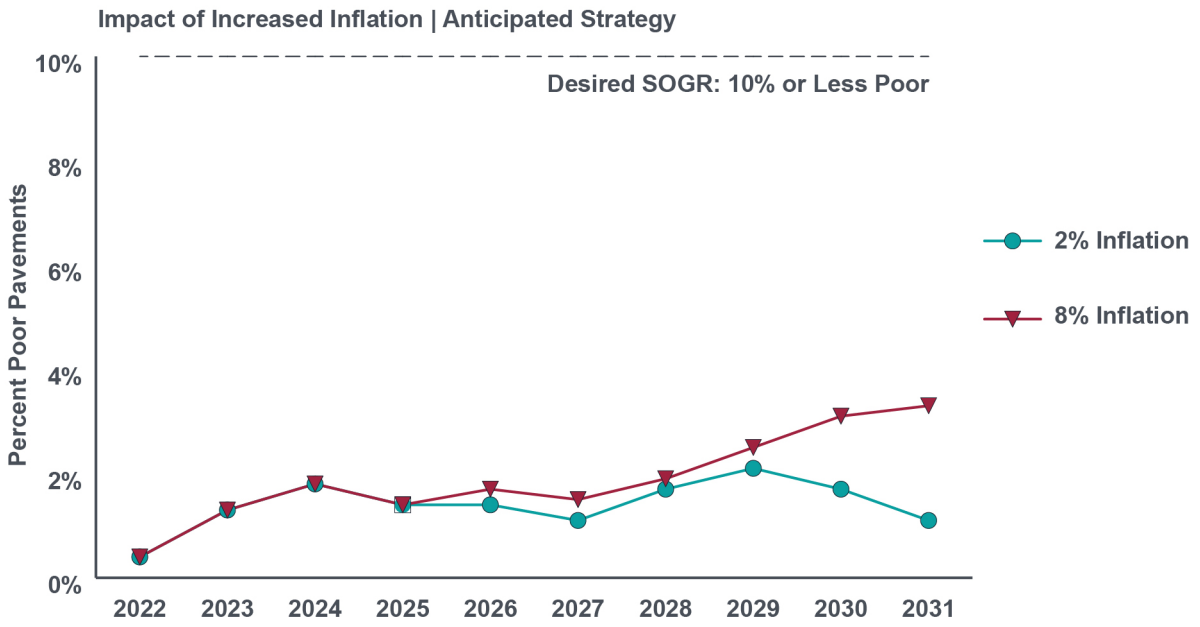


Figure F-2. Impact of increased inflation on pavement condition.

Bridge Risks

Risks are addressed in the BMS through the multi-criteria utility function. Risks contribute to fifteen percent of the overall utility. Risks included in the utility function are:

- Seismic (age, location, and seismic appraisal)
- Scour (channel protection, scour appraisal, scour rating, waterway adequacy)
- Underclearances
- Load rating (posting)
- Fracture criticality

Within the BMS modeling framework, candidate bridge treatments improve the bridge characteristics within the analysis and, as a result, improve the utility function value. Bridge treatments are associated with these risks through treatment benefits, which enables the system to identify treatments to reduce these risks. For example, bridge rehab, replacement, and strengthening reduce load rating and fracture criticality risks.

STEP 4. DEVELOP LCP SCENARIOS

Step 4 involves the development of LCP scenarios using the strategies defined in Step 2 and the inputs from Step 3. By evaluating a mix of strategies and funding levels, the DOT&PF can determine:

- The best strategy to optimize pavement and bridge conditions with the anticipated funding, and those resulting conditions
- The combinations of funding and strategy that could allow the agency to achieve and sustain the DSOGR
- The changes in strategy that will best allow the agency to accommodate increases or decreases in budget

Considering Bridge Risks Due to Extreme Weather and Climate Change

The bridge management system has been configured to take risks due to extreme weather and climate change into consideration within its modeling algorithm. Among other risks, it considers seismic risk by coding a location attribute into a custom data table to be used for seismic risk calculations. Seismic retrofit and bridge replacement treatments can be selected to reduce the seismic risk. Scour risks are considered in the utility function and scour work can be selected to reduce this risk.

Pavement LCP Scenarios

Table F-5 provides a summary of the scenarios included in LCP for pavements.

Table F-5. Pavement life-cycle scenarios.

Strategy	Annual Budget Levels ($ millions)
Preferred	$110, $130, $150
Worst-First	$130

Bridge LCP Scenarios

Figure F-3 provides a summary of the scenarios included in LCP for bridges. In addition to the current budget level of $60 million per year, the bridge LCP scenarios also considered budgets of $48 million and $75 million per year. The current strategy at $60 million provides the DSOGR for *Good* and *Poor* bridges for the next performance period through 2025. The DSOGR for *Poor* bridges is maintained for the 10 year TAMP planning period through 2031, however the 20-year analysis results indicate that additional funding is required to sustain the DSOGR for both *Good* and *Poor* bridge conditions through 2041.

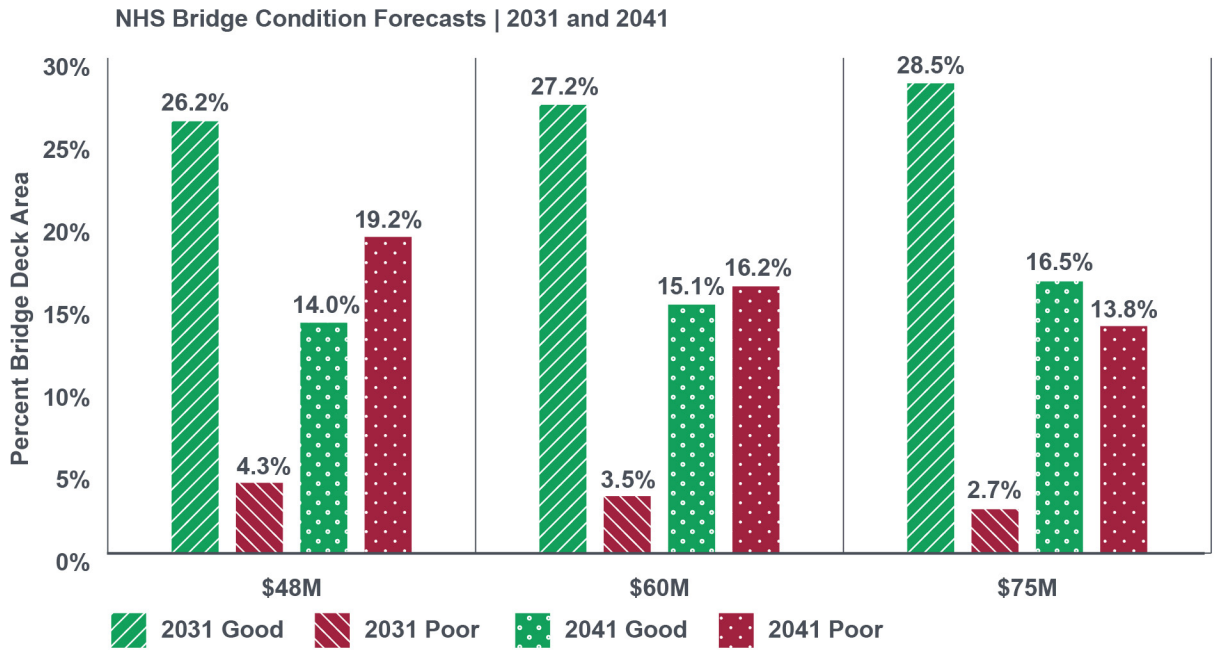


Figure F-3. 10- and 20-year Good and Poor NHS bridge deck area by scenario.

STEP 5. PROVIDE INPUT TO FINANCIAL PLANNING (10-YEAR ANALYSIS SUMMARIES)

Pavement Analysis Results

Figures F-4 through F-9 show forecasted pavement conditions using the preferred life-cycle strategy at different annual budget amounts, ranging from $110 million to $150 million. The results are presented showing the percentage of pavements, by lane-miles, in *Good*, *Fair*, and *Poor* condition for each year of the TAMP. These graphs demonstrate the impact of varying investment levels on future pavement conditions. Section 4 contains graphs showing the impact of varying treatment strategies on forecasted pavement conditions at the same investment level.

Figures F-4 and F-5. Forecasted Interstate pavement condition.

Figures F-6 and F-7. Forecasted non-Interstate pavement condition.

Figures F-8 and F-9. Forecasted non-NHS pavement condition.

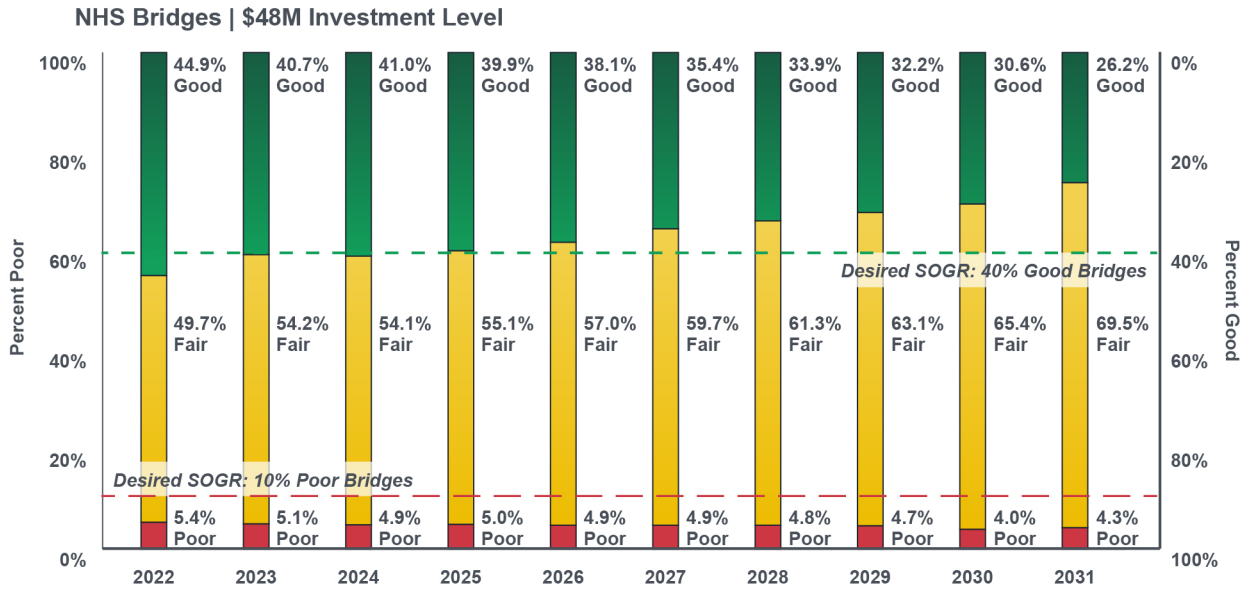


Figure F-10. Forecasted bridge conditions—$48 million annual budget.

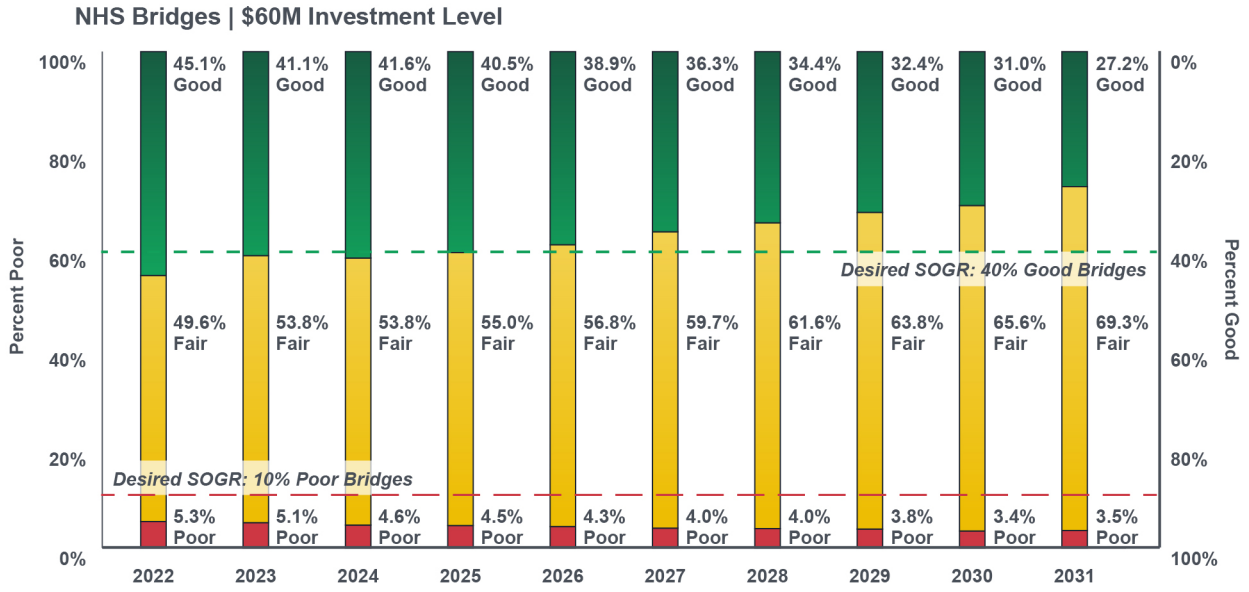


Figure F-11. Forecasted bridge conditions—$60 million annual budget.

Bridge Analysis Results

Figures F-10 through F-13 show forecasted bridge conditions using the preferred life-cycle strategy at different annual budget amounts, ranging from $48 million to $75 million. The results are presented showing the percentage of bridges, by deck area, in *Good*, *Fair*, and *Poor* condition for each year of the TAMP. These graphs demonstrate the impact of varying investment levels on future bridge conditions.

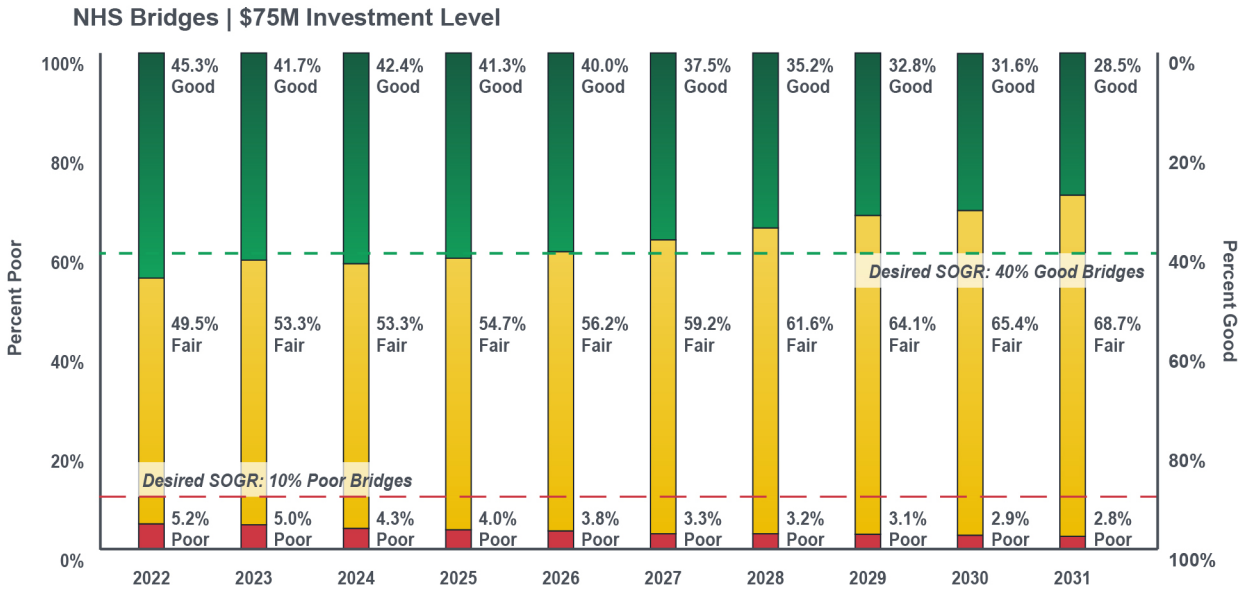


Figure F-12. Forecasted bridge conditions—$75 million annual budget.

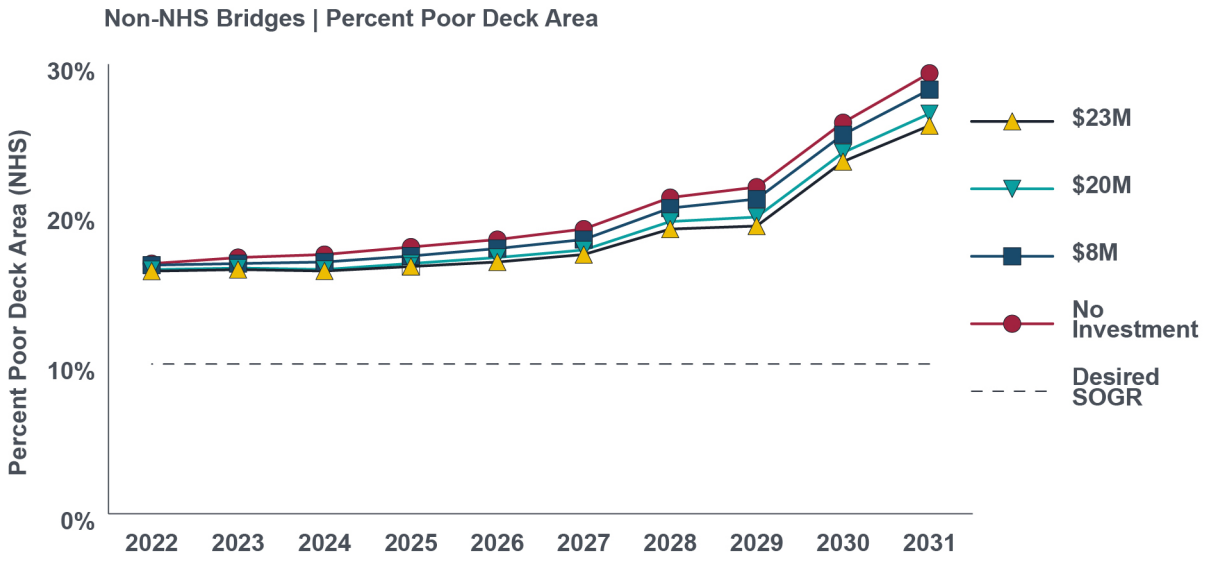


Figure F-13. Forecasted non-NHS bridge conditions at varied budgets.

Appendix G: Risk Management

Risk management is a systematic process that involves the identification, assessment, planning, and management of threats and opportunities faced by programs, processes, and projects. To develop a 10-year TAMP with investment strategies to sustain a SOGR, DOT&PF must identify and evaluate risks to these investment strategies. Figure G-1 provides an overview of the five-step risk management process that DOT&PF follows to manage risks related to investments in, and the performance of, pavements and bridges on the NHS in Alaska.

The agency follows the first four steps of this process to develop a risk register (shown in table G-7), which documents the highest priority risks and identifies the strategies and actions the agency will take to mitigate those risks. The risk register is used as a management tool in the fifth step, Manage Risks, to support and track execution of the risk mitigation strategies and actions. To support this, the risk register identifies individuals responsible for tracking and reporting on the implementation of each mitigation strategy or action.

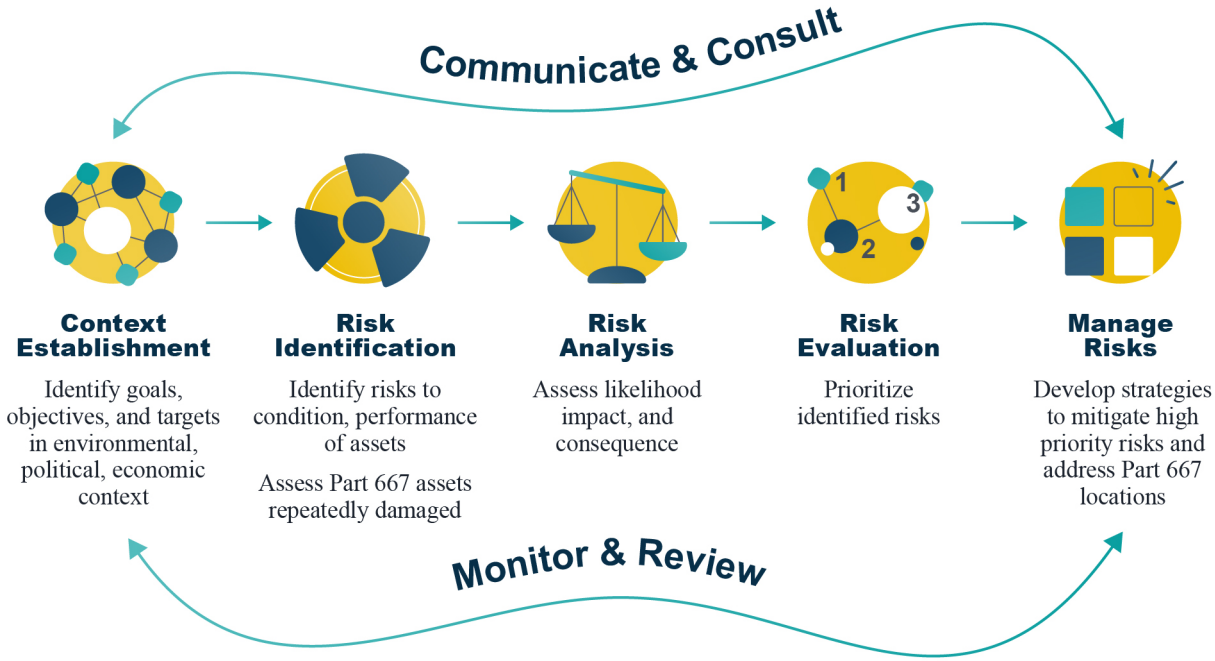


Figure G-1. The risk management process.

The DOT&PF management process includes two cycles for periodic development, review, updating, and replacement of the risk register. Once every 4 years, in support of updating the agency's TAMP, DOT&PF will conduct a workshop with the full risk management team. This workshop will guide the development of a new risk register that is updated to meet the needs of the agency as they have changed over the past 4 years. Annually, the TAM Coordinator will work with individuals identified to track each strategy to update the risk register as needed. An annual meeting (virtual or in-person) of the full Risk Management Team (see Step 1) is held to develop an updated risk register.

STEP 1. ESTABLISH RISK CONTEXT

An agency must manage many aspects of uncertainty to deliver its mission. This step in the process identifies the aspects of uncertainty that could impact asset management, narrowing the scope of the effort so that it can be effectively managed. Establishing the risk context involves:

- Establishing a Risk Management Team
- Defining asset management objectives and targets to be considered

- Identifying the levels of risk to be considered

The effort under this step started with information from Alaska's LRTP that is referenced in several sections of the TAMP. During development of the LRTP, DOT&PF formed the Transportation Stakeholders group and asked it to consider various scenarios. The elements of each scenario ranged from system preservation to travel demand and finance. As part of this effort, the group was asked to consider policies it would recommend and future risk areas for the plan's policy. The Transportation Stakeholders group identified the following risk areas: safety and cost, uncertainty, ramifications, capacity, culture, staffing levels, reliability, public opinion, and benefit. These risk areas were considered in later steps of the TAM risk management process.

Risk Management Team

Because risks can come in many forms, it is important to have a diverse and representative team to identify and prioritize them. The DOT&PF Risk Management Team consists of managers and technical experts from Finance, Pavement Management, Bridge Management, Geographical Information Systems, Regional Maintenance & Operations, Environmental Management, Construction, Safety, TAM Coordination, Planning, and Programming. Representatives from the FHWA Division Office also participate in many Risk Management Team activities.

Asset Management Objectives and Targets

Asset management objectives and targets are developed every 4 years as part of updating the agency's TAMP. The Risk Management Team uses these objectives and targets to establish the scope of the TAM risk management effort, identifying the most important trends or issues that could impact their achievement. The following subsections lists the objectives and targets used in development of the 2021 Risk Register, presented in table G-7. Each of these objectives and targets are described in further detail in other sections of the TAMP.

The following are the objectives that were used to develop the 2021 risk register.

- Treat pavements and bridges in *Good* and *Fair* condition before they deteriorate to save money over the asset life cycle.
- Manage pavement and bridge data and analysis systems centrally to make recommendations through coordination with regional planning, preconstruction, and maintenance.
- Provide information to allow effective selection and design of future preservation, rehabilitation, and reconstruction projects, including:
  - Accurate estimates of future conditions versus funding scenarios
  - Displays of analysis results in understandable formats
- Perform appropriate preservation on all NHS roadways maintained by DOT&PF.
- Develop preservation strategies for all pavement types, such as:
  - A gravel road preservation program
  - A disinvestment strategy that converts extremely low-volume roads to gravel
- Continue to implement a two-phase seismic retrofit program:
  - Phase 1 = most critical bridge deficiencies
  - Phase 2 = vulnerabilities in bridge columns and foundations
- Continue to support the seismic bridge retrofit program.
- Address scour-critical bridges in a prioritized manner.
- Develop a geotechnical and vulnerable assets mitigation plan.
- Explore adding assets in future TAMPs:
  - Road embankments
  - Retaining walls
  - Culverts
  - Rock slopes
  - Soil slopes
  - Material sites
  - Drainage structures
  - Tunnels
  - ADA

Below are the targets that were considered when developing the 2021 risk register.

- Condition targets:
  - Interstate pavement:
    - Less than 5 percent*: *Poor*
      (*Currently 10 percent—Anticipate revising to five percent in next target setting cycle)
    - At least 20 percent: *Good*
  - Non-Interstate NHS:

- Less than 10** percent: *Poor* (**Currently 15 percent—Anticipate revising to ten percent in next target setting cycle)
- At least 15 percent: *Good*

» NHS and non-NHS bridges:
- Less than 10 percent: *Poor*
- At least 40 percent: *Good*
- Internal benchmark is less than 7.5 percent *Poor*

» Replace or rehabilitate 1 to 3 *Poor* bridges per year.

Levels of Risk

As shown in Figure G-2, there are three primary levels of risk that DOT&PF manage to deliver their mission. The TAMP risk management process is concerned with the two highest levels of risk: agency and program. These risks represent areas of uncertainty that could impact multiple projects or business areas. Project risks are better managed during program delivery processes such as STIP development, design, and construction.

STEP 2. RISK IDENTIFICATION

Risk identification is the process of identifying and describing aspects of uncertainty and their potential impacts on the organization. Risks are documented in a risk statement, composed in two parts. The first part of the risk statement is referred to as the *if* clause. An *if* clause identifies the potential event or occurrence that poses a threat or opportunity related to one or more of the TAM objectives and goals at the agency or program level. The second portion of the risk statement is called the *then* clause. *Then* clauses describe the possible, probable, or expected impacts should the *if* clause come to pass. Often there are multiple *then* clauses for each *if* clause, as each risk event is likely to result in multiple impacts. The risk register (table G-7) is organized with separate columns for ***if*** and *then* clauses.

Quadrennial Risk Workshop

For development of TAMP updates, the Risk Management Team will identify risks during an in-person risk workshop. During this workshop, participants will seek to identify as many risks as possible for consideration during risk analysis and evaluation.

Annual Review and Update

During annual review, risk identification is handled by individual managers and members of the Risk Management Team. At least annually, the Chief Engineer or their designee will hold an in-person or virtual meeting with the Risk Management Team to assess the need to identify new risks in, or remove risks from, the risk register. This information will be used as described in step 5, Manage Risks.

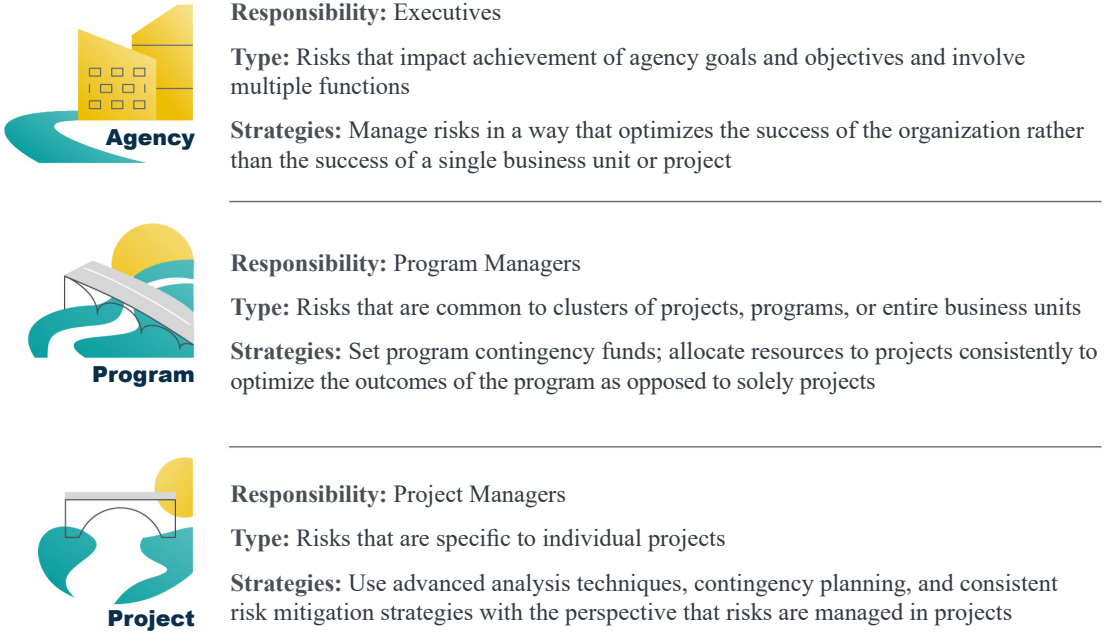


Figure G-2. Risk levels.

STEP 3. RISK ANALYSIS

Risk analysis is the process of determining and documenting the likelihood and impact of each risk statement. To ensure this is done consistently for all risks and by all Risk Management Team members, DOT&PF developed the risk matrix shown in table G-1. The risk matrix is used during the Quadrennial Risk Workshop to analyze all identified risks and during annual updates. This allows for analysis of any new risks that have been identified for inclusion in the risk register. The results of this analysis are used as inputs in step 4, Risk Evaluation.

Table G-1. DOT&PF risk matrix.

			Likelihood				
	Risk Matrix with Impact and Likelihood Definitions		***Rare (0-10%) < once per 10 years***	***Unlikely (10-30%) < once per 10 years,> once per 3 years***	***Likely (30-70%) Once per 1-3 years***	***Very Likely (30-70%) Once per year***	***Almost Certain (90-100%) Several times per year***
Impact	Catastrophic	Potential for multiple deaths and injuries, substantial public and private costs	Medium	Medium	High	Very High	Unacceptable
	Major	Potential for multiple injuries, substantial public or private cost, and/or foils agency objectives	Low	Medium	Medium	High	Very High
	Moderate	Potential for injury, property damage, increased agency cost, and/or impedes agency objectives	Low	Medium	Medium	Medium	High
	Minor	Potential for moderate agency cost and impact to agency objectives	Low	Low	Low	Medium	Medium
	Insignificant	Potential impact that is low and manageable with normal agency practices	Low	Low	Low	Low	Medium

STEP 4. RISK EVALUATION

Risk Evaluation is the process of prioritizing risks. This is similar to risk assessment, but it considers the agency's risk threshold, or appetite to tolerate uncertainty, as well as the agency's capacity to mitigate risks. The DOT&PF's risk tolerance or risk appetite refers to how much risk an organization is willing to accept. Table G-2 shows DOT&PF's appetite for different levels of risk:

Table G-2. DOT&PF Risk Tolerance.

Level of Risk	*Response*
Unacceptable	Coordinate immediate response
Very High	Coordinate response with stakeholders
High	Work with stakeholders on a long-term solution
Medium	Review risk with stakeholders, may be acceptable
Low	Acceptable risk, does not require review

During this step of the Quadrennial Workshop, the Risk Management Team identifies potential risk mitigation strategies or actions that could serve to reduce the likelihood or impact of threats, improve the agency's ability to respond should a threat come to pass, or allow the agency to take advantage of opportunities. Following the workshop, the team works by web meeting and conference call to finalize the list of mitigation strategies to be implemented during the TAMP time frame. These selected mitigation strategies are shown in the right-hand column of the risk register in table G-7. During its annual review of risks, the Risk Management Team will consider changes to the risk mitigation strategies based on recommendations by the individuals assigned to track and report on each risk. The annual review of mitigation strategies is discussed further in step 5, Manage Risks.

STEP 5. MANAGE RISKS

Risks are managed through implementation of the selected mitigation strategies. The following subsections describe the identified risks, document the groups primarily responsible for managing the assets included in the TAMP, and list strategies for managing risks to those assets and the related TAM objectives and targets.

RISK REGISTER

The risk register in table G-3 documents the risks identified within the context of risk management and beyond the agency's risk tolerance. Each of the identified risks has at least one mitigation strategy that the Department will pursue and track through its asset management implementation. DOT&PF does not have an enterprise risk plan but does address enterprise risk in different areas of the Department The organizational unit responsible for implementing and reporting on each mitigation strategy is identified in the register.

Table G-3 summarizes the matrix developed as the result of the August 6, 2021, Risk Workshop and follow up meetings to finalize risks, assign responsible unit, mitigation strategies, and risk mitigation plans.

Table G-3. Risk and mitigation strategy matrix.

If …	*Then …*	*Applicable Mitigation Strategies*	*Responsible Unit*	*Risk Mitigation Plan*
funding is below current projections,	increase M&O costs, delay existing projects, and decrease staff. take full advantage of federal funds. shift in function / programs / services.	Implementing PMS & BrM optimized investments to related systems such as ESRI, MRS, and AASHTOWare.	Pavement & Bridge	Systems are implemented—currently optimizing the systems.
increases in the number of assets without an increase in maintenance resources,	there will be a net reduction in maintenance and maintenance level of service (LOS) across all assets.	Stop acquiring *Poor* assets from other agencies.	Regional Directors / Planning	Asset Managers/M&O Continuous Communication with Regional Directors, Planners, and other staff.
		Maintenance cost as part of the project development process. Project criteria STIP projects. Existing Policy & Procedure 09.01.010 requires local maintenance for a local expansion project.	Planning	Scoring criteria already in CTP for STP funds. STIP criteria for NHPP funds is being implemented as part of new STIP criteria.
		Transfer assets to other agencies.	Regional Directors / Planning	Current process to work with legislative liaison and community leaders. Goal—one transfer per year.
		Look at design for maintenance savings, e.g. bridge already optimizing design.	Design/Bridge	Update Design Manuals with M&O savings in mind.
		Tolerate and communicate to the public how increased infrastructure reduces the LOS for maintenance on all assets.	Public Information Officers	Continuous communication already in place.

If …	*Then …*	*Applicable Mitigation Strategies*	*Responsible Unit*	*Risk Mitigation Plan*
the agency cannot deliver the program,	infrastructure that would improve performance and safety would not be constructed or improved.	Keep sufficient number of trained project delivery staff (e.g., Engineering / ROW / Enviro).	Regional Directors/ Division Directors with Admin and HR staff	Core competency plan. Knowledge Management Initiative with succession planning.
		Take advantage of materials cost decreases by having contingency projects on hand, and if costs increase, use Advanced Construction (AC).	Planning, Regional Directors	Selecting shelf ready projects is a continuous process in place using AC in the STIP.
		Improve scoping practices to improve schedule and financial planning accuracy.	Planning, Environmental, Preconstruction Regional Directors	Develop a scoping standard operating procedure (SOP) with detailed initial planning estimates.
		Create connections between spending or policy plans (10-year plan, STIP, HSIP, SHSP).	Planning	Internal 10-year extended STIP and capital review meetings.
		Ensure initial construction quality so asset performs as expected over the anticipated timeline and does not require premature investment.	Construction	Quality Assurance Program provided in specifications, QC/QA plans.
		Bundle bridge projects in rural areas to save on mobilization and material costs.	Regional Directors, Bridge and Planning	Currently bundling projects to take advantage of the cost savings.
the use of studded tires is reduced,	the damage to roads that causes unreasonably short pavement life will be reduced, resulting in longer pavement lives, allowing funding to be used for other assets.	Research completed on studded tire impacts. Work with leadership to explore options.	Research/Pavement/ Central Region	Research project deployment activities, continue research efforts, and educate public on this and its alternatives.
		Change the dates between which studded tires are allowed. Enforcement if current dates are adequate.	Legislative liaison/ enforcement	Work on implementing. Research project with deployment activities.
		Educate public on road damage and other travel options available to them (e.g., non-studded snow tires, walking, biking).	Public Information Officers and MPO liaisons	Research project deployment activities.
		Charge fees for studded tire users.	Legislative liaison	This is not DOT&PF authority.

If …	*Then …*	*Applicable Mitigation Strategies*	*Responsible Unit*	*Risk Mitigation Plan*
natural events occur impacting infrastructure (excluding seismic),	mobility, public health, and safety will be impacted. funds would be rerouted from the existing operating budget, causing project delays. specific risks include flooding, ice falls, coastal flooding, avalanches, and rock falls.	Design new bridges to a 50-year flood event and floodway areas to a 100-year flood event.	Current Practice—Bridge	Current practice.
		Statewide coordination of hydrologists. Quick rapid repair technique and seismic repair, deployable.	Bridge	Current practice.
		Implement a GAM plan to support project selection and scoping and integrate available data with selection/scoping.	GAM	Statewide materials developed work plan. Condition ratings for rock slopes, soil slopes, and retaining walls as well as letter grades of risk (A-F) that are available through ArcGIS Online (AGOL) maps. M&O activities (rockfall, landslide, avalanche) are being included in GAM slopes and condition ratings. Beginning to use M&O rockfall cleanup activities to estimate risk to roads.
		Implement a system or process for identifying, evaluating, and prioritizing environmental hazards improvement for resiliency and vulnerable assets (example avalanches, icefall, and extreme weather events).	Planning with M&O, Design, Bridge	Planning to develop a Resiliency work plan; can use index similar to avalanche hazard index being worked on by avalanche group.
		Engage with other agencies for research monitoring and predictive modeling. Current modeling effort to adjust hydraulic models.	Research/CR Hydraulics	Current Research Project "Precipitation Projections for Alaska."
		Develop hazard index and mitigation strategies for vulnerable or high-value assets.	GAM for Geotechnical Planning and Research	Completed research project—need implementation.
we continue to have warmer winters with more thawing permafrost,	we will see more settlement, decreased pavement ride quality, and shorter pavement service lives. increased M&O costs.	Identify vulnerable areas and prioritize treatments to increase resiliency. Pavement Management foundation stability A, B, C.	Planning & NR Pavement	Included in Resiliency work plan. *Updated* unstable subgrade locations have been added to the Pavement Management System for consideration in analysis and recommendations. Modifying design standards, aka Pave Design policy, waivers.
		Develop a mitigation plan for unstable embankments within the GAM mitigation plan.	GAM	Update GAM mitigation plan for unstable embankments.

If …	*Then …*	*Applicable Mitigation Strategies*	*Responsible Unit*	*Risk Mitigation Plan*
the Office of Information and Technology (OIT) organization is unable to support DOT&PF's technology needs,	the agency data may not be secure and any breach may disrupt agency operations. the agency may not be able to purchase, upgrade, or replace software and hardware as needed. the agency's ability to make informed decisions may be reduced. expenditures to collect data will not yield the anticipated benefits.	Develop a joint IT and data governance plan between OIT and DOT&PF.	Admin Services or Executive Team	Follow current DOT&PF data governance plan.
		Communicate the criticality of IT services to executives.	All Directors via data and IT work group	Completed a presentation to Executive Leadership.
		Develop a specific Technology Risk Register.	All Directors via data and IT work group	No mitigation plan.
		Document current LOS.	All Directors via data and IT work group	No mitigation plan.
		Department of Administration (DOA) transfers risk back to DOT&PF.	Commissioner	No mitigation plan.
DOT&PF leadership changes,	they may not have a complete understanding of recent federal initiatives such as TAM, TPM, and performance-based planning.	Develop briefings on key priorities for new leaders.	Asset Management Executive Management Transition Book	Executive briefings.
		Schedule NHI and other educational opportunities for new leaders.	Asset Management	Executive training opportunities.
there is a moderate seismic event of 6–7 magnitude, there is a major seismic event of 8–9 magnitude,	structural damage may occur, and some bridges may need to be inspected for structural soundness. isolated bridges may collapse or become structurally unsound. major structural damage may occur to multiple bridges and a significant number of bridge projects would need to be added to the program.	Deploy Response Team to inspect and evaluate affected structures, then develop plan to fix detected issues.	M&O, Design, Construction & Bridge, adding others as needed	Develop a Lessons Learned from November 2018 earthquake.
		Treat and tolerate the risk for collapse and continue the Seismic Retrofit Program to improve resiliency.	Bridge, with others as needed	Fully program and administer the Seismic Retrofit Program.
		Update existing preliminary seismic analysis and schedule replacement of seismically vulnerable bridges.	Bridge	Fully program and administer the Seismic Retrofit Program.
		Coordinate with Regions to design and construct new seismically resilient bridges.	Bridge	Fully program and administer the Seismic Retrofit Program.
		Provide public service information after a seismic event (emergency action plan) and include it in Alaska 511.	Public Information Officers (PIO)s	Develop a Lessons Learned from November 2018 earthquake.
		Update Field Operations Guide (FOG).	CR Safety	Review and Update Field Operations Guide as needed.

DISCUSSION OF KEY RISKS AND MITIGATION STRATEGIES

While preparing the risk register, many risks were discussed and prioritized. All the risks included in the risk register are categorized as medium or higher. Low risks were not included in the risk register. The highest risks are discussed in more detail in Section 3. The following sections provides additional details of key risk mitigation strategies and efforts listed in the risk register (table G-3).

Funding

ENTERPRISE RISK: PROGRAM PLANNING AND DEVELOPMENT

A funding increase is an opportunity to invest more into Alaska's transportation assets. The Infrastructure Investment and Jobs Act (IIJA) was passed in November 2021. Some funding opportunities included in IIJA are Surface Transportation block grants, HSIP and other safety programs, as well as a dedicated bridge program, new apportionments for carbon reduction, and a protection of funding to improve resiliency and Electric Vehicle (EV) infrastructure.

Delivery of Program

ENTERPRISE RISK: PROGRAM PLANNING AND DEVELOPMENT

The Alaska STIP is the state's 4-year program for transportation system preservation and development. It includes Interstate, state, and some local highways, bridges, ferries, and public transportation but does not include airports or non-ferry-related ports and harbors.

PLANNING FOR BRIDGE RISK

Scoring criteria was developed for program planning. A utility factor is used for bridge projects in the planning process. The utility factor includes four components: condition, life-cycle, risk, and mobility. Condition includes two components: 1) NBI condition for the deck, the superstructure, and the substructure, and 2) element weights to account for preservation. Life-cycle includes preservation treatments based on bridge element data. Risk includes fracture critical, which is posted for load and affects freight and mobility; under clearance; scour critical; channel protection; waterway adequacy; and seismic risk. Scour critical bridges have a higher risk rating. Finally, the last criteria is mobility, which includes deck geometry, detour length, and approach roadway alignment as defined in the FHWA bridge data dictionary.

Data and IT Systems

ENTERPRISE RISK: IT

DOT&PF utilizes a comprehensive set of activities to assess enterprise risk for information technology. The first step involves gathering all information related to the system. The next steps involve identifying the potential threats, levels of vulnerability, and identifying the current and planned controls related to the proposed system. Mitigation includes prioritizing, evaluating, and implementing the appropriate controls to reduce the risk to the proposed system. Next, determinations are made on the likelihood of vulnerabilities being exercised as well as any related adverse impact of the exercises by known threats.

Once the activities listed in figure G-3 on the following page are completed, a risk determination is made. The risk determination will identify the likelihood of a given threat source, the magnitude of the impact, and the adequacy of the current and/or planned security controls in place to reduce or eliminate risk. After identifying the risk level through a developed matrix, the control recommendations are suggested to reduce the level of risk to the IT system.

The final step in the risk assessment process is to document the results in a report or briefing.

System Performance

ENTERPRISE RISK: PLANNING

The current LRTP 'Let's Keep Moving 2035,' addresses risk by analyzing trends impacting future performance using a risk-based approach. Trends affecting the physical condition of the transportation system and its operational performance are analyzed. Four broad categories of trends are considered during the planning process: 1) Travel Demand, 2) Delivery/Supply, 3) Public Policy and Financial Capacity, and 4) Climate Change & Extreme Weather Events. The

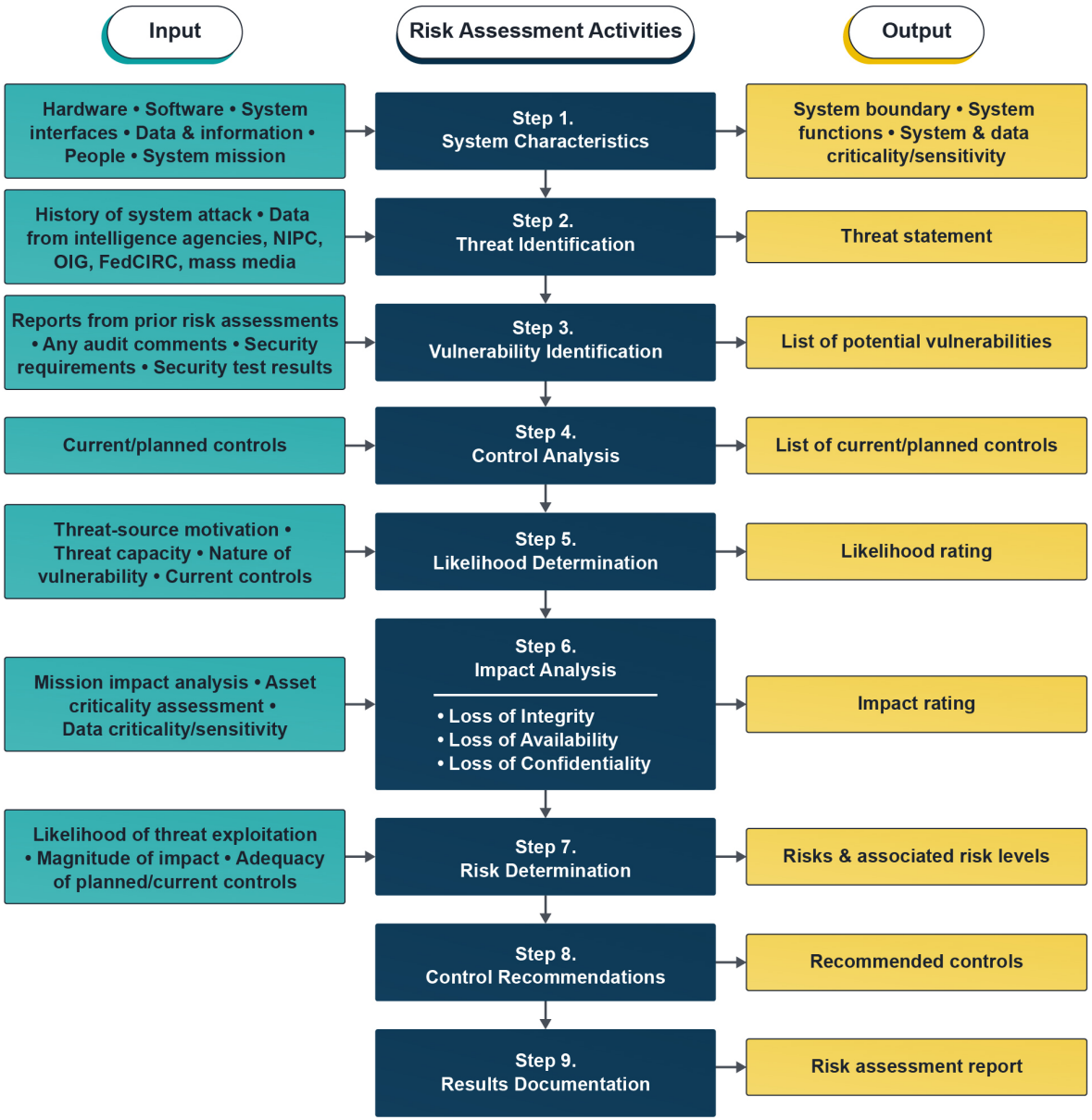


Figure G-3. Risk assessment for information technology (Risk Assessment Tool—Department of Commerce).

information for the current LRTP can be found here: Let's Keep Moving 2035.

The Statewide LRTP/Financial Plan (FP) update that is now underway is conducting an infrastructure assessment, a freight assessment, and a financial assessment to understand existing system strengths, weaknesses, needs, and opportunities. Scenario planning was conducted around the key drivers of economic/resource development, funding, and workforce to identify areas of greatest risk and emphasis for policy direction and performance management. The draft plan releasing in May of 2022 will provide policies and action steps aimed to better enable functionality and interoperability of the transportation system by areas of greatest priority. It will also establish key indicators and protocols for assessing system performance and progress towards goals. More information about the updated LRTP can be found here: Project Home—Alaska Moves 2050.

Seismic Activity

RESILIENT INFRASTRUCTURE: BRIDGE DESIGN

Alaska is the most seismically active state in the United States. The earth's most active seismic feature, the circum-Pacific seismic belt, brushes Alaska and the Aleutian Islands, where more earthquakes occur than in the other forty-nine states[6] combined.

6 USGS Alaska Earthquake and Tsunami Hazards

In 1995 the Department implemented a seismic retrofit program for bridges using hazard data from the U.S. Geological Survey. This data, together with a seismic vulnerability assessment of bridges and determination of priority highway routes, have resulted in the prioritization of bridges for seismic retrofit.

The Department retrofits bridges in an attempt to prevent collapse during an earthquake. Phase 1 of the program addresses the most critical bridge deficiencies that can be accomplished for the least cost. Phase 2 of the program is intended to address vulnerabilities in the bridge columns and foundations, which are typically much more expensive to correct. The STIP includes $950,000 per year for the seismic retrofit program (for FFY22–FFY23 and after).

INCLUDING BRIDGE RISKS IN LIFE-CYCLE PLANNING

The bridge management system is being configured for risk through the BrM enterprise system. Seismic information and hydraulic parameters are being included in scenario planning. The hydraulic parameters included in this analysis are channel protection, water adequacy, and scour as defined in the FHWA bridge data dictionary. Preservation weighting is also being included in life-cycle planning network policies in BrM. Preservation is a big component of the life-cycle planning process. Work to configure an enterprise level implementation of risk as part of the life-cycle planning process is ongoing.

Resiliency

CLIMATE CHANGE

Alaska's diverse climates can be classified into five general climate regions: maritime, west coast, south central, interior, and arctic. The regions correspond to different climate-related impacts on temperature and precipitation. Weather events show changes in the timing, frequency, form, and intensity of precipitation, which may cause related and increasing natural processes. Impacts also include:

- Melting/warming permafrost
- Increased storm frequencies and intensity
- Increased coastal erosion due to lack of sea ice
- Increased river and shore erosion
- Sea level rise
- Increasing temperatures
- Debris flows
- Avalanches
- Floods
- Aufeis

For DOT&PF, this means that construction costs will be higher to maintain frozen permafrost as temperatures rise, and maintenance and operations costs will increase if the warming trend continues.

Extreme Weather Events

Alaska has 6,640 miles of coastline, which is more than all 49 other states combined. Facilities in coastal areas include roads, airports, harbors, and docks. Alaska has twenty coastal airports and twelve coastal highways. Coastal areas are vulnerable because they could be affected by land-based changes in patterns of precipitation and temperature increases, as well as increases in sea level and the number of storm-driven tides[7]. Diminishing sea ice has reduced the natural coastal protection along Alaska's northwestern coast. Coastal erosion is causing some shorelines to retreat at rates averaging tens of feet per year[8].

Flooding presents another significant risk to the Alaska infrastructure. In 2015, Dalton Highway[9] had major flooding events due to ice buildup that caused water to flow over the highway, and spring breakup caused another round of flooding that washed sections of the gravel road away. This flooding caused road closures and resulted in $17 million in emergency repair costs.

To mitigate for extreme events, DOT&PF addresses infrastructure resilience in all phases of an asset's life cycle, including planning, design, construction, and maintenance and operations. Itemized below are actions that have been adopted to incorporate resilience into the asset management process, followed by more detailed examples of how these strategies have been implemented.

7 Landscape Conservation Cooperative LCC Network—A High-Resolution Coupled Tide and Storm Surge Model for the Gulf of Alaska, Bering Sea, Chuckchi Sea, and Beaufort Sea

8 USGS Climate Impacts to Arctic Coasts

9 Alaska DOT&PF Dalton Highway Updates 2015 Flooding Response

- Incorporate potential impacts of extreme events into long term planning through vulnerability assessments and adaptation plans (erosion, flooding, sea level rise, extreme weather events).
- Identify and inventory external risks to existing infrastructure (e.g., seismic evaluations, bridge scour program).
- Perform infrastructure inspection, replacement, or retrofit to mitigate risks.
- Implement operational and an emergency response program to minimize impacts of asset failures because of extreme events (e.g., staff training and planning, staging resources for response).
- Establish programs to review and evaluate construction standards and new technologies to ensure reasonable incorporation of resiliency to extreme events.
- Perform periodic re-evaluations of the system for vulnerabilities.
- Monitor mitigated locations over time.
- Prioritize locations with high risk.

Resilient Infrastructure

DOT&PF has implemented a number of mitigation strategies to enhance the resilience of its infrastructure and reduce risks associated with climate change and extreme weather events. Below are descriptions of a number of measures the Department has taken to protect its infrastructure and the public who relies on it.

THAWING PERMAFROST: ROADWAY DESIGN

For thawing permafrost, the ACE (Air Convection Embankment) is a mitigation technique to prevent thaw settlement in permafrost-rich soils. The ACE chimney effect acts as a one-way heat transfer device. When coarse material is placed on the side slope, the movement of cold air through the material cools the embankment adjacent to the side slope and transfers the heat to the air. The air is warmed slightly by the warm embankment and then escapes up through the rock. The ACE treatment is an effective mitigation technique to prevent thaw and was constructed in the following locations:

- Alaska Hwy MP 1354-1364 (figure G-4)
- Thompson Dr, Fairbanks (figure G-5)
- Taylor Hwy, MP 70 Lost Chicken Creek
- Elliott Hwy, MP 0-12
- Dalton Hwy, MP 219—FDL Realignment

More information can be found at Alaskan Transportation Spring 2020.

MATERIAL SELECTION: BRIDGE DESIGN

Bridges are designed in Alaska with materials that provide the most longevity. Building in resilience through design has been the most effective tool to anticipate, prepare for, and adapt to changing bridge conditions. The bulb tee girder is designed to have zero tension so that the moment and shear in the girder are the same. The waterproof membrane is designed to provide longevity by keeping water from penetrating into cracks, reducing the freeze/thaw effect. In addition, rebar is

Figure G-4. ACE on the Alaska highway.

Figure G-5. ACE on Thompson Drive, Fairbanks

used to strengthen concrete. The protective coating used on rebar is plant fabricated and designed to help prevent oxidation (rusting).

SCOUR CRITICAL PROGRAM: BRIDGE DESIGN

The Statewide Hydraulics section implements the Bridge Scour Monitoring and Retrofit Program. Tasks for this program include installation of monitoring and telemetry data collection equipment, inspection of bridges for scour, and implementation of the DOT&PF Plan of Action (POA) for scour-critical bridges. Other tasks include coordination with local agencies on NBIS compliance and designing and constructing physical scour countermeasures on bridges identified as scour critical according to NBIS. The STIP includes $950,000 each year for FY22 and FY23 and beyond.

FLOODING: BRIDGE DESIGN

Bridges are designed to a 50-year flood event and a 100-year flood event for floodway areas. Bridges are designed so that they do not create a backwater situation. The capacity of the hydraulic feature is designed to protect the asset and existing infrastructure. Some rivers have large, braided channels with existing bridges, and the river can change direction. Maintenance crews work hard to maintain the river in its current location. Some risk is accepted by the Department for certain infrastructure.

FLOODING: BRIDGE AND CULVERT DESIGN

DOT&PF worked with the University of Alaska Fairbanks on precipitation forecasting. The Projections of Precipitation for Alaska Infrastructure research report provided analysis for the statistical probability of extreme precipitation events across all locations in Alaska. Hydraulic structures, such as bridges and culverts, designed with careful assessment and interpretation of the new databases will better meet the standards for sound hydraulic methodologies and best available science as recommended by FHWA (Future Projections of Precipitation for Alaska Infrastructure Final Report).

Figure G-6. Mendenhall River Bridge, Juneau, Jokulhlaup (Glacial Melting) Event 2016.

FLOODING: ROADWAY DESIGN

To mitigate flooding due to extreme weather events, raising the roadway and increasing the culvert size is an effective mitigation technique to prevent road closures. The raised roadway acts as a collection area for debris, flows, or flooding events, and equipment can be used to clear the inside of large culverts when large events occur. The following locations used this technique:

- Dalton Highway MP 362-414 (figure G-6)
- Haines Highway MP 1-4
- Haines Highway MP 19 (figures G-8 and G-9)

Figure G-7. Dalton Highway—2015 flooding.

Figure G-8. Haines Highway MP19 project with elevated roadway.

Figure G-9. Haines Highway MP19.

UNSTABLE SLOPES: PLANNING

The Statewide Materials Geotechnical Services group is completing research to guide development of a GAM plan for four primary asset classes that provide critical function and whose deterioration can negatively affect fiscal scenarios, road user mobility, and safety. The geotechnical asset types considered in this research effort are:

- Rock slopes
- Unstable embankments and soil slopes
- Material sites
- Retaining walls

Inventory and condition surveys have commenced for each of these key geotechnical asset classes. Slopes and embankments have been inventoried along all NHS routes statewide, while retaining walls have been inventoried along select NHS and Alaska Highway System (AHS) routes. The existing statewide Material Site Inventory (MSI) supplied a wealth of information for identifying service areas with a scarcity of quality materials.

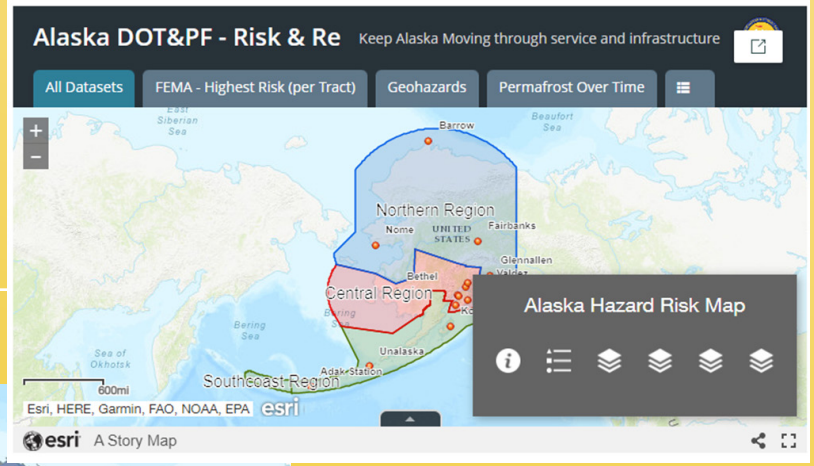
DOT&PF has created a new mapping tool to assist the Department in managing data sets related to infrastructure risk and resilience including FEMA Risk Assessment, geohazards, permafrost, seismic, and flood related data. Figure G-10 shows examples of the Risk and Resilience Storymap tool.

RESILIENCE RESEARCH

DOT&PF incorporates research into the design process for roadways, bridges, and culverts. The following research projects include resilience topics:

DOT&PF Resilience Mapping Project

The DOT&PF created a risk and resilience storymap to provide extreme weather information for pavement and bridge planning. The storymap includes data from the FEMA Risk Assessment, information about known geohazards, permafrost data, seismic risk information, and flood data related to bridges.



The map was created to increase the DOT&PF's ability to anticipate and plan for disruptive events which may affect pavements or bridges.

Figure G-10. Alaska DOT&PF Risk and Resilience Storymap tool.

Impacts of Climate Variability and Change on Flood Frequency Analysis for Transportation Design

University of Alaska, Fairbanks (UAF)

Abstract: Planning for construction of roads and bridges over rivers or floodplains includes a hydrological analysis of rainfall amount and intensity for a defined period. Infrastructure design must be based on accurate rainfall estimates—how much (intensity), how long (duration), and how often (frequency or probability). UAF and the National Oceanic and Atmospheric Administration are updating this important design tool with support from AUTCD and DOT&PF. The quality of reported precipitation data varies due to gauge location, type, and whether or not a rain or snow gauge shield is present.

Report Date: September 2010

Estimating Future Flood Frequency and Magnitude in Basins Affected by Glacier Wastage

University of Alaska, Fairbanks

Abstract: The report presents field measurements of meteorology, hydrology, and glaciers. It also features long-term modeled projections of glacier mass balance and stream flow informed by downscaled climate simulations.

Report Date: March 2015

Estimating Flood Magnitude and Frequency at Gaged and Ungaged Sites on Streams in Alaska and Conterminous Basins in Canada, Based on Data through Water Year 2012

US Geological Survey

Abstract: Estimates of the magnitude and frequency of floods are needed across Alaska for engineering design of transportation and water-conveyance structures, flood-insurance studies, flood-plain management, and other water-resource purposes. This report updates methods for estimating flood magnitude and frequency in Alaska and conterminous basins in Canada.

Report Date: 2016

Repair of Reinforced Concrete Bridge Columns via Plastic Hinge Relocation

North Carolina State University

Abstract: The goal of this report is to present a repair procedure for seismically damaged reinforced concrete bridge columns via plastic hinge relocation.

Report Date: September 2018

Volume 1

Volume 2

Volume 3

Identification of Seasonal Streamflow Regimes and Streamflow Drivers for Daily and Peak Flows in Alaska

US Geological Survey

Abstract: Alaska is among northern high-latitude regions where accelerated climate change is expected to impact streamflow properties, including seasonality and primary flow drivers. Evaluating changes to streamflow, including flood characteristics, across this large and diverse environment can be improved by identifying the distribution and influence of flow drivers. These results provide a spatially comprehensive perspective on seasonal streamflow drivers across Alaska from historical data and serve as an important historical basis for analysis.

Report Date: December 2020

Future Projections of Precipitation for Alaska Infrastructure

International Arctic Research Center, University of Alaska, Fairbanks

Abstract: The goals of this project were to use the best available climate change models and data to create more accurate projections of the severity and frequency of extreme precipitation events and to present these projections in useful, accessible, site-specific formats for hydrologic and engineering applications.

Report Date: April 2021

Low Temperature Performance of Friction Pendulum Bearings Inundated with Ice

University of Nevada, Reno

Abstract: Research the effects of ice in base isolators. Determine the effects of movement during an earthquake if ice is present in the bearing and compare to bearing without ice.

Report Date: December 2022

Monitoring Aufeis under Bridges

University of Alaska, Fairbanks

Abstract: Determine the usefulness of using drone aircraft to fly under bridges in Alaska in order to capture precise data about the interactions between bridge structures and abutments with seasonal aufeis.

Report Date: December 2022

Permafrost Protection using Air Convection Embankment Shoulders

University of Alaska, Fairbanks

Abstract: Analyze temperature data to characterize the cooling effectiveness of the ACE, ventilated shoulder, and hairpin thermosyphon cooling feature.

Report Date: December 2022

Investigating Extreme Floods and the Influence of Selected Flood-Generating Processes for Alaska

US Geological Survey

Abstract: Changes in flood-generating processes have critical implications for engineering design, public safety, and ecosystems. Characterizing historical streamflow patterns and their underlying drivers creates an important basis for understanding the distribution and magnitude of floods, especially extreme floods, and planning for the impacts of climate change.

Report Date: Research in progress

Incorporating Extreme Weather Event Considerations into the Alaska Highway Drainage Manual

Alaska Department of Natural Resources—Division of Geological & Geophysical Surveys

Abstract: Alaska's climate is changing rapidly, affecting environmental assumptions pertinent to design and maintenance of infrastructure and travel corridors. This manual helps organize and present up-to-date climate science as it relates to infrastructure and engineering challenges. Additionally, it provides a reference guide and tools that can be used by engineers attempting to integrate this information into their designs. This reference guide is a summary of current research, models, datasets, and analytical tools related to climate change and extreme weather events in Alaska.

Report Date: Research in progress

EMERGENCY FUNDING AND PART 667

ER funding is available through the FHWA to restore essential travel, minimize the extent of damage, or protect remaining facilities. Eighty-seven projects required emergency funding in Alaska from 1998 through 2018. ER funding is utilized on NHS and non-NHS routes. Table G-4 shows the repair projects required for different emergency categories.

Table G-4. Repair project costs required per Emergency category.

Repair Category	*Extent*	*Cost of Repair*
Earthquake Repairs	15%	$8.4 million
Storm Repairs	42%	$24.4 million
Flood Repairs	43%	$24.9 million
Total	100%	$57.7 million

Fifty percent of emergency funding is spent on projects in recurring places. Some of these reoccurring projects are tabulated in table G-5. Table G-6 shows the number the projects by cost category.

Table G-5. List of reoccurring projects.

Project Location	*Number of Projects*
Richardson Highway	4 projects
Parks Highway	3 projects
Glenn Highway	3 projects
Nash Road	3 projects
Council Road	3 projects
Front Street Nome	2 projects
Lutak Road	2 projects

Table G-6. List of the projects categorized based on cost.

Cost Range	*Number of Projects*	*Total $ in Each Category*
$250,000 or less	2	$0.3 million
$1.0 million or less	4	$2.3 million
$10.0 million or less	10	$33.9 million
Over $10.0 million	2	$21.1 million
Total	18	$57.7 million

The major emergency event in Alaska is flooding: $24.9 million, or 43 percent, of emergency funding was used for flooding. $24.4 million, or 42 percent, was used for emergencies from storms and $8.4 million, or 15 percent, was spent on emergencies resulting from earthquakes.

The Department conducted a statewide evaluation to determine if there are reasonable alternatives to roads, highways, or bridges[10] that have required repair/reconstruction[11] on two or more occasions due to emergency events[12] (Alaska DOT&PF Twice Damaged Assets Report 12/1/21).

Assets that have been damaged on two or more occasions since January 1, 1997, are defined as "Twice Damaged Assets." Section 667 supports

10 Defined in 23 USC 101(a)(11) that is open to public but excludes tribal and federally owned infrastructure

11 Excludes emergency repairs under 23 CFR 668.103

12 Natural Disaster declared by the Alaska's Governor or the President of the United States

Table G-7. List of the locations twice damaged for the period of January 1, 1997, to December 31, 2019.

Facility	*Emergency Events*	*TDA Locations [Specific Emergency Events]*
Glenn Highway (Central Region)	2006 Flooding	MP 70.524–70.675 [2006 & 2012 Flooding]
	2012 Flooding	–
	2018 Earthquake	–
Richardson Highway (Northern Region)	2000 Avalanches	MP 14.789–14.829 [2006 & 2012 Flooding]
	2006 Flooding	MP 16.608–16.628 [2006 & 2012 Flooding]
	2012 Storm/Flood	MP 18.696–18.782 [2006 & 2012 Flooding]
	2018 Earthquake	MP 31.328–31.368 [2006 & 2012 Flooding]
		MP 33.412–33.452 [2006 & 2012 Flooding]
Parks Highway (Central Region)	2006 Flooding	30.97 to 31.06 [2006 & 2012 Flooding]
	2012 Storm/Flood	–
	2018 Earthquake	–
Lutak Road (Southcoast Region)	1998 Storm	MP 0.276 to 0.324 [1998 & 2005 Storms]
	2005 Storm	MP 3.83 to 3.84 [1998 & 2005 Storms]
Nash Road (Seward) (Central Region)	2002 Flooding	MP 2.013 to 2.033 [2002, 12 & 18 Flooding]
	2012 Flooding	MP 2.193 to 2.471 [2012 & 18 Flooding]
	2018 Flooding	–
Council Road (Nome) (Northern Region)	2004 Storm	MP 20.951 to 21.330 [2004, 11 & 13 Storms]
	2011 Storm	–
	2013 Storm	–
Front Street (Nome) (Northern Region)	2004 Storm	MP 0.00 to 1.116 [2004 & 2011 Storms]
	2011 Storm	–

long-term investment decision-making in a manner that results in the conservation of federal resources and protection of public safety and health. Table G-7 summarizes the locations that meet the requirements in Section 667. These locations have been twice damaged for the period of January 1, 1997, to December 31, 2019.

Process for Identifying Twice Damaged Assets for Emergency Repair or Reconstruction

Figure G-11 illustrates the process for identifying assets that have been damaged twice since 1997 and have needed reconstruction or repair.

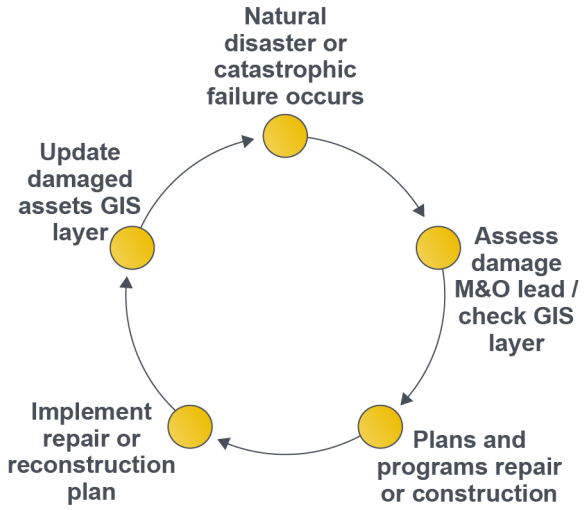


Figure G-11. Identification of assets in need of repair or reconstruction.

The Statewide Transportation Geographic Information Section (TGIS) maintains an inventory of public roadways through its mapping database. TGIS includes a GIS layer in its database to locate twice damaged assets.

Assets that have been damaged twice need an Alternatives Evaluation prior to spending federal aid (excluding the emergency funding). Each region will conduct this evaluation on a 4-year cycle. The evaluation includes an asset characterization, a review of threats and consequences, and an alternative evaluation. Reasonable alternatives include options that could partially or fully achieve the following:

- Reduce the need for federal funds to be expended on emergency repair and reconstruction activities.
- Mitigate or partially/fully resolve the root cause of the recurring damage to assets.
- Better protect public safety and health and the human and natural environment.
- These alternatives need to be evaluated in the project design prior to construction activities.

Further information on the twice damaged asset evaluation can be found in the Policy & Procedure 07.05.100, Highway Twice Damaged Asset Evaluation.

Process For Evaluating Alternatives

The GIS layer used to locate pavement and bridge assets on the NHS and non-NHS damaged by natural disasters or catastrophic failure includes the date of the event, declaration type, Route ID, and beginning/end mile points. A description of event or disaster, repair/reconstruction date, description of the repair/reconstruction, cost of the repair/reconstruction, and alternative evaluations are also available.

The twice damaged asset locations are compared to the current STIP locations. The list of projects that need an alternatives evaluation are projects that are in the extended 10-year STIP plan, with years 6-10 to be evaluated next. A report on twice affected areas will be prepared every 4 years.

For non-DOT&PF, non-NHS assets, the Department will compare all locations included in the project with its records of locations damaged by qualifying emergency events using the GIS database prior to requesting federal aid for any highway or bridge project. DOT&PF considers the outcomes of these evaluations during the development of transportation plans and programs, including TIPs and STIPs, and during the environmental review process under 23 CFR Part 771.

Appendix H: Financial Planning

BACKGROUND

Federal rulemaking published October 2016 requires state DOTs to prepare a 10-year financial plan as part of their TAMP. Both MAP-21 and 23 CFR 515 state that the TAMP is one of a series of plans required as part of a TPM.

The TAMP is the connection between long-term planning LRTP and short-term programming STIP, in addressing how the Department will manage pavement and bridges on the NHS to achieve its overall performance goals. The TAMP financial plan, described in Section 5 of the TAMP, describes how the agency manages the STIP to achieve the transportation goals established in the LRTP.

This appendix describes the process DOT&PF completed to develop the TAMP financial plan. The following resources were used in development of the plan.

- DOT&PF used the FHWA November 2017 guidance document *Developing TAMP Financial Plans* as a basis for the process described in this appendix.
- DOT&PF participated in a gap analysis completed by a FHWA contractor in January 2018.
- DOT&PF participated in an FHWA Asset Management Workshop on LCP, Risk Management, and Financial Plan to Support the Implementation of Asset Management Plans on March 29, 2018.
- DOT&PF hosted a session of the National Highway Institute Course 136002, Financial Planning for TAM on February 13-14, 2019.

The process for developing the financial plan consists of four steps leading to selection of investment strategies. The following sections describe these four steps, including the data sources and stakeholders that were involved in developing the financial plan.

STEP 1. IDENTIFY AVAILABLE FUNDING FOR ASSET MANAGEMENT

Transportation funding in Alaska is a combination of federal funds, state general funds, and Alaska Marine Highway System revenues. The Federal highway program funds form the majority of the available funds. The following subsections describe the process DOT&PF uses to estimate available funding for asset management.

Data Sources

The primary data source for forecasting future transportation funding is the current federal transportation act. The BIL provides a stable source of funding for transportation infrastructure from 2022 through 2025. Figure H-1 shows how the funding from the BIL to Alaska is allocated between the highway programs in Federal Fiscal Year 2022 in millions.

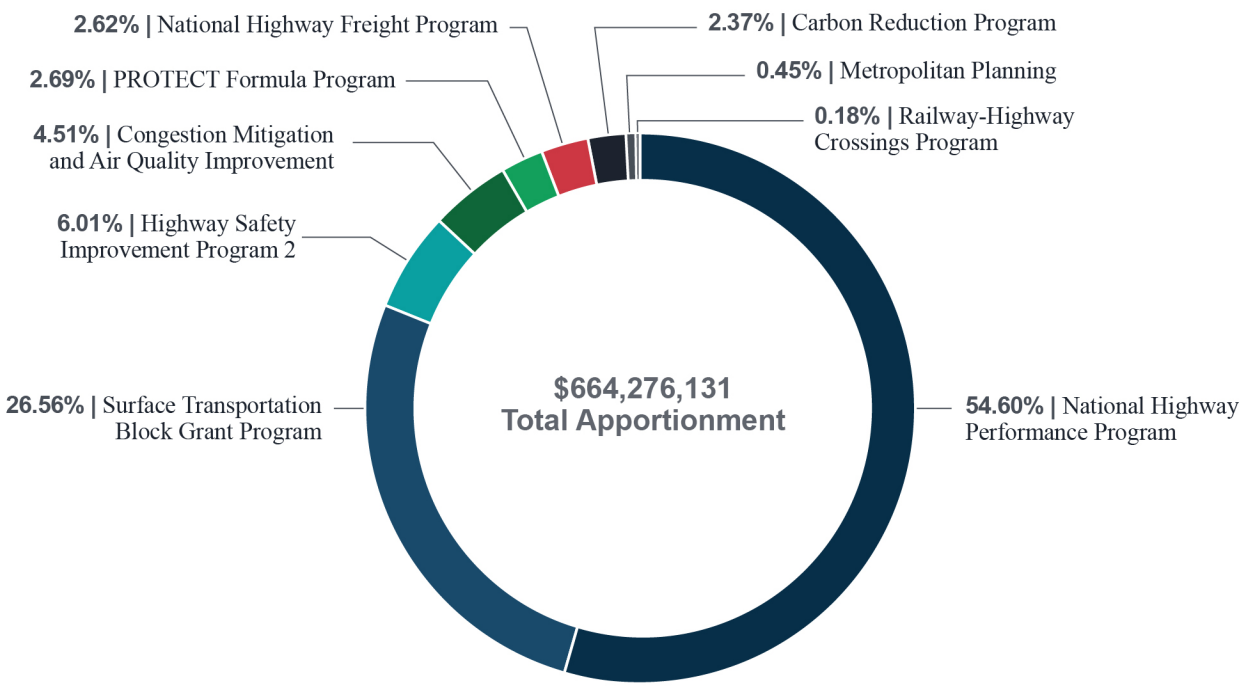


Figure H-1. BIL funding for Alaska fiscal years 2022-2025[13].

DOT&PF has projected funding beyond federal fiscal year 2025 to increase annually at a rate of 2 percent. This assumption is included in table 4-1 of the TAMP.

Alaska does fund some highway projects without federal funding, and state-funded projects are not included in the STIP but can be found in the legislature's approved budget for each state fiscal year. These are normally state-funded bonds that are connected to infrastructure that support resource development.

These projects often do not have a significant impact on current infrastructure conditions and are not considered as funding available for asset management or included in the financial plan.

13 FHWA Notice of Apportionment of Federal-Aid Highway Program Funds for Fiscal Year (FY) 2022

Stakeholders

The following organizational units contribute to the estimation of funds available for asset management.

- The STIP Manager provides information from the STIP.
- The Capital Improvement Program Manager:
  - » Provides information on the purpose of any state-funded projects in the legislature's approved budget.
  - » Contributes to the determination of anticipated future federal funding.
- The TAMP Coordinator develops the funding estimate for SOGR.

STEP 2. ESTIMATE FUNDING NEEDS

Funding needs are the estimated expenditures required to achieve condition targets and the DSOGR for pavement and bridges on the NHS. Funding needs are forward looking and estimated based on predictions of asset performance under different investment scenarios. The following subsections describe the processes established to estimate funding needs for NHS pavements and bridges, other assets, risks to the transportation network, and system performance.

Funding Needs for Pavements and Bridges

To develop funding needs for the TAMP, performance models are used based on the

historical performance of pavement and bridges in the state. To develop the models, the average rate of change in condition over the life of a pavement section or bridge was calculated and combined with data from other assets of similar design (which are referred to as a "family"). The average rate of change for the entire family is used to predict the future condition of all asset sections that meet the family criteria.

The performance models are combined with unit cost data from DOT&PF construction projects to model the impacts of investment in different types of treatments over a 10- year period to predict the amount of work that can be accomplished, the impact of that work on asset conditions, and the annual deterioration of asset conditions due to use and exposure to the environment. The performance models have been incorporated into the Department's PMS and BMS, which were implemented in October 2019. These new management systems provide the Department with expanded capabilities to evaluate asset performance.

The following subsections elaborate on DOT&PF's procedures for estimating funding needs by describing the data sources used, the stakeholders involved, and their roles in the analysis. The final subsection provides information on how to improve the estimation of funding needs for the next TAMP update.

STAKEHOLDERS

Several internal units contribute to the estimation of funding needs, as described below.

- The Pavement Manager:
  - » Develops the pavement performance curves
  - » Determines pavement treatment unit costs
  - » Applies the performance models, unit costs, and funding scenarios to determine the future cost to achieve the asset management objectives for NHS pavements
- The Bridge Management Engineer:
  - » Develops the bridge performance curves
  - » Determines the bridge treatment unit costs
  - » Applies the performance models, unit costs, and funding scenarios to determine the future cost to achieve the asset management objectives for NHS bridges
- The Statewide Planning Chief provides investment scenario inputs.
- The TAMP Coordinator provides oversight and information on TAM goals and objectives.

Funding Needs for Other Assets and System Performance

Funding needs for other assets and system performance are largely determined based on investment in the current STIP. DOT&PF has developed a 10-year STIP with committed projects to achieve long-term goals according to the performance-based plans developed under the TPM effort established by MAP-21. The following subsections provide details on the data sources used to develop the estimates, the roles of stakeholders involved, and opportunities to improve the process in the future.

DATA SOURCES

The primary data sources for estimating future needs for managing other assets and performance areas are the 10-year STIP and historic maintenance and operations budgets.

STAKEHOLDERS

Several stakeholder units within DOT&PF contribute to the estimation of funding needs for other assets and performance areas, as described below.

- The Statewide Planning Chief provides information from the 10-year STIP, including obligation amounts and fund sources by year.
- The Regional Maintenance and Operations Chiefs provide information on their annual expenditures outside of the STIP.

Funding Needs for Mitigating Risks to the Transportation System

As described in section 3.5 of the TAMP and Appendix G, DOT&PF actively invests to mitigate significant risks to the transportation system. These investments are made to reduce the likelihood that threats to the system performance will occur, to reduce their impact if they do occur, or to maximize the agency's opportunities to improve performance.

Data Sources

Implementing risk mitigation comes at a cost. These costs are typically included in the treatment unit costs in pavement and bridge management

systems and are then reflected in the performance modeling run by the management systems. Some of the costs of risk mitigation strategies, such as seismic retrofitting of bridges, are difficult to distinguish from work done to improve bridge conditions. Further complicating such estimates is that mitigation features, such as improved bridge design, which may be incorporated into work done to improve bridge conditions. This type of work may increase project costs but cannot be separated out from preservation, rehabilitation, and reconstruction funds.

For risk-related needs that could not be estimated from STIP data, the TAMP Risk Management Team provides estimates to the level of NHPP funding and state match that is expected to be programmed for each risk mitigation strategy.

STAKEHOLDERS

The following stakeholders contribute to developing estimates of needs for transportation risk mitigation:

- The Statewide Planning Chief provides and analyzes 10-year STIP data.
- The TAMP Risk Management Team provides estimates on the impact of risk mitigation efforts on available NHPP funding.

STEP 3. QUANTIFY FUNDING GAPS

Funding gaps exist when the forecasted needs exceed the amount of anticipated funding. Funding gaps may occur in any year of the financial plan.

If available funding is significantly greater than the needs, it may be determined that there is a surplus of funding. When they occur, surpluses are typically only in one portion of the financial plan. For example, due to specific circumstances, there may be few candidates for work in a specific year of the plan. This could lead to a surplus in funds for one asset class.

Surpluses in one program are offset by funding gaps in other programs. This section describes the processes for quantifying funding gaps or surpluses. The processes described in Appendix I explain how the agency uses cross-asset tradeoff to develop an investment plan that balances needs and funding across assets and programs to best achieve the agency's objectives.

Data Sources

The data sources for quantifying funding gaps are the outputs of steps 1 and 2, as described in this appendix. Needs and available funding are estimated for each year of the TAMP. Those estimates are compared to determine whether funding is adequate to address the needs in each year for all asset classes, performance areas, and risks.

Stakeholders

The Asset Managers lead the effort to quantify funding gaps with assistance from the Statewide Planning Chief and Chief Financial Officer. The Capital Program Review Team provides support to the process.

STEP 4. SELECT INVESTMENT STRATEGIES

If funding gaps are identified, DOT&PF will conduct a review of options to best address its needs across asset classes and programs. DOT&PF will select investment strategies using the process described in the bullets below.

- Review the risk management strategies, life-cycle cost scenarios, and funding distributions that cover the state of good repair or federal performance targets and national goals.
- Prioritize preservation before more costly rehabilitation and reconstruction projects.
- Anticipate funding gaps to reach goals. We plan to use innovative techniques for maintaining pavements over unstable subgrades and to respond to high level of surface rutting.
- Improve efficiency to free up money for additional preservation or other priorities.
- Communicate this funding level to external and internal stakeholders who have the opportunity to comment on this funding level.
- Develop an agency self-assessment to implement the investment strategies and any risks to that implementation. Risks may include changes in management, lack of organizational support for asset management objectives and performance management or LCP, knowledge or technology gaps, or proven inaccurate assumptions.

Additional information on establishing the selected strategies as an investment plan and managing the implementation of that plan are provided in Appendix I.

Appendix I: Investment Strategies

INTRODUCTION

"Investment Strategy" is defined in 23 CFR 515.5 as a set of strategies that result from evaluating various levels of funding to achieve state DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.

The policies and goals laid out in the LRTP and the LCP, as well as risk management and financial planning processes described in this TAMP, contribute to the investment strategies DOT&PF will use to achieve national goals, statewide targets, and a state of good repair.

PROCESS FOR DEVELOPMENT OF INVESTMENT STRATEGIES

The following sections outline the steps used to develop the cross-asset analysis process.

Review Policies and Objectives

- Review existing DOT&PF goals, policies, and actions, including the LRTP.
- Review internal processes related to programming decisions, particularly the 10-year STIP.

Step 1. Acquire Scenarios from Asset Management Systems

- DOT&PF used the pavement management system and bridge management system described in Appendix F to develop several scenarios for both pavements and bridges.
- Scenarios varied in terms of both strategy and total budget.
- The LCP scenarios were run in PMS and BMS, which allowed a comparison of resulting conditions for each asset at varied investment levels.

Step 2. Assess Available Funding

The Department assessed funds available for the NHS, including an analysis of federal NHPP apportionments, state matching funds, and other state or federal funds that are reasonably expected to be available over a 10-year period. The Department displayed funds available by fund type.

- The Statewide Planning Chief provided an assessment of the available NHPP funding as well as the level of current programming in the STIP dedicated to performance needs other than pavement and bridge conditions.

ASSUMPTIONS:

- NHPP apportionment: FFY2022 NHPP apportionment after set-asides and penalties, 2 percent annual growth. Includes NHPP Freight and Exempt (This is a conservative assumption, predicated on growth keeping pace only with inflation).
- State matching funds: Equal to NHPP Funds apportionment divided by 0.9097, assuming a match ratio of 9.03 percent (This is a generous assumption, because some NHPP funds are 100 percent of total project costs).
- Other state or federal funds reasonably expected to be available: Limited to those included in the current approved STIP (This is a conservative assumption as other funds may become available in the years beyond the STIP period).
- Obligation Limitation: Over a 4-year period, 100 percent of NHPP funds will be used (other funds would be allowed to lapse), therefore 100 percent of NHPP funds will be assumed to be available to the NHS annually with regard to the TAMP financial plan. No obligation limitation will be factored in (This is a generous assumption because sequestration and rescission may still occur).
- Total funds available to the NHS: The total of NHPP funds, state matching funds, and other

state or federal funds reasonably expected to be available.
- Funds needed for planning, ITS, Alaska Marine Highway System (AMHS) ferries, and similar NHS needs that do not impact pavement or bridge conditions will be deducted from the total funds available to the NHS.

The remaining funds will be available for projects that result in construction projects and can be categorized into the five work types as defined below.

- **Initial Construction:** Includes all projects in the STIP coded to work type New Construction. New Construction is used for projects that construct new roads, new interchanges, or add capacity by constructing new lanes. Passing lanes are not considered added capacity.
- **Maintenance:** Includes all force account work completed by the regions and Whittier Tunnel Maintenance and Operations.
- **Preservation:** Includes each region's Pavement and Bridge STIP Needs items with the amount needed for maintenance work deducted.

The BMS and PMS will aid staff in the evaluation and selection of road segments or bridges for optimal preservation treatment and timing.

- **Rehabilitation:** Includes all STIP projects coded to work type System Preservation and Bridge Rehabilitation with the amounts needed for preservation work deducted.
- **Reconstruction:** Includes all STIP projects coded to work type Reconstruction and Bridge Replacement.

Step 3. Compare Scenarios

Alaska selected the following life-cycle planning scenarios for each asset type (pavement and bridges) for further analysis:

- **Pavement**
  - **Varied Funding Scenarios**—Multiple pavement budget scenarios ranging from $110M-$150M for SOGR funding were modeled utilizing the preferred life-cycle strategy. This range was selected as a reasonable variation on the anticipated SOGR funding amount of $130M for pavement. These scenarios would provide information on the impact of realistic variations in pavement funding on the forecasted condition of the pavement network. The $130M and $150M scenarios meet the SOGR for the percentage of *Good* and *Poor* NHS pavements. The $110M scenario meets the SOGR for *Good* pavements on the NHS; however, while it is forecasted to reach six percent *Poor* on the Interstate network by the end of the analysis period, it slightly exceeds the proposed SOGR of five percent. It is still under the federally mandated maximum of ten percent *Poor* on the Interstate NHS.
  - **Sustained Inflation Scenario**—A scenario was run to demonstrate the effect that sustained elevated inflation would have on the forecasted network condition to quantify the impact of inflation as a potential risk. It was determined that this risk had minimal impact on the pavement network condition during the analysis period.
  - **Varied Life-Cycle Strategy Scenarios**—A "worst first" scenario was run to demonstrate the impact of delaying treatments based on the lowest condition thresholds rather than applying the preferred life-cycle strategy that promotes timely preservation treatments to prevent severe and costly deterioration. This analysis indicated that at the same funding level, the worst first strategy resulted in a five percent increase in the percentage of NHS pavements in *Poor* condition by the end of the analysis period. The increase in the percentage of *Poor* pavements from 7 percent to 12 percent clearly demonstrates the benefit of the preferred life-cycle strategy.
- **Bridge**
  - **Do Nothing**—No funding spent on NHS bridges.
  - **Low Budget Scenario**—This scenario meets the *Poor* target of the DSOGR with 4 percent *Poor* bridges in 2031 but fails to meet the *Good* target with 26 percent *Good* bridges in 2031.
  - **Medium Budget Scenario**—This scenario meets the *Poor* target of the DSOGR with 4 percent *Poor* bridges in 2031 but fails to meet the *Good* target with 27 percent *Good* bridges in 2031.
  - **High Budget Scenario**—This scenario meets the *Poor* target of the DSOGR with 3 percent *Poor* bridges in 2031 but fails to meet the *Good* target with 29 percent *Good* bridges in 2031.

Step 4. Recommend Acceptable Scenarios

Pavement and bridge budget scenario runs were reflective of variations on the planned investment scenario that validated the funding assumptions and planned investment strategy.

Step 5. Determine Funding Risks

The TAMP Team identified the following risks to implementing the selected scenarios.

- Implementing scenarios in the first 3 to 4 years of the TAMP period along with current STIP projects will be challenging.
- Cost increases could impact the number of deliverable projects and therefore the forecasted asset conditions based on the various budget scenarios.
- Annual programing can vary considerably, so DOT&PF will incorporate both an annual and running-average review to analyzing the agency's consistency regarding implementing the TAMP investment strategies.
- Potential increases in program funding based on increases in the BIL apportionments could present a challenge for the Department to deliver a larger program.

Step 6. Finalize Input to TAMP Investment Strategies

The TAMP Team prepared a summary of the TAMP analysis results for executive review. During the review, executive staff provided feedback on the TAMP processes, analysis, and resulting investment strategies. The executive input was used to finalize the investment strategies included in the TAMP.

MANAGING INVESTMENT STRATEGIES WHILE ADDRESSING SYSTEM NEEDS

DOT&PF monitors and manages the performance of the NHS using all seven TPM National Goal areas: safety, congestion, system reliability, freight movement and economic vitality, environmental sustainability, and project delivery.

Each of these performance areas contribute to the development of the capital program in support of the agency's LRTP. Several internal processes allow staff to manage delivery of the program to ensure the expected performance is delivered on time and within budget. These internal processes are connected to the TAMP development process, as outlined below, to ensure that the TAMP is developed in full awareness of any gaps in the performance of NHS assets and that the gaps are considered in the development of TAMP investment strategies.

- DOT&PF holds a monthly Planning Chiefs meeting to discuss issues related to delivery of the capital program, including STIP projects. This meeting addresses the needs of programmed projects to remain on schedule and budget. If project schedules or budgets change, this group determines the impact on the overall program, decides on actions to balance program delivery, and determines accomplishments to best achieve the agency's objectives, as described in the LRTP and including all TPM goal areas.
- In addition to the Planning Chiefs meeting, DOT&PF convenes a Capital Program Review Team (CPRT) meeting at least twice per year. This is a cross- disciplined group that discusses and resolves issues in delivery of specific projects and program objectives, including the achievement of TPM goals and targets.
- The TAMP Steering Team and Technical Teams include participants in both the Planning Chiefs and CPRT meetings. As DOT&PF engages in the update of its TAMP, these members will share performance gaps in areas other than pavement and bridge conditions to the attention of the larger teams. As these issues are discussed and understood, they are included in the risk analysis and are considered when developing gap analysis scenarios in the PMS and BMS.

The Department will maintain a 10-Year Extended STIP for allocation of funds available by work type for asset management and performance management.

The Extended STIP will be informed by the current approved STIP, project delivery schedules, Planning Chief meetings, and CPRT meetings. Additionally, PMS and BMS will affect greater influence over time of project priorities and fund allocation to further asset management goals.

The Extended STIP will be used to estimate the cost of expected future work, by work type, to implement investment strategies contained in the asset management plan by state fiscal year

and work type (23 CFR 515.6(d)(1)). Most of the Department's capital program planning is by federal fiscal year due to the state's reliance on federal funds, but to meet the regulation for state fiscal year, an assumption will be made that the total funds available to the NHS are the same for a state fiscal year as they are for a federal fiscal year. This assumption is sufficient given that there will remain 12 months represented, and a similar amount of work will be obligated within the state fiscal year (July 1st to June 30) as would be within the federal fiscal year (October 1st to September 30th).

For the Consistency Review, the Department will use FFY22 obligated/awarded funds and show that there is alignment between actual and planned levels of investment. The Department will assess funds available for the NHS. The Department will display funds available by fund type.

CONSISTENCY REVIEW

The investment strategies shown in the TAMP provide a simplified view of how investments are made on an annual basis to improve or sustain asset conditions. In practice, projects may be accelerated, delayed, or take multiple years to deliver. As a result, it is nearly impossible to precisely predict the amount of investment to be made in a specific future year. This is recognized in several related FHWA policies, such as the policy to provide states up to 4 years to obligate funding after allocation.

DOT&PF will follow the process below to provide a consistent means of assessing whether the agency's investments are consistent with the TAMP investment strategies in a way that accounts for this natural variation in annual programming and project delivery.

- DOT&PF will compare FFY22 obligations/awards to the amounts included in the investment strategy for the same year.
  - This comparison will be made for each asset (pavement and bridges) and work type (new construction, maintenance, preservation, rehabilitation, and reconstruction) included in the TAMP investment strategy, resulting in a total of ten comparisons for each year.
- A consistency determination will be made for each asset-work type combination (e.g., maintenance of NHS pavements or reconstruction of NHS bridges). Each asset-work type combination is referred to as a "component" of the TAMP investment strategy.
- A set of investments will be considered consistent with the relevant component of the TAMP investment strategy if all the following criteria are met:
  - The sum of those investments equals an amount between 50 percent and 150 percent of the value of the TAMP investment strategy component for the year of analysis.
  - The sum of those investments for the year of analysis and the 3 previous years either do not:
    - Exceed 125 percent of the value of the TAMP investment strategy components for their respective years of analysis
    - Fall short of 75 percent of the value of the TAMP investment strategy components for their respective years of analysis
- DOT&PF will investigate and explain any components of the TAMP strategy for which actual investments are inconsistent.
- The Capital Program Review Team will recommend corrective actions as needed to address inconsistencies between actual investments and the TAMP investment strategies by:
  - Updating the TAMP investment strategy
  - Modifying future programming

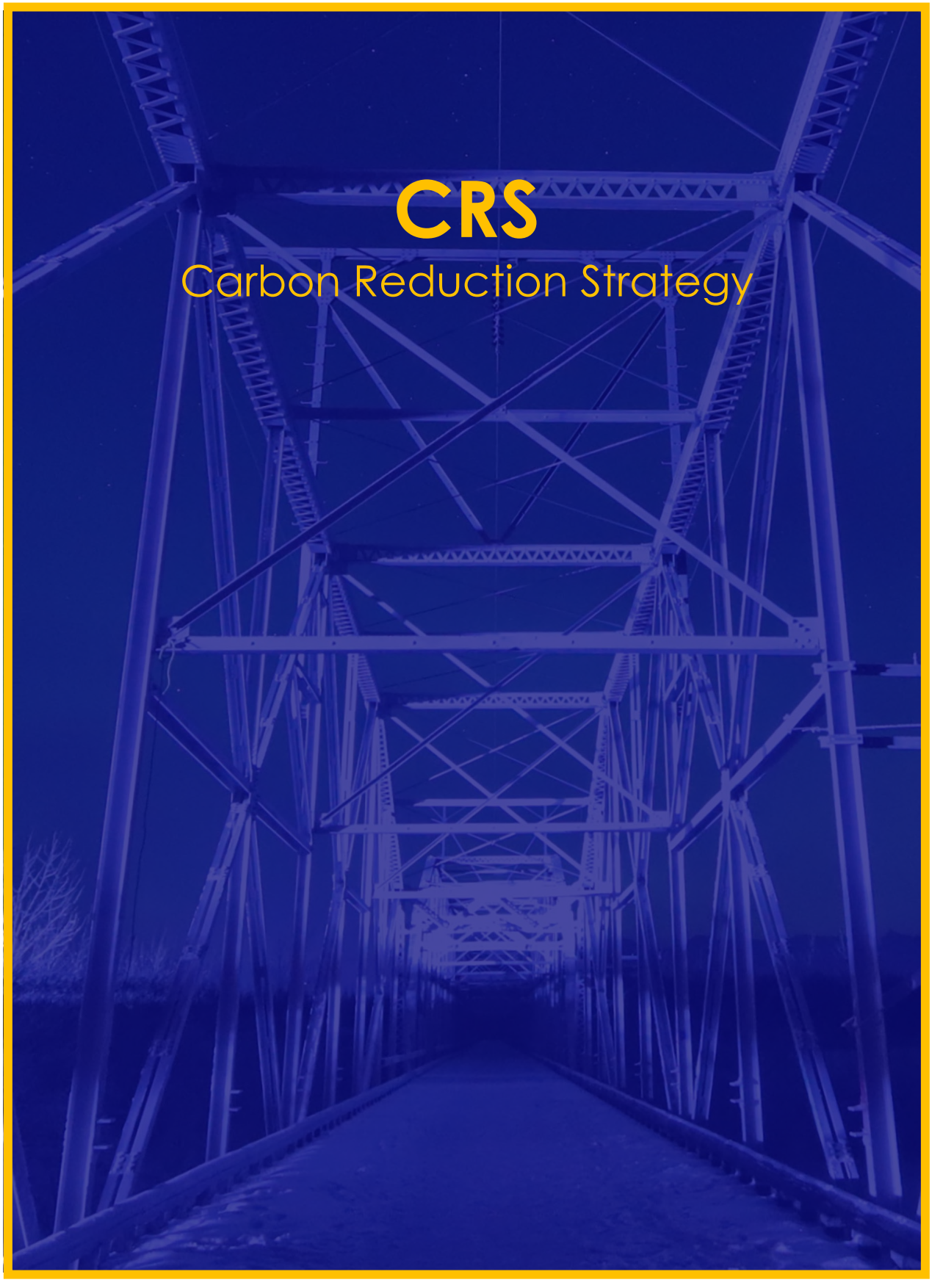
Appendix J: Glossary of Acronyms

Acronym	*Definition*
AC	Advanced Construction
AASHTO	American Association of State Highway and Transportation Officials
AADT	Annual Average Daily Traffic
ACE	Air Convention Embankment
ADT	Average Daily Traffic
AE	Alternatives Evaluation
AER	Alternatives Evaluation Report
AGOL	ArcGIS Online
APCI	Alaska Pavement Condition Index
AUF	Alaska University Fairbanks
AUTC	Alaska University Transportation Center
BrM	AASHTO BMS
CPRT	Capital Program Review Team
CS	Condition State
CMAQ	Congestion Mitigation Air Quality Improvement Program
DOA	Department of Administration
DOT&PF	Alaska Department of Transportation and Public Facilities
DOT	Department of Transportation
DSOGR	Desired State of Good Repair

Acronym	*Definition*
DDIR	Disaster Damage Inspection Report
ER	Emergency Relief
EMS	Equipment Management System
FHWA	Federal Highway Administration
FFY	Federal Fiscal Year
FOG	Field Operations Guide
FAST Act	Fixing America's Surface Transportation
GCR	General Condition Rating
GIS	Geographic Information System
GAMS	Geotechnical Asset Management System
HSIP	Highway Safety Improvement Plan
HSP	Highway Safety Plan
IIJA	Infrastructure Investment and Jobs Act
ITS	Intelligent Transportation System
IRI	International Roughness Index
LM	Lane-miles
LOS	Level of Service
LOTTR	Level of Travel Time Reliability
LCP	Life-cycle Planning

Acronym	*Definition*
LRTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
M&O	Maintenance and Operations
MMS	Maintenance Management System
MPO	Metropolitan Planning Organization
MP	Mile Points
MOA	Municipality of Anchorage
MSI	Material Site Inventory
NBI	National Bridge Index/Inventory
NBIS	National Bridge Inspection Standards
NHFN	National Highway Freight Network
NHPP	National Highway Performance Program
NHI	National Highway Institute
NHS	National Highway System
NPMRDS	National Performance Management Research Data Set
NCDOT	North Carolina Department of Transportation
OIT	Office of Information and Technology
PMS	Pavement Management System

Acronym	*Definition*
PEL	Planning and Environmental Linkage
P&P	Policy and Procedure
PSR	Present Serviceability Rating, Pavement Serviceability Rating
PIO	Public Information Officers
SOGR	State of Good Repair
STBGP	Surface Transportation Block Grant Program
STIP	Statewide Transportation Improvement Program
SD	Structurally Deficient
STP	Surface Transportation Program
TAM	Transportation Asset Management
TAMIS	Transportation Asset Management Information System
TAMP	Transportation Asset Management Plan
TGIS	Statewide Transportation Geographic Information Section
TPM	Transportation Performance Management
TTTR	Truck Travel Time Reliability
TDA	Twice-damaged Assets
VMT	Vehicle Miles Traveled



CRS

Carbon Reduction Strategy

Alaska Department of Transportation and Public Facilities Transportation Carbon Reduction Strategy

A Five-Year Comprehensive Plan: 2024-2029

11/15/2023

Prepared for: Federal Highway Administration

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Transportation and Public Facilities

OFFICE OF THE COMMISSIONER
Ryan Anderson, P.E., Commissioner

PO Box 112500
Juneau, Alaska 99811-2500
Main: 907.465.3900
dot.alaska.gov

November 15, 2023

Sandra Garcia-Aline
Alaska Division
Federal Highway Administration
P.O. Box 21648
709 West 9th Street, Room 851
Juneau, AK 99802-1648

Re: Announcing DOT&PF's Transportation Carbon Reduction Strategy

Dear Ms. Garcia-Aline,

I am writing to announce a significant milestone in Alaska's journey towards environmental stewardship and sustainability: the launch of our state's inaugural Transportation Carbon Reduction Strategy (CRS). This strategy is a response to the mandates of the 2021 Bipartisan Infrastructure Law and the Carbon Reduction Program, tailored to address the unique transportation landscape of Alaska—a landscape characterized by vast expanses, a sparse population, and a heavy reliance on non-highway travel modes, especially aviation.

The CRS is a comprehensive approach that aligns with federal directives, requiring states to develop and update a carbon reduction strategy every four years. In Alaska's case, this involves a nuanced understanding of our state's geographical challenges and transportation needs. The strategy is sensitive to community sizes across Alaska, ensuring that funding and resources are allocated efficiently, with a focus on projects that mitigate on-road carbon emissions.

Alaska's transportation setting, with its vast and unique geographical challenges, requires a diverse mix of transportation modes. This diversity makes the reduction of transportation-related emissions a complex but crucial task. In terms of emissions profile, despite ranking 39th nationwide in CO2 emissions, Alaska leads in per capita total energy consumption. The transportation sector, being the second-highest emitting sector in the state, necessitates focused reduction strategies.

The CRS also highlights the state's energy production profile, which currently relies on a blend of fossil fuel and renewable energy sources. A significant emphasis is placed on diversifying and optimizing energy usage. This includes the initiation of carbon management initiatives such as the Carbon Offset Credit Program, which emphasizes sequestration and management of carbon through nature-centric projects and renewable energy advancements.

"Keep Alaska Moving through service and infrastructure."

To achieve these objectives, the strategy introduces the Sustainable Transportation and Energy Program (STEP), which outlines various projects promoting a sustainable transportation system focusing on reduced GHG emissions, energy independence, and environmental health. The Carbon Reduction Implementation Plan provides a detailed roadmap for reducing transportation carbon emissions, detailing specific projects, funding, and strategic focus areas.

A comprehensive plan for Electric Vehicle (EV) infrastructure implementation is also a cornerstone of the CRS. This plan aims to increase EV adoption in Alaska, complemented by strategies for emissions reductions, promoting alternative transportation, congestion management, energy optimization, sustainable construction, and infrastructure development.

However, challenges abound. Alaska's vast and remote landscapes present unique challenges for transportation and energy infrastructure. Our heavy reliance on aviation and marine transport, combined with limited road networks, requires innovative solutions for reducing emissions. But these challenges also present opportunities for pioneering sustainable transportation solutions.

The DOT&PF's first Carbon Reduction Strategy is more than a plan; it is a commitment to reduce Alaska's carbon footprint while catering to its diverse transportation needs. By leveraging modern technologies, promoting alternative fuels, and focusing on sustainable practices, we are paving the way for a greener future.
Your support and collaboration are essential in this endeavor. Together, we can lead Alaska toward a more sustainable and environmentally responsible future.

Sincerely,

Ryan Anderson, P.E.
Commissioner

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ACRONYMS

ACC	Alaska Administrative Code
ADA	Americans with Disabilities Act
ADEC	Alaska Department of Environmental Conservation
AMHS	Alaska Marine Highway System
AMTS	Anchorage Metropolitan Area Transportation Solutions
ARRC	Alaska Railroad Corporation
BIL	Bipartisan Infrastructure Law
CNG	Compressed Natural Gas
CO2	Carbon Dioxide
CO2e	CO2 equivalent
CMAQ	Congestion Mitigation and Air Quality Improvement
CRP	Carbon Reduction Program
CRS	Carbon Reduction Strategy
DOT&PF	Alaska Department of Transportation and Public Facilities
EIA	Energy Information Administration
EPA	United States Environmental Protection Agency
EV	Electric Vehicle
FAST	Fairbanks Area Surface Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
HOV	High-Occupancy Vehicle
LBS	Pounds
LRTP	Long Range Transportation Plan
MACS	Metropolitan Area Commuter System
Mat-Su	Matanuska-Susitna
MSB	Mat-Su Borough
MVP	Mat-Su Valley Planning
MMT	Million Metric Tons
MPO	Metropolitan Planning Organization
MWh	Megawatt Hour(s)
NASA	National Aeronautics and Space Administration
NEVI	National Electric Vehicle Infrastructure Formula Program
PROTEC	Promoting Resilient Operations for Transformative, Efficient & Cost-Saving Transportation
SaaS	Software as a Service
SIP	Strategic Investment Plan
STEP	Sustainable Transportation Program
STIP	Statewide Transportation Implementation Plan
TIP	Transportation Implementation Plan
UAF	University of Alaska Fairbanks
U.S.C.	United States Code

Alaska Department of Transportation & Public Facilities Carbon Reduction Strategy

FOREWORD

In 2021, the Bipartisan Infrastructure Law heralded the Carbon Reduction Program, a federal initiative exclusively dedicated to supporting projects that aim to curtail transportation emissions. This program zeroes in on the reduction of carbon dioxide emissions from on-road highway sources within the transportation sector.

To be eligible for the program's funding, each state, in tandem with its metropolitan planning organizations, is mandated to craft a carbon reduction strategy within two years of the legislation's enactment, with subsequent updates every four years.

Alaska's inaugural Carbon Reduction Strategy for the transportation sector presents recommendations tailored to mitigate on-road carbon dioxide emissions, in alignment with the program's directives. Alaska's unique transportation landscape, characterized by its vast expanse yet sparse population density (1.3 individuals per square mile), poses distinct challenges. Many Alaskan communities remain disconnected from the National Highway System, leading to limited road-based travel. Moreover, with 86% of communities dependent on non-highway travel modes, aviation emerges as a primary mode of transportation[1]. However, this strategy remains focused on on-road emissions, as mandated by the program.

Alaska's transportation energy infrastructure is diverse, with regions relying on varied energy sources, from coal and diesel to hydropower and natural gas. This diversity necessitates region-specific carbon reduction strategies. For instance, an electric vehicle powered by hydropower offers a more sustainable solution than one dependent on coal.

A comprehensive approach to carbon emissions in transportation considers both upstream (related to the production and transport of materials) and downstream (pertaining to the usage or disposal of materials) emissions[2]. Given Alaska's reliance on diverse transportation modes for goods shipment, upstream emissions are particularly significant[3]. While this strategy emphasizes potential carbon dioxide reductions from various transportation projects, a thorough evaluation of Alaska's upstream and downstream emissions within the sector remains a future objective.

The strategies outlined herein require regional assessments due to Alaska's varied energy profiles in transportation. For a detailed understanding, refer to Appendix: Emissions Calculations and 8.0 Measuring Progress: Emissions Calculations which provide example project calculations based on proposed changes in Alaskan transportation infrastructure.

The Carbon Reduction Program allocates funds to entities like the Alaska Department of Transportation and Public Facilities and Metropolitan Planning Organizations, based on

[1] Decarbonizing the critical sectors of aviation, shipping, road freight and industry to limit warming to 1.5–2°C

[2] Moving Low-Carbon Transportation in Xinjiang: Evidence from STIRPAT and Rigid Regression Models

[3] Future Power Train Solutions for Long-Haul Trucks ↩ ↩2

community size[4]. These entities are tasked with directing funds to transportation projects that mitigate on-road carbon dioxide emissions. However, this strategy does not impose any mandates on the public to participate in carbon reduction efforts.

Beyond its primary goal, this strategy envisions broader benefits for Alaska's transportation sector. It advocates for enhancements such as congestion relief, trail development for alternative transportation, traffic safety measures, advanced mass transit systems, and improved road visibility during winters[5]. Moreover, the strategy's emphasis on energy efficiency can significantly reduce transportation-related energy expenses, especially in regions with high energy costs[6]. While the primary objective remains carbon dioxide reduction, the ancillary benefits, such as safer transportation routes and reduced energy costs, might resonate more deeply with the Alaskan populace.

1.0 Introduction

The Alaska Department of Transportation and Public Facilities (DOT&PF) proudly presents this Carbon Reduction Strategy (CRS), crafted in alignment with the directives of the Bipartisan Infrastructure Law (BIL) and the Infrastructure Investment and Jobs Act (IIJA) of 2021, as detailed in 23 U.S. Code (U.S.C.) 175. This strategy is further shaped by the guidelines of the Carbon Reduction Program (CRP).

The Alaska Transportation CRS delineates a roadmap to curtail transportation-related carbon dioxide (CO2) emissions from on-road sources. It also highlights a suite of projects and strategies tailored for Alaska's unique transportation landscape. Key federal mandates that have informed this strategy include:

- Formulating the CRS within two years post the BIL's enactment.
- Periodic updates to the CRS at least every four years.
- Pinpointing and championing projects aimed at emission reduction.
- At the discretion of the State, quantify the total carbon emissions from production, transportation, and utilization of construction materials for transportation facilities.
- The CRS shall be appropriate to the population density and context of the state, including any designated Metropolitan Planning Organization (MPO).

The CRP's overarching objective is to channel funds towards projects that are at the forefront of reducing CO2 emissions from on-road transportation avenues. With an allocation of an estimated $81.6 million over the next five years under the CRP, Alaska is poised to make significant strides in this direction. In the Alaskan context, "on-road source" is an inclusive term that covers our terrestrial highways and our vital ferry routes via the Alaska Marine Highway System (AMHS).

CO2, a predominant greenhouse gas (GHG), has been identified as a major contributor to the global climate change crisis[7]. Its ability to trap solar radiation within the Earth's atmosphere has led to a cascading effect of global warming. This warming manifests in various forms, including rising sea levels, altered precipitation patterns, heightened drought and flood risks, and threats to biodiversity[8]. CO2 is predominantly released from burning fossil fuels, solid waste, and biological

[4] A Study on the Ship Energy Efficiency & GHG Emission Control in China ↩

[5] Future Power Train Solutions for Long-Haul Trucks
[6] Moving Low-Carbon Transportation in Xinjiang: Evidence from STIRPAT and Rigid Regression Models
[7] Can the bullet train speed up climate change mitigation in China
[8] Transportation and Greenhouse Gas Emissions Trading. Final Technical Report

materials. The planet's average surface temperature has surged by approximately two degrees Fahrenheit since the late 19th century, with increased CO2 emissions being a significant contributor[9]

This CRS encapsulates DOT&PF's commitment to curbing CO2 emissions through a blend of innovative projects, forward-thinking policies, incentives, and planning. The DOT&PF's ethos, "Keep Alaska Moving," resonates with the strategies detailed herein. Enhancing road networks, fostering active transportation connectivity, and other strategies underscore the synergy between Alaska's mobility and carbon reduction initiatives[10].

Implementation responsibilities are distributed across various entities:

- State and local governments oversee maintenance for their respective roads.
- Mass transit options are the responsibility of local governments.
- Procurement processes, encompassing construction contractors or equipment and materials, are managed by state and local governments.

The CRP appropriates funds for States and MPOs. The strategies outlined here are holistic, catering to any entity across Alaska that benefits from this funding. It's worth noting that while the Alaska Railroad Corporation (ARRC) operates outside the DOT&PF's domain and isn't a direct funding recipient, the CRP provides for flexing funds from Federal Highway Administration (FHWA) to Federal Transit Administration (FTA) to accommodate ARRC projects that could reduce CO2 emissions from railroad transportation, including transportation of passengers and freight[11]

1.1 Carbon Reduction Strategy Alignment and Funding

Alaska, with its unique geographical and climatic conditions, faces distinct challenges and opportunities in the realm of sustainable development and environmental conservation. The vast landscapes, sparse population distribution, and reliance on various modes of transportation necessitate a comprehensive approach to carbon reduction, especially in the transportation and waste management sectors[12].

Transportation Sector. Alaska's transportation system is characterized by its diverse and extensive network, which is vital to the state's connectivity and economy. This system encompasses terrestrial highways, a robust maritime industry including the Alaska Marine Highway System (AMHS) and the newly designated M-11 Marine Highway routes by the USDOT Maritime Administration (MARAD), alongside a critical aviation sector. The integration of these maritime routes, crucial for both commercial and personal transit, highlights the significance of comprehensive carbon reduction strategies in this sector. Moreover, the rise in motorized vehicles and the heavy reliance on aviation further emphasize the need for effective environmental measures. In Alaska, a region noted for its ecological sensitivity, the impact of GHG emissions, mainly CO2, CH4, and N2O, from the transportation sector is particularly consequential.

Solid Waste Sector. Given Alaska's remote communities and logistical challenges, solid waste management becomes a critical concern. Efficient waste management practices can significantly

[9] Can the bullet train speed up climate change mitigation in China
[10] Effect of Community Road Infrastructure, Socio-Demographic and Street Pattern in Promoting Walking as Sustainable Transportation Mode
[11] A Holistic Approach for Estimating Carbon Emissions of Road and Rail Transport Systems
[12] Greenhouse Gas Emission Reduction Strategies in the Transportation and Solid Waste Sector

reduce GHG emissions, especially methane, produced during the decomposition of organic waste in landfills.

Mitigation Strategies. For Alaska to address these challenges, a multi-faceted approach is essential. Adopting methods that inventory and project GHG emission loads can provide a clear roadmap for the future. Furthermore, leveraging tools like SWOT and QSPM analysis can help Alaska determine the most effective reduction strategies tailored to its unique conditions. For instance, promoting green open spaces and non-motorized pathways in urban areas like Anchorage or Juneau can reduce the carbon footprint. In remote communities, strategies could focus on efficient waste management practices and alternative energy sources for transportation.

1.1.1 DOT&PF's Sustainable Transportation and Energy Program

The Department of Transportation and Public Facilities (DOT&PF) has initiated the Sustainable Transportation and Energy Program (STEP) to bolster the Carbon Reduction Strategy (CRS). STEP outlines a series of projects and programs that embody Alaska's commitment to a multi-modal and sustainable transportation system. The objective of STEP is to enable communities to thrive through transportation investments that promote reduced GHG emissions, energy independence, efficiency, low-cost transportation, and a healthy environment.

Funding for STEP is sourced from various programs, including the Carbon Reduction Program (CRP), National Electric Vehicle Infrastructure (NEVI) Formula Program, the Low-No Emissions Vehicle Program, and the Congestion Mitigation and Air Quality Improvement (CMAQ). Additionally, discretionary grant programs are tapped into as they become available. While each of these programs has its unique requirements and focus, they collectively converge to fulfill the overarching objectives of STEP.

1.1.2 Sustainable Transportation and Energy Program (STEP) Funding Programs Outside of the Carbon Reduction Program

National Electric Vehicle Infrastructure Formula Program (NEVI). The NEVI program is established under the BIL and provides funding for strategic deployment of electric vehicle charging infrastructure to incentivize adoption and use of zero-emission vehicles. The program is formula-funded through FHWA. NEVI also provides funding to establish an interconnected network to facilitate data collection, access, and reliability in transportation systems[13]. Further detail on the NEVI program in Alaska is provided in 6.2 Electric Vehicles in Alaska.

Low-No Emission Vehicle Program. The Low-No Emissions Vehicle Program provides funding to state and local government transportation agencies for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities. The Low- No Emission Vehicle Program is an FTA grant award program.

Congestion Mitigation and Air Quality Improvement (CMAQ). CMAQ is an ongoing FHWA program that provides funding for transportation projects and programs that help meet the requirements of the Clean Air Act and its amendments. Unlike the CRP, which targets reduction of GHG emissions (specifically CO2), CMAQ targets reduction in criteria air pollutants, which are different environmental considerations than GHG5. While GHG and criteria air pollutants considerations are not the same, often a reduction of one will result in a beneficial reduction of

[13] To find out more, please read the Alaska Energy Authority's Alaska Electric Vehicle Infrastructure Deployment Plan found at: https://www.akenergyauthority.org/Portals/0/Electric%20Vehicles/2022.07.29%20State%20of%20Alaska%20NEVI%20Plan%20(Final).pdf?ver=2022-06-29-152835-320

the other (e.g., a reduction in transportation emissions reduces both GHG CO2 and criteria air pollutant carbon monoxide). Eligible projects under CMAQ include electric vehicles and charging stations, diesel engine replacements and retrofits, transit improvements, pedestrian and bicycle facilities, and shared micro-mobility projects (e.g., shared electric scooter systems). CMAQ projects provide a dual benefit by both reducing congestion related emissions and improving equitable access, safety, and use of new and emerging technology.

1.2 Integration of the Carbon Reduction Strategy with DOT&PF's Comprehensive Planning Framework

The Carbon Reduction Strategy (CRS) seamlessly integrates into the DOT&PF's holistic planning framework, often referred to as the "Family of Plans." This framework comprises a series of transportation blueprints that direct the State's endeavors in formulating policies, initiating programs, and launching projects. The aim is to perpetually enhance Alaska's transportation infrastructure. The "Family of Plans" is structured into three distinct tiers.

Tier I: Statewide Long-Range Transportation Plan (LRTP). The prevailing LRTP, titled "Let's Keep Moving 2036," sets the strategic direction for the state's transportation future. A subsequent draft, "Alaska Moves 2050," is currently under development by DOT&PF. The LRTP serves as the foundational plan, detailing the goals, policies, and actions aligned with federal and state regulations, including the 23 Code of Federal Regulations Section 450.216 and Title 17 of the Alaska Administrative Code, Section 05.120.

Tier II: Strategic Investment Plan (SIP). Operating in synergy with the LRTP, the SIP's primary function is to spotlight pivotal transportation system enhancements. It empowers DOT&PF to allocate funds for projects through the Statewide Transportation Improvement Program (STIP).

Tier III: **Modal and System Plans**. These plans delve into specific transportation systems, focusing on distinct modes or subjects, such as carbon reduction. The CRS is categorized under this tier, offering a strategic roadmap to achieve the overarching goal of diminishing carbon emissions.

Tier III: **Collaborative Transportation Plans**. This subset encompasses plans crafted through collaborative efforts between DOT&PF, governmental bodies, local communities, and tribal entities. Examples include city government LRTPs, community blueprints, and tribal transportation strategies.

Every plan within the "Family of Plans," irrespective of its tier, should resonate with the objectives, policies, and actions articulated in the statewide LRTP (Tier I). Specifically for the CRS, the draft "Sustainability in Alaska Moves 2050" advocates for a dedicated action to "analyze emission hotspots statewide, discern root causes, and identify impactful countermeasures to curtail carbon emissions." The CRS embodies the initial step in realizing this action, propelling Alaska towards a transportation future that is sustainable, environmentally conscious, and equitable.

1.3 Carbon Reduction Program-Eligible Projects

Eligible projects for funding under the Carbon Reduction Program (CRP) are delineated in 23 U.S.C. Part 175. These projects also encompass those described in established programs like CMAQ (Section 149(b)(4), Sections 142, 101(a)(29), 503(c)(4E)).

Table 1: FHWA Carbon Reduction Program Eligible Projects

Congestion Mitigation and Air Quality Improvement	As described in section 149(b)(4).
Public Transportation	Projects eligible for assistance under Section 142.
Pedestrian and Bicyclist Infrastructure	Projects detailed in Section 101(a)(29) which include construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized transportation modes.
Advanced Transportation Technologies	Projects as per Section 503(c)(4)(E) focusing on advanced transportation and congestion management technologies.
Intelligent Transportation Systems	• Deployment of infrastructure-based intelligent transportation systems capital improvements. • Installation of vehicle-to-infrastructure communications equipment, including retrofitting DSRC technology deployed in existing pilot programs to C–V2X technology.
Energy Efficiency	Replacement of street lighting and traffic control devices with energy-efficient alternatives.
Carbon Reduction Strategy Development	Development in accordance with subsection (d).
Demand Management	Projects or strategies supporting congestion pricing, shifting transportation demand to nonpeak hours, increasing vehicle occupancy rates, or reducing road demand, including electronic toll collection and travel demand management strategies.
Freight Movement	Efforts to minimize environmental and community impacts.
Alternative-Fuel Vehicles	• Support for deployment, including acquisition, installation, or operation of publicly accessible electric vehicle charging infrastructure or hydrogen, natural gas, or propane fueling infrastructure. • Purchase or lease of zero-emission construction equipment and vehicles, including supporting facilities.
Diesel Engine Retrofit	As described in section 149(b)(8).
Emission Reduction	Projects as per section 149(b)(5) that don't involve new capacity construction.
Port Facilities	Projects reducing transportation emissions, including advancement of port electrification.

1.4 Funding Apportionment

The FHWA provides a consolidated sum to each state, which is then distributed among various programs. The allocation for the CRP is determined by the percentages outlined in 23 U.S.C.175(e)(1)(A) and 23 U.S.C. 175(e)(1)(B). DOT&PF is mandated to distribute 65 percent of these funds to urbanized regions based on their population density. Of the total $81.6 million designated for Alaska, about 35 percent is allocated to MPOs. MPOs cater to urban areas with populations exceeding 50,000. In contrast, regions with populations under 50,000 are allotted roughly 30 percent of the urbanized area funds, with the exact amount based on population

density (as depicted in Figure 3). DOT&PF retains the discretion to distribute the residual 35 percent of funds across the state. Transferring funds to FTA projects is permissible and at the state's discretion. States are advised to commit CRP funds, either independently or combined with other eligible U.S. Department of Transportation funds, to projects that align with the strategies of this CRS. Additionally, a state can reallocate up to 50% of its annual funds between its various allocations, including programs like NHPP, STBG, HSIP, CMAQ, NHFP, and the PROTECT Formula Program.

Table 2. Carbon Reduction Program Summary of Available Funds for Alaska Fiscal Years (FY) 2022 to 2026

Urbanized Areas	**Population Range**	**FY 2022-2026**[14]
Metropolitan Planning Organizations (Anchorage Metropolitan Area Transportation Solutions and Fairbanks Area Surface Transportation)	Greater than 50,000	$29.0 million
Small Urban and Rural Areas	Less than 50,000	$24.0 million
Statewide	Any	$28.6 million
Total	Statewide	$81.6 million[15]

2.0 Carbon Reduction Strategy Development

The formulation of a Carbon Reduction Strategy (CRS) in the transportation sector is a pivotal step towards achieving sustainable and low-carbon transportation systems. As observed in various global industries, the proactive involvement of specific sectors in crafting and executing carbon reduction policies can lead to substantial emission reductions. In the transportation domain, a well-structured CRS can harness the potential of digital technologies, government policies, and industry innovations to foster green practices and reduce carbon footprints[16]. This section delves into the requirements, goals, and collaborative efforts essential for crafting a robust CRS that aligns with global sustainability objectives.

2.1 Requirements and Objectives of the Carbon Reduction Strategy

Pursuant to the Bipartisan Infrastructure Law (BIL), every state, in collaboration with designated Metropolitan Planning Organizations (MPOs), is mandated to formulate a Carbon Reduction Strategy (CRS) within two years following the enactment of 23 U.S.C. 175 on November 15, 2021. Subsequent updates to this strategy are expected every four years, with MPOs playing a consultative role. A comprehensive list of CRS prerequisites, as detailed in the Carbon Reduction Program (CRP), along with the specific measures taken to fulfill each requirement, is available in Appendix C. The CRS, as delineated in 23 U.S.C. 175(d), sets forth the primary objectives and requirements of such a strategy.

[14] All dollar amounts are estimates and are subject to change.
[15] Local match is required. Federal aid requirements for project delivery apply.
[16] Government Low-Carbon Policies Optimization for Smart Transportation Enterprises

2.2 Engaging with Metropolitan Planning Organizations

The project team engaged in consultations with Alaska's two primary MPOs: Fairbanks Area Surface Transportation (FAST) Planning and Anchorage Metropolitan Area Transportation Solutions (AMATS). Additionally, discussions were held with a prospective MPO: Matanuska-Susitna (Mat-Su) Valley Planning (MVP).

Engagements with FAST Planning included sessions with the Staff and Technical Advisory Committee on May 3, 2023, and the Policy Board on May 17, 2023. Post these consultations, FAST Planning proposed actionable on-road CO2 emission reduction initiatives and offered recommendations for their integration into the CRS. Some of these suggestions encompassed:

- Incorporation of alternative vehicle charging stations.
- Signal interconnect projects to enhance traffic flow.
- Promotion of transit usage and accessibility.
- Development of quantifiable metrics to evaluate air quality enhancements.
- Integration of roundabouts.
- Strategies to minimize traffic start and stop.

Conversations with AMATS spanned multiple committees throughout July and August 2023. While AMATS couldn't provide formal recommendations within the stipulated timeframe, they expressed their intent to do so before the CRS undergoes review and approval by the FHWA. The discussions revolved around carbon emission mitigation strategies, emphasizing reduced congestion, promotion of transit and active transportation, curbing individual vehicle miles, and encouraging the adoption of zero-emission vehicles. AMATS highlighted the success of their vanpooling initiative in curbing single-occupancy vehicle trips. Detailed meeting materials and summaries are archived in Appendix: Public Engagement

The draft CRS was shared with both FAST and AMATS on September 5, 2023, for their review and feedback. All received comments and suggestions were integrated into the final CRS, with formal feedback documented in Appendix: Public Engagement.

2.3 Stakeholder Engagement in CRS Development

The development of the Carbon Reduction Strategy (CRS) places a significant emphasis on inclusive stakeholder engagement. Recognizing the importance of public participation, DOT&PF launched an interactive StoryMap on its official website. This digital tool provides a comprehensive overview of the CRS's background, contextualizes its relevance to Alaska, and offers a platform for stakeholders to share their perspectives on carbon reduction measures through an online survey and the Smart Comment portal.

Our collaboration with Metropolitan Planning Organizations (MPOs) has been instrumental in broadening the outreach of the StoryMap. By sharing it with their networks, MPOs have encouraged a diverse range of stakeholders to provide feedback. All insights and suggestions gathered from these MPO sessions were meticulously assessed to ascertain their suitability for incorporation into the CRS. A comprehensive record of these engagements, including the feedback received, is documented in Appendix: Public Engagement.

Even after the plan is approved, the public will have consistent opportunities to engage in discussions on future carbon reduction initiatives, as highlighted in the Statewide Transportation Improvement Program (STIP), MPO Transportation Improvement Programs (TIPs), and other forthcoming planning endeavors. It's essential to highlight that the CRS is not a static document; it will undergo periodic reviews and updates, at least every four years, to ensure it remains aligned with evolving needs and best practices.

3.0 Alaska's Transportation Setting

Alaska, with its vast landscapes and unique geographical challenges, has a transportation system that is distinct from most other regions. The state's expansive area, combined with its remote and often inaccessible communities, necessitates a diverse mix of transportation modes. A significant portion, about 86%, of Alaskan communities are isolated, with no direct road access. The state's transportation matrix comprises roads and highways, which transform into winter trails and ice roads during colder months, ports and waterways, aviation, rail, and other innovative modes (Figure 6). The available infrastructure largely dictates transportation choices within each region.

Roads and highways, while essential, cover only a fraction of Alaska's vast expanse. DOT&PF oversees thousands of lane miles, but many communities remain unconnected by road. Instead, they rely on alternative modes of transportation, such as aviation and marine routes. Alaska boasts an extensive aviation system, with hundreds of registered airports, heliports, and seaplane bases. Given that over 80% of Alaskan communities are not connected by roads, air travel is not just a convenience but a necessity for many residents.

The Alaska Marine Highway System (AMHS) is another critical component of the state's transportation network, connecting numerous coastal communities. Only a handful of these communities are accessible by Alaska's road system, underscoring the importance of marine transportation.

Rail transportation, primarily through the Alaska Railroad, offers both passenger and freight services, connecting key regions from Fairbanks to Seward. Active transportation, such as walking and cycling, is also gaining traction, especially in urban areas. However, in many rural communities, these modes have always been essential.

Considering carbon emissions, the diverse transportation modes present both challenges and opportunities. The reliance on aviation and marine transport, while essential for connectivity, can contribute significantly to the state's carbon footprint. However, the increasing interest in active transportation and the potential for innovations in sustainable aviation and marine technologies offer pathways to reduce emissions.

Incorporating sustainability practices into Alaska's transportation system is crucial. As the global community moves towards more eco-friendly practices, understanding and optimizing the carbon emissions from Alaska's transportation sector will be pivotal. This will not only help in reducing the state's carbon footprint but also in ensuring that its unique transportation needs are met in the most sustainable way possible.

Table 3: Transportation Summary by Mode

Roads and Highways	DOT&PF manages 11,843 lane miles throughout Alaska. Road networks span from Unalaska Island in the southwest to Utqiaġvik in the north, including paved and gravel roads, elevated boardwalks, and winter trails. The interstate highway system, while extensive, often consists of two-lane non-divided highways. Major urban networks are in Anchorage, Matanuska-Susitna Borough, Fairbanks North Star Borough, Kenai Peninsula Borough, and Juneau City and Borough.
Active Transportation	Active transportation, encompassing walking and cycling, is gaining traction in Alaska. While facilities for pedestrians and cyclists often coexist with the road network, there's a growing emphasis on integrating sidewalks, multi-use pathways, and bike lanes into new roadway projects, especially in urban areas. Both urban and rural communities in Alaska are witnessing a surge in interest in active transportation.

Aviation	Alaska boasts an extensive aviation network, arguably the largest in North America, with 765 registered facilities in 2021. DOT&PF has jurisdiction over 235 state airports, including two international airports in Anchorage and Fairbanks. Given that over 80% of Alaskan communities lack road connectivity, aviation plays a pivotal role, akin to roads in other states, ensuring the movement of goods and people.
Alaska Marine Highway System (AMHS)	The AMHS, covering 3,500 miles of coastline, connects 33 Alaskan communities and extends to Prince Rupert, British Columbia, and Bellingham, Washington. Only a handful of these communities have road access. The system operates with nine active ferries.
Rail	The Alaska Railroad mirrors the interstate highway system in its trajectory, spanning 482 miles from Fairbanks to Seward. It offers year-round passenger services and freight services, linking major port facilities and transportation hubs.
Transit	Public transit is not ubiquitous in Alaska. Where available, local governments manage it. Funding remains a challenge, with few transit systems having a dedicated source.
Ports and Waterways	Ports and waterways are vital for freight, passenger movement, and tourism. They also serve as lifelines for many remote Alaskan communities. While deepwater coastal ports handle the bulk of waterborne freight, inland waterways, facilitated by ports on rivers like the Yukon, Kuskokwim, and Tanana, are essential for smaller communities.
Other Modes	Alaska employs a variety of transportation modes, including ice roads in winter, board roads in remote communities, an extensive trail network, and winter trails connecting distant communities.
Other Facilities	DOT&PF's jurisdiction extends beyond transportation, overseeing 80 maintenance stations, 16 harbors, 851 bridges, a fleet of 7,366 state equipment and vehicles, 827 public facilities, nine weigh stations, and three tunnels, including the Anton Anderson Memorial Tunnel, North America's longest highway tunnel.

4.0 Emissions in Alaska

Alaska's emissions profile is shaped by its unique geography, climate, and economic activities. The state's emissions are presented in millions of metric tons of CO2 equivalency (MMT CO2e), encompassing CO2, CH4, and other greenhouse gases.

4.1 CO2 Emissions in Alaska

According to the U.S Energy Information Administration (EIA), as of 2021, Alaska ranked 39th nationwide in terms of CO2 emissions. Despite this, Alaska stands out as the leading state in the U.S for per capita total energy consumption and expenditures. This high ranking can be attributed to Alaska's heavy reliance on air travel, its challenging climate, and the vast distances that need to be covered for transportation.

The primary sources for baseline CO2 emissions data in Alaska are:

U.S Energy Information Administration (EIA): Provides up-to-date CO2 emissions data as of 2021. The EIA database encompasses GHG emissions, with a specific focus on CO2 emissions across all sectors.

Alaska Department of Environmental Conservation Report: Offers data on GHG emissions up to 2018, though not exclusively on CO2 emissions. This report details transportation GHG emissions, differentiating between on-road and off-road sources in Alaska.

The Alaska Department of Environmental Conservation (ADEC), Division of Air Quality, has compiled the "Alaska Greenhouse Gas Emissions Inventory 1990-2020". This report indicates that CO2 emissions in Alaska originate from various sectors, including electricity generation, residential and commercial activities, industry, transportation, waste decomposition, agriculture, and the disruption of emission sinks. Figure 1 includes the latest data from the Environmental Protection Agency (EPA) and depicts the percentage distribution of CO2 emissions by sector. The industrial sector, which comprises oil and gas, mining, waste management, and agriculture, is the most significant contributor, accounting for 48.9% of emissions. Transportation follows closely, contributing to 33 percent of Alaska's CO2 emissions, making it the second-highest emitting economic sector.

4.1.1 Alaska Emissions Compared to National Trends

Alaska's greenhouse gas (GHG) emissions profile is distinct due to its unique geographical, environmental, and economic conditions. According to the Energy Information Administration (EIA), based on total energy-related CO2 emissions for 2020, Alaska was ranked 41st in emissions among states. In 2020, Alaska's total CO2 emissions were reported at 33.4 million metric tons (MMT), an increase from previous years but still lower than the peak of 45.4 MMT in 2005. On a per capita basis, Alaska ranks fourth highest in the nation, and second for total energy expenditures[1]. This ranking has remained consistent since 2015. The EIA attributes this to factors such as Alaska's Arctic environment, which results in long and harsh winters, and its economy's reliance on oil and natural gas extraction[1].

Furthermore, Alaska's total yearly CO2 emissions rank 41st out of the fifty states and Puerto Rico, with 35.2 million tons recorded for 2019. In comparison, states with larger populations and economies, such as Texas and California, recorded emissions of 701.9 MMT and 363 MMT, respectively.

On a broader scale, Alaska's GHG emissions for 2020 constituted approximately 0.66% of the total nationwide GHG emissions. When considering global anthropogenic GHG emissions, which account for 36.44 billion tons per year (TPY), Alaska contributes a mere 0.000092672% of CO2e to these global emissions.

Despite Alaska's relatively minor role in overall national and global greenhouse gas emissions, the state stands out for its high per capita emissions. This contrast is deeply rooted in Alaska's distinctive context. On one hand, its small population size typically leads to a lower total emissions output. However, Alaska's vast and rugged Arctic environment significantly elevates per capita energy and fuel needs, especially during prolonged, harsh winters. Furthermore, the state's prominent oil and natural gas industry, a major contributor to its economy, also adds substantially to its per capita emissions. Thus, Alaska's unique combination of a low population, an energy-intensive climate, and a major fossil fuel industry culminates in its high per capita emissions despite its smaller overall emissions contribution.

On a national scale, the U.S. transportation sector is the largest contributor to greenhouse gas emissions, primarily driven by road vehicles like cars and trucks. However, Alaska's transportation emissions profile is distinct due to its heavy reliance on aviation and marine transportation. While

road vehicles dominate the transportation emissions in the contiguous U.S., Alaska's vast landscapes and limited road networks necessitate a more diverse transportation mix. While Alaska's transportation emissions trends reflect its unique geographical and infrastructural challenges, its contribution to the nation's overall transportation emissions is relatively small.

4.1.2 Alaska Emissions by Sector

Alaska's emissions trajectory over the past thirty years presents a complex interplay of variables, influenced by infrastructure, technology, and resource utilization. The electrical generation sector reveals patterns of fuel combustion efficiency and technology adaptation, with coal combustion emissions indicating potential areas for technological intervention since 2013. The oil and gas sector's emissions data, juxtaposed with production metrics, offers insights into extraction and refining efficiencies. In transportation, the consistency of gasoline highway vehicle emissions, contrasted with the rise in diesel emissions, points to vehicular technology trends and fuel consumption patterns. The residential sector's data, particularly the spike in natural gas use, suggests infrastructural developments and shifts in energy consumption methodologies. Meanwhile, the agriculture and waste sectors underscore the engineering challenges and opportunities in waste management and sustainable farming practices. The role of emission sinks, from an engineering lens, emphasizes the importance of ecological infrastructure in carbon sequestration. Collectively, this analysis underscores the need for innovative engineering solutions to optimize resource utilization, enhance efficiency, and mitigate environmental impacts in Alaska's future.

Electrical Generation. In the realm of electrical generation, there has been a noticeable plateauing and slow decline in emissions from three of the four fuel combustion types since 1990. However, coal combustion emissions have seen an uptick since 2013. On the other hand, emissions from petroleum distillate (diesel) have slightly tapered off in the last two years of the reporting period, and natural gas emissions have consistently declined since their peak in 2012.

Oil and Gas. The oil and gas sector has witnessed a decrease in emissions between 1990 and 2020, primarily attributed to the decline in crude oil production and refining. Specifically, CH4 emissions from oil production have declined by 0.325 MMT in the last five years. In contrast, natural gas production emissions saw a minor increase between 2017 and 2019 before decreasing by 0.134 MMT.

Transportation. Transportation emissions have shown varied trends. Gasoline highway vehicles' emissions have remained consistent over the past three decades, with a slight uptick to over two million TPY of CO2e by 2018. Diesel highway vehicles have seen a steady increase in emissions since 1990, culminating just below 800,000 TPY of CO2e by the end of the analysis period. Off-road vehicle emissions, which include aviation and marine sources, peaked in the mid to late 2000s but have experienced a slight decline in recent years. When examining on-road vehicle emissions trends from 1990 to 2018, emissions from gasoline highway vehicles have remained relatively consistent, with a slight increase to over two million tons per year (TPY) of CO2e by 2018. Passenger vehicle emissions have also seen an increase, reaching over 1.33 million TPY since 1990.

Residential and Commercial. The residential sector has shown interesting trends. Statewide residential emissions have largely remained stable since 2013. However, there was a significant increase in residential natural gas use between 2019 and 2020, leading to a rise in emissions by 430,000 tons of CO2e since 1990. This increase is noteworthy, especially considering the state's population grew by 181,000 during the same period.

Agriculture and Waste. Agriculture and waste sectors also contribute to the state's emissions. Agriculture produces GHGs through mechanisms like fertilizer converting to nitrous oxide and

decomposition from agricultural waste that produces methane. Waste decomposition, especially anaerobic decomposition of waste food, can release methane.

Emission Sinks. Lastly, emission sinks or reservoirs play a crucial role in the state's emissions profile. These are areas where carbon is removed from the atmosphere and sequestered. While wildfires produce CO2, N2O, and CH4, the gases from wildfires are often absorbed by more productive recolonized vegetation.

Summary. Understanding Alaska's emissions trends over the past three decades is pivotal for shaping future policies and strategies. These trends reflect the state's evolving economic activities, technological advancements, and policy measures. While some sectors have seen increases in emissions, others have witnessed declines, emphasizing the need for a comprehensive approach to achieve broader environmental and sustainability goals.

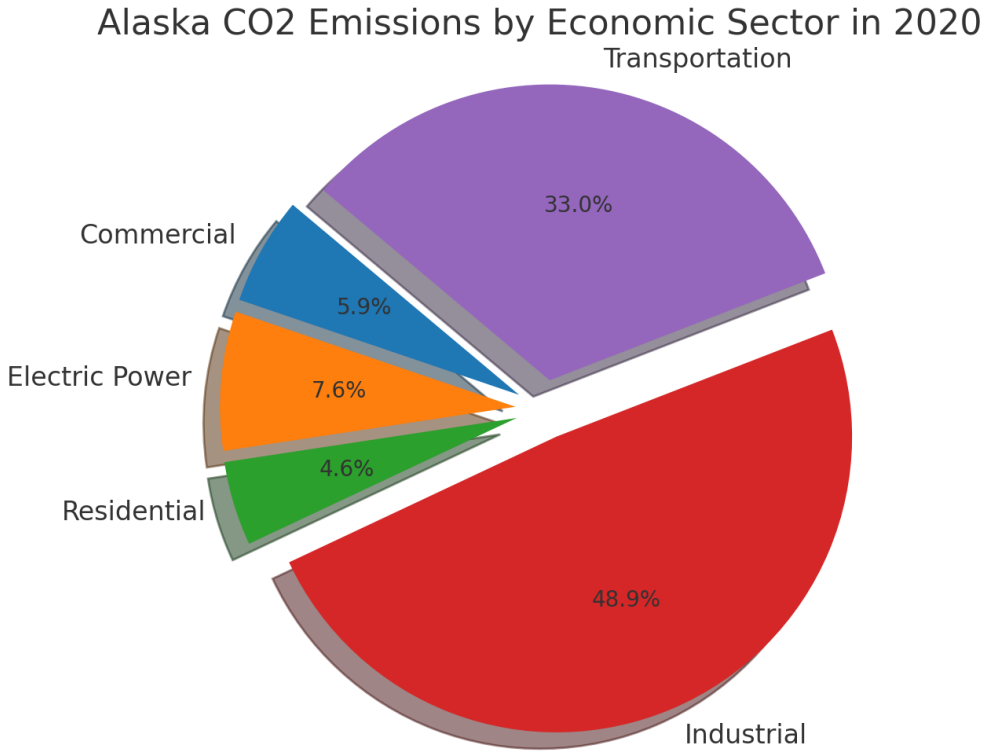

Figure 1: Alaska CO2 Emissions by Economic Sector in 2020

4.2 Transportation GHG Emissions in Alaska

Alaska's unique geographical and climatic conditions have shaped its transportation infrastructure and, consequently, its greenhouse gas (GHG) emissions profile. The state's reliance on various modes of transportation, both on-road and off-road, has implications for its carbon footprint. The primary contributors to the state's transportation emissions are aviation, marine vessels, and on-road vehicle traffic.

4.3 Trends in Alaska Emissions

Electrical Generation: Emissions from electrical generation, especially from natural gas and coal, are significant. The shift in electrical generation methods (such as increased use of

renewable energy) could indirectly affect transportation emissions, particularly if electric vehicles become more prevalent.

Natural Gas and Coal Emissions: Trends in these sectors show fluctuations over the years. Reductions in natural gas emissions and increased coal usage in certain areas might impact transportation policies and fuel usage patterns in Alaska.

Petroleum Distillate (Diesel) Emissions: Diesel is a key fuel for transportation, and the document notes that diesel-fired electrical generation trends have remained stable. Rural Alaska, in particular, relies heavily on diesel due to logistical challenges, which could be indicative of diesel usage trends in transportation.

Oil and Gas Facilities: The emissions from these facilities can be a proxy for understanding the broader energy landscape in Alaska, which indirectly impacts transportation fuels availability and usage patterns.

Aviation Emissions. The aviation industry in Alaska is extensive, serving both large urban centers and smaller remote communities. Major air hubs are situated in Anchorage, Fairbanks, Juneau, and Ketchikan. Notably, the Ted Stevens-Anchorage International Airport has emerged as a significant cargo hub for trans-Pacific air freight, while Fairbanks stands as the primary cargo and passenger hub for Interior Alaska. Both these cities also accommodate active military air bases. Furthermore, the state's vast network of single and two-engine light aircraft highlights the importance of air travel in connecting its remote regions. Emissions from this sector peaked at nearly 14 MMT in the mid-2000s but saw a decline to less than eight MMT by 2018.

Maritime Emissions. Alaska boasts a robust marine industry, which plays a pivotal role in connecting its communities to trans-Pacific trade routes and markets in the contiguous United States. The state has also become a sought-after destination for the international cruise industry, especially during the warmer months. Additionally, Alaska's fishing industry, operating year-round across regions like the Gulf of Alaska, Bering Sea, and North Pacific Ocean, is a testament to its marine significance. However, it's crucial to note that international shipping routes traversing federal or state waters are not represented in the State GHG Inventory Tool (SIT) and, as such, are excluded from this document. Maritime emissions, which aren't differentiated by vessel type in the ADEC report, have remained relatively stable since 2009, fluctuating between 50,000 and 100,000 metric tons annually.

On-Road Emissions. On the road, Alaska's transportation is somewhat limited, with the primary activity centered on the Alaska Highway, linking the Kenai Peninsula, Fairbanks, and the Alcan Highway border crossing into the Yukon Territory. Many of Alaska's remote communities outside the 'Railbelt and Roadbelt' areas have sparse intercity road connections. As a result, residents in regions like Western and Northern Alaska often turn to off-road vehicles, complemented by personal marine and aviation traffic.

The ADEC report, which categorizes emissions by CO2 equivalent (CO2e), provides a detailed breakdown of on-road vehicle emissions up to 2018. This category encompasses passenger vehicles, light-duty trucks, and diesel highway emissions. The emissions from highway vehicles are calculated using Vehicle Miles Traveled (VMT) averages. This tool also factors in the average vehicle age to produce a comprehensive statewide emissions profile. Notably, despite Alaska's declining population, passenger vehicle emissions reached 1.4 MMT in 2018, the highest since 1990. This suggests a potential shift in vehicle usage patterns, or the types of vehicles being

used. Light-duty trucks, which include SUVs and personal pick-up trucks, contributed approximately 0.5 MMT in the same year. Diesel highway emissions, which have seen a steady increase since the 1990s, registered 0.8 MMT in 2018.

Rail. Lastly, when it comes to railroads, Alaska's network is relatively limited. The Alaska Railway (AKRR) connects Seward and Fairbanks, while the smaller White Pass and Yukon Railway (WPYRR) operates between Skagway and Carcross in the Yukon Territory. In essence, Alaska's diverse transportation sector, shaped by its geographical challenges and remote communities, underscores the importance of understanding its emissions profile to meet broader environmental objectives. Locomotive emissions, while minimal, range between 7,000 and 37,200 metric tons annually.

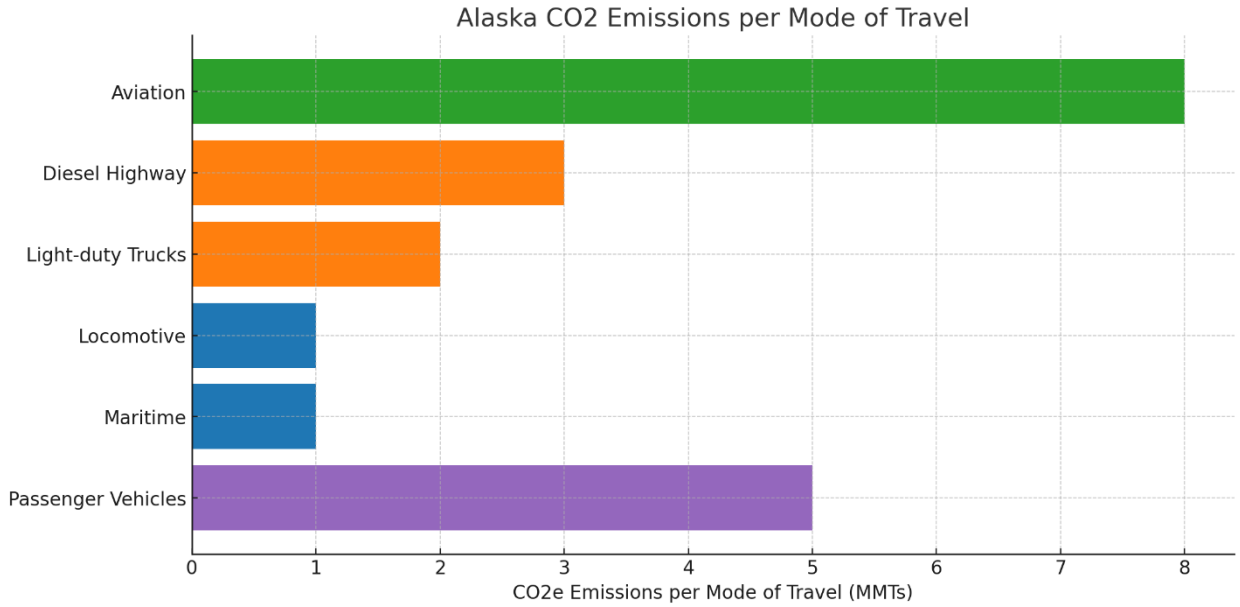

Figure 2: Alaska CO2e Emissions per Mode of Travel (MMTs)

Comparative Analysis and Insights. When juxtaposed, aviation's contribution to GHG emissions in Alaska is striking, with nearly 8 MMT, while all on-road sources combined account for less than 3 MMT. This highlights Alaska's unique transportation dynamics, where air travel often serves as the primary mode of inter-community connectivity due to its vast and challenging terrains. Alaska's transportation emissions profile underscores the need for targeted interventions and strategies. While the state's unique geographical and climatic conditions present challenges, they also offer opportunities for innovative solutions to reduce its carbon footprint.

5.0 Alaska's Energy Production

Alaska's energy infrastructure, as depicted in Figure 3, is a complex amalgamation of diverse energy sources, including natural gas, coal, petroleum, hydroelectric, wind, solar, biomass, and battery storage. Energy Information Administration (EIA) data indicates that natural gas is the predominant energy source for electricity generation in Alaska, with a monthly consumption of 245,000 MWh. Hydroelectric follows at 87,000 MWh, petroleum at 85,000 MWh, coal at 59,000 MWh, and non-hydroelectric renewables at 17,000 MWh.

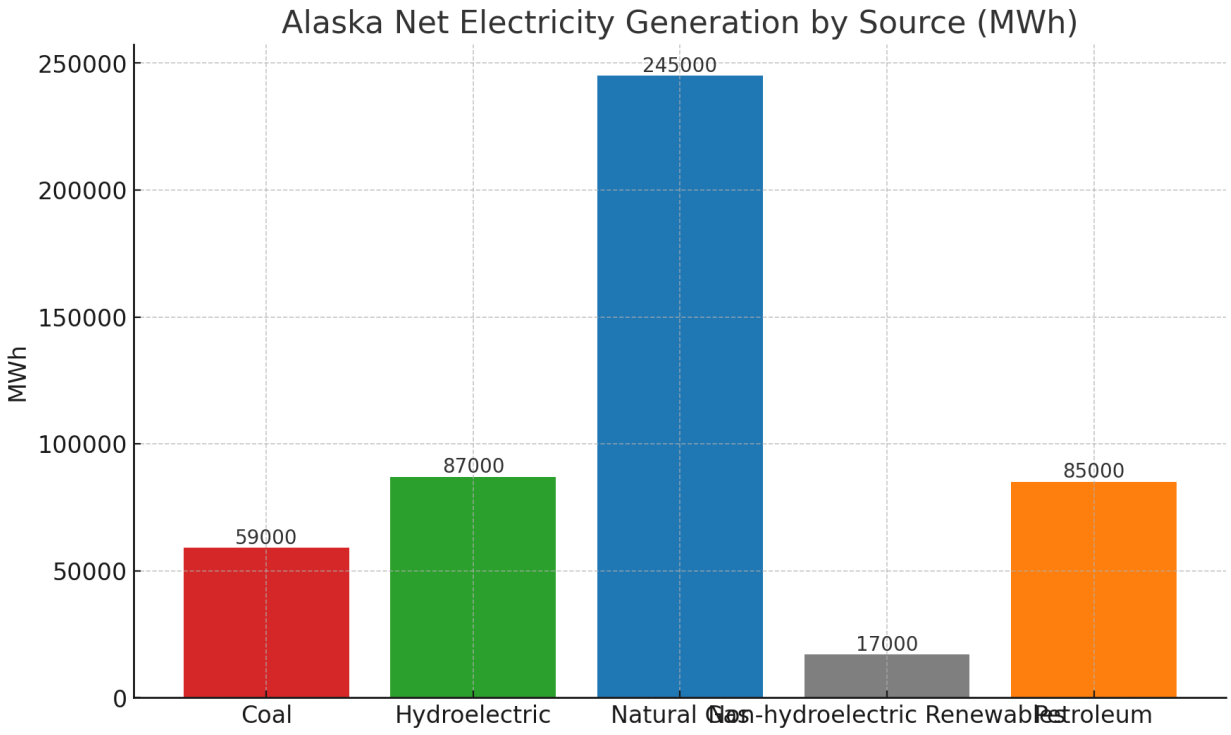

Figure 3: Alaska Net Electricity Generation by Source (MWh)

The state's energy grid is supported by 151 generation facilities. These facilities not only power residential and commercial establishments but also play a pivotal role in transportation infrastructure, such as lighting and charging stations. This interconnectedness implies that any shift in energy production directly impacts the transportation sector's CO2 emissions.

In rural Alaska, the energy matrix is predominantly petroleum-based. However, urban centers like Anchorage and the Kenai Peninsula predominantly utilize natural gas. Hydroelectricity complements natural gas in Southcentral Alaska and is the primary energy source in Southeast Alaska. The Interior Alaska region, on the other hand, relies on coal and petroleum. Non-hydroelectric renewables are interspersed across the state, indicating potential areas for expansion.

5.1 Fossil Fuel Energy Sources

In Alaska, natural gas is a dominant energy source for electricity generation, and the state boasts the third-largest natural gas reserves in the nation. Coal remains a significant energy contributor, though its emissions have increased since 2013. Meanwhile, despite a decline in crude oil production and refining leading to reduced emissions since 1990, rural Alaskan communities continue to depend heavily on petroleum-based energy.

Table 4: Alaska Fossil Fuel Energy Sources

Natural Gas	Natural gas stands out as a primary source of energy for electricity generation in Alaska. The Energy Information Administration (EIA) reports that natural gas consumption for electricity generation in the state is approximately 245,000 megawatt hours (MWh) monthly[17]. Alaska's proven natural gas reserves rank third among the states, showcasing its vast potential as a domestic energy

[17] EIA

	source[18]. The state is also in the process of developing an 800-mile pipeline to transport the North Slope's natural gas to international markets, with potential spur pipelines to supply natural gas energy to communities along its route.
Coal	Coal combustion has been a significant contributor to Alaska's energy production. There has been an uptick in coal combustion emissions since 2013.
Oil and Petroleum	The decline in crude oil production and refining has led to a decrease in emissions from the oil and gas sector between 1990 and 2020. However, rural Alaska primarily relies on petroleum-based energy sources.

5.2 Renewable Energy Sources

Alaska's strategic position as an energy-rich state is evident. Beyond the current infrastructure, the state is actively exploring innovative energy sources to enhance efficiency and reduce costs, especially for its remote communities. The state's vision is to provide affordable energy, targeting 10 cents power for all Alaskans by 2030. This vision is backed by initiatives in tidal energy, geothermal energy, nuclear microreactors, wind, solar, and natural gas.

Tidal energy, leveraging Alaska's extensive coastline, especially the kinetic energy from Cook Inlet's tides, offers a promising renewable energy source. Geothermal energy, tapping into Alaska's 97 thermal springs, provides a consistent energy source, unaffected by weather variations. The recent legislative update in 2022, facilitating the siting of nuclear microreactors, showcases the state's forward-thinking approach to harnessing nuclear energy. Wind and solar, though currently contributing a minor fraction to the state's energy grid, have vast potential, especially with the Alaska Energy Authority's (AEA) backing. Natural gas, with Alaska ranking third in proven reserves, remains a cornerstone of the state's energy strategy, with ambitious projects like the 800-mile pipeline underway.

Table 5: Alaska Renewable Energy Sources

Solar	Solar energy, although accounting for less than one percent of the state's electric grid, is gaining traction. The Alaska Energy Authority (AEA) has funded solar energy projects, leading to the establishment of new solar electric sources in various regions[19].
Wind	Alaska's wind resources, especially in its western and coastal regions, are abundant[20]. Wind power contributes to 2.4 percent of the energy for Alaska's electric grid. The AEA supports research and development efforts for rural and Arctic wind applications.
Tidal Energy	Alaska's extensive coastline offers potential for tidal energy production. Underwater turbines can harness the kinetic energy from tidal currents, especially in areas like Cook Inlet, which boasts one of the world's largest tidal ranges[21].

[18] Alaska's Natural Gas Reserves
[19] Golden Valley Electric Association
[20] Alaska Energy Authority
[21] National Renewable Energy Lab

Geothermal	With 97 known thermal springs spanning the state, geothermal energy presents a reliable and renewable energy source[22]. The Alaska Department of Natural Resources administers a program to lease lands with geothermal potential for development.
Nuclear Microreactors	In 2022, Alaska updated its statutes to streamline the permitting process for siting nuclear microreactors, which are prefabricated units transportable by truck or barge, capable of providing up to 20 megawatts of thermal energy[23].
Hydroelectric	Hydroelectric consumption for electricity generation is reported at 87,000 MWh, supplementing natural gas in Southcentral Alaska and serving as the predominant energy source for Southeast Alaska.

Incorporating energy-efficient transportation measures, such as LED lighting and vehicle electrification, can further optimize energy consumption. Emission sinks or reservoirs, areas where carbon is removed from the atmosphere and sequestered, play a pivotal role in Alaska's emissions profile. While wildfires produce greenhouse gases, the emissions are often absorbed by recolonized vegetation, aiding in carbon sequestration. These strategies, combined with the state's diverse energy initiatives, pave the way for a resilient, cost-effective, and sustainable energy future for Alaska.

6.0 Alaska's Carbon Initiatives

6.0 Carbon Management

Alaska is actively engaging in several initiatives to manage and reduce its carbon footprint. One of the prominent initiatives is the Carbon Offset Credit Program, spearheaded by the Department of Natural Resources (DNR). This program facilitates businesses or entities emitting CO2 to counterbalance their emissions by investing in credits from nature-centric projects on State-owned land.

Moreover, the Alaska Energy Authority (AEA) champions renewable energy and energy efficiency programs. In the transportation sector, the emphasis is on electrification, with initiatives like the Alaska Electric Vehicle Working Group, the EV rapid charging infrastructure, and the execution of the National Electric Vehicle Infrastructure (NEVI) Formula Program.

6.1 Carbon Sequestration and Economic Diversification

Alaska, with its vast and diverse landscapes, is uniquely positioned to play a pivotal role in carbon sequestration, a crucial strategy in the global effort to mitigate carbon emissions. The state has recognized the potential of carbon offsets as a revenue source and has initiated the Senate Bill (SB) 48, laying the groundwork for a statewide carbon offset program within the Department of Natural Resources (DNR). This program emphasizes the importance of maintaining the accessibility of lands for Alaskans' recreational activities, ensuring no hindrance to natural resource development, and not imposing emission limits on businesses or individuals.

The program's primary focus is on carbon sequestration on state lands, particularly through forestry-driven carbon credit opportunities and other nature-based carbon offset avenues. The DNR has identified forests in the Matanuska-Susitna Borough, Tanana Valley, and near Haines as potential carbon offset sources. However, the recent spruce bark beetle infestation and the heightened potential for forest fires add complexities to these efforts. These challenges

[22] Alaska Department of Natural Resources
[23] Alaska Statute 18.45

necessitate proactive management strategies, such as selective logging and controlled burns, to protect and maintain the forests' health and carbon-capturing capabilities.

Additionally, strategies like proactive wildfire management, tree replanting, and marine-based solutions such as kelp farming are being explored.

In addition to forest-based solutions, strategies like tree replanting, marine-based solutions such as kelp farming, and proactive wildfire management are being explored. Complementing these efforts, Alaska's boreal ecosystems and permafrost regions offer significant carbon sequestration potential. Research underscores the role of fire, forest succession, and permafrost in influencing carbon dynamics within these ecosystems. Inundated wetlands, characterized by slow decomposition and high primary productivity, have been highlighted as potential carbon sinks. Restoring these wetlands can serve as an effective negative emission technology. Furthermore, integrating vegetation in urban environments, as discussed in studies on carbon-positive buildings, can also contribute to carbon sequestration.

DNR is in the process of drafting regulations for the offset market and will collaborate with external auditors to validate potential offsets before listing them on registries. Governor Dunleavy’s carbon offset program represents a forward-thinking economic strategy that leverages Alaska's natural resources to create a new revenue stream while simultaneously contributing to global carbon reduction efforts.

The program includes several key components:

1. **Innovative Economic Diversification**: As traditional oil revenues decline, Alaska must explore alternative revenue sources to support its economy. The carbon offset program presents an innovative way to monetize the state's vast forest resources without depleting them, ensuring long-term economic sustainability.
2. **Pragmatic Environmentalism**: Dunleavy's plan pragmatically uses market-based mechanisms to encourage environmental stewardship. By selling carbon credits, Alaska can help fund its budgetary needs while indirectly promoting global carbon emission reductions.
3. **Balanced Approach to Forestry Management**: The program maintains a balance by monetizing the carbon storage of standing forests while allowing for the responsible harvesting of timber.
4. **Market Responsiveness**: The voluntary international forestry carbon market provides immediate opportunities for revenue that Alaska can harness.
5. **Catalyst for Renewable Energy Investment**: By directing a portion of the carbon credit revenues to a renewable energy fund, Alaska is taking a step towards supporting cleaner energy sources.
6. **Engagement with Global Corporations**: Corporations worldwide are seeking to mitigate their carbon footprints, and Alaska's carbon offset program allows these entities to invest in the state’s natural wealth.
7. **Meeting Demand for Carbon Offsets**: Alaska's strategy positions the state as a key player in meeting the growing demand for carbon offsets.
8. **Proactive Forest Management**: The preemptive approach to managing beetle infestations and fire-prone areas by selective logging could protect the forest's overall health and carbon capture capacity in the long run.

9. **Strategic Economic Leadership**: Governor Dunleavy's approach reflects strategic leadership. By capitalizing on the carbon offset market now, Alaska can gain a foothold in what is likely to become a more regulated and robust market in the future.

Governor Dunleavy's carbon offset program can be seen not just as a financial necessity, but as a transitional strategy that acknowledges the state's economic realities while also participating in the global effort to address climate change. It's a strategic pivot that shows foresight in economic planning and environmental responsibility, paving the way for a more sustainable and financially secure future for Alaska.

6.2 Electric Vehicles in Alaska

The "State of Alaska FY 24 Electric Vehicle Infrastructure Implementation Plan[24]" provides a comprehensive look into the current state and future prospects of EV adoption in Alaska. It was developed by the Alaska Energy Authority (AEA), DOT&PF, and various stakeholders, including electric vehicle stakeholders, utilities, communities, and residents. The document is a draft plan that outlines the strategy for implementing electric vehicle (EV) infrastructure in Alaska using NEVI funds. AEA is the State Energy Office and the lead agency for statewide energy policy and program development. They have been designated, through an MOA with DOT&PF, as the state's lead agency for EV planning and implementation.

Phases of NEVI Implementation:

- **Phase 1**: Build Out Alaska's Alternative Fuel Corridor (2022-2024)
- **Phase 2**: Build Out Alaska's Highway and Marine Highway Systems (2024-2026)
- **Phase 3**: Install Charging Stations in Rural Hub Communities (2025-2026)
- **Phase 4**: Develop Charging Sites in Urban and "Destination" Locations (2026)

Present Day

As of May 2023, Alaska boasted 1,875 registered EVs, a commendable 50% surge from December 2021's 1,250 registrations. However, with an EV penetration rate of 0.36%, the state still trails the national average. Interestingly, Alaskans show a strong preference for Sport Utility Vehicles (SUVs) and pickup trucks, which make up 80% of the state's new vehicle purchases. Electric SUVs currently represent about 11% of the state's EVs, with electric pickup trucks just shy of 2%. Notably, while Tesla once dominated the Alaskan market with a 53% share in 2022, its dominance dwindled to 40% by 2023, with Chevrolet emerging as a strong competitor.

Through funding from the Volkswagen (VW) diesel emissions settlement[25], a corridor from Kenai Peninsula to Healy features 15 fast chargers and eight Level 2 chargers, strategically placed at nine charging stations, ensuring that each station is within a 100-mile radius of its neighbors. As of July 2023, eight of these sites, located in Anchorage, Chugiak, Healy, Homer, Cantwell, Seward, Soldotna, and Trapper Creek, are operational. The ninth station, situated at Cooper Landing, is under construction.

EV Projections

Alaska's EV growth projections are categorized into two scenarios. The "Continued Growth Scenario" foresees a steady growth rate of 42.05% from 2020 to 2021, translating to an average

[24] https://www.akenergyauthority.org/Portals/0/Electric%20Vehicles/2023.06.19%20Alaska%20FY24%20NEVI%20Plan%2065%20Percent%20Draft.pdf

[25] https://www.akenergyauthority.org/What-We-Do/Renewable-Energy-and-Energy-Efficiency-Programs/Electric-Vehicles/EV-Fast-Charging-Network

of 1,200 EV sales annually. This would result in an addition of roughly 6,000 new EV registrations over a span of five years, pushing the penetration rate to 1.01% by 2026, a significant leap from 0.20% in 2021. On the other hand, the "Aggressive Growth Scenario" is more optimistic, predicting a 63% growth rate. This scenario anticipates the introduction of new battery electric pickup truck models and a broader range of SUV offerings. If this scenario plays out, Alaska could witness about 2,600 EV sales annually, adding a whopping 13,160 new EV registrations over five years, and potentially elevating the penetration rate to 2.02% by 2026.

Several factors are poised to influence Alaska's EV adoption rate. The state's inclination towards SUVs and pickup trucks suggests that the introduction of battery electric pickup trucks could significantly amplify the EV market share. However, external factors like supply chain disruptions and challenges in vehicle availability have temporarily hindered registration growth. On the infrastructural front, the Bipartisan Infrastructure Law (BIL) is set to bolster the development of a statewide EV fast charging network and community-based charging installations. The NEVI program, with its allocation of $5 billion over five years, aims to establish EV service equipment charging stations along major highway corridors. Alaska stands to benefit significantly from this initiative, with a projected receipt of over $50 million over the next five years.

Looking Ahead

While Alaska's present EV adoption rate might be modest compared to the national average, the state is on the cusp of a significant EV revolution. With infrastructural support, the introduction of EV models tailored to Alaskan preferences, and continued collaboration between the public and private sectors, Alaska's EV future is bright and promising.

The scarcity of EV charging facilities has been a notable barrier to EV adoption in Alaska. Consequently, the development of a fast-charging network is pivotal for the broader acceptance of EV technology. The transition to electric vehicles can be incentivized through various means. For instance, a study on the electrification of the transport sector highlighted that subsidies on EV purchases and the expansion of fast-charging infrastructure can significantly boost EV adoption[26]. Such measures can have both immediate and long-term impacts on emissions reduction. Investing in charging infrastructure can lead to sustained reductions in emissions over several years.

The NEVI deployment plan identifies where and when EV charging infrastructure should be deployed, considering factors such as consumer adoption, installation costs, return on investment, utility availability, roadway traffic, weather, and site host availability. The deployment plan is expected to evolve over the five-year NEVI program, incorporating lessons learned, data collection, and continued stakeholder engagement.

Specific Infrastructure Recommendations to Improve EV Adoption

To improve the percentage of EVs in Alaska, the state needs to focus on a comprehensive deployment of EV charging infrastructure, considering both urban and rural areas, and ensuring that the infrastructure is user-friendly, efficient, and future-proofed. Specific suggestions include:

- Adequate lighting and restrooms at charging stations, ensuring ADA compliance.
- Clearly marked spaces designated for EVs only.
- Signs recommending charging up to 80% and directing users to the charging location.

[26] "Policies for Electrification of the Car Fleet in the Short and Long Run - Subsidizing Electric Vehicles or Subsidizing Charging Stations?"

- Futureproofing of sites by funding the installation of additional make-ready infrastructure at the same time as initial chargers are deployed.
- Publicly funded chargers should be capable of charging at a rate of 350kW.
- EV charging connectors should be SAE J1772 and SAE CCS connectors.
- Chargers must accept credit cards and other forms of payment.
- Consideration for adding Tesla charging adapters at each location.
- Work with the Department of Motor Vehicles (DMV) to efficiently designate and report on EVs.
- Funding to increase the capacity of existing power supplies and improve site access.
- After the EV infrastructure installation, there will be operational considerations, including electricity and maintenance costs and associated networking fees.

6.3 Carbon Reduction Emissions Milestones

In aiming to reduce its carbon footprint, the state is focusing on key sectors like transportation and industry that contribute significantly to emissions. Recognizing the complexities in managing emissions, the state proposes the following aspirations, which are indicative rather than time-bound goals.

Emissions reductions of 15%: This milestone reflects the potential impact of reducing GHG emissions from 2020 levels by 15%. This would entail targeting high-emission sectors with immediate measures to reduce emissions.

Emissions reductions of 30%: This milestone represents the challenging goal of cutting GHG emissions by 30% from 2020 levels. Achieving this would likely require a comprehensive transformation of the state's energy infrastructure, adopting sustainable practices across all sectors, and harnessing Alaska's natural resources for carbon sequestration.

Table 6: Alaska Carbon Emission Reduction Calculations

	Current Emissions (MMT/year)	Emissions After 15% Reduction (MMT/year)	Emissions After 30% Reduction (MMT/year)
Passenger vehicles	1.4	1.19	0.98
Diesel highways	0.8	0.68	0.56
Light-duty trucks	0.5	0.43	0.35
Maritime operations	0.1	0.085	0.07
Locomotives	0.03	0.025	0.02
Total	2.83	2.41	1.98
Reduction from Baseline	0	0.42	.085

While DOT&PF has strategies to achieve reductions, many factors that influence outcomes are beyond the Department's direct control. Therefore, while goal-oriented, it's essential to approach these milestones with an understanding of their aspirational nature in the context of broader environmental and economic factors.

7.0 The Multi-Faceted Approach to Sustainable Transportation in Alaska

The Alaska Transportation Carbon Reduction Strategy represents a comprehensive and forward-thinking plan designed to revolutionize the state's transportation sector. This approach encompasses seven distinct yet interrelated core themes, each targeting a specific aspect of transportation. Together, they form a cohesive strategy aimed at fostering a transportation network that is not only efficient and responsive to current needs but also sustainable, reducing

environmental impact and paving the way for a cleaner, greener future in Alaska. DOT&PF plays a pivotal role in promoting carbon-efficient decisions within the transportation sector. By focusing on the planning, design, and construction of sustainable infrastructure, DOT&PF not only enhances the transportation system but also sets a standard through its own carbon-conscious operations, fleet management, procurement decisions, and construction methodologies.

Alternative Fuel Production: Foster the development of alternative and renewable fuel manufacturing in the transportation sector. It emphasizes the creation and support of facilities for producing hydrogen, natural gas, propane, alcohols (e.g., ethanol, methanol, butanol), and oils derived from vegetables or waste. By investing in the manufacturing infrastructure for these fuels, the strategy aims to not only facilitate their integration into transportation systems but also to establish a sustainable and self-reliant fuel supply chain within the sector.

Advanced Carbon Management: Proactively manage carbon emissions by utilizing geological formations for carbon sequestration and Alaska's forests for carbon capture, while integrating sustainable energy into the transportation infrastructure.

Multimodal Alternative Fuel Supply Network: Foster the adoption of alternative fuels across different transportation modes by building infrastructure for electric and hybrid vehicles. The strategy also extends to marine transportation electrification and supports aviation and rail sector pilot projects.

Low Emission Vehicles and Energy-Efficient Infrastructure. Expand the use of electric, hybrid, and hydrogen vehicles, particularly in public and freight transport, alongside the transition of state-owned fleet vehicles to eco-friendly models. Implement energy-efficient lighting solutions, such as LED streetlights, to reduce overall energy consumption.

Active Transportation and Transit Enhancements: Encourage the use of Alaska Railroad for passenger services, enhance mass transit options, and develop infrastructure that supports pedestrian and cyclist mobility. This includes constructing sidewalks, bike lanes, and safe crosswalks, and promoting non-vehicular transportation modes.

Smart Traffic Solutions: Implement intelligent technology solutions for traffic management, such as interconnected traffic signals, advanced warning systems, and vehicle-to-infrastructure communications. Develop roundabouts and alternative routes to improve traffic flow and reduce congestion-related emissions.

Sustainable Construction Practices: Adopting construction methods that prioritize carbon reduction.

These strategies align with the Carbon Reduction Plan (CRP) objectives, such as minimizing single-occupancy vehicle trips, promoting low-emission transit options, and endorsing eco-friendly construction techniques.

To prioritize efforts, sources of on-road and off-road CO2 emissions have been ranked based on their emission levels.

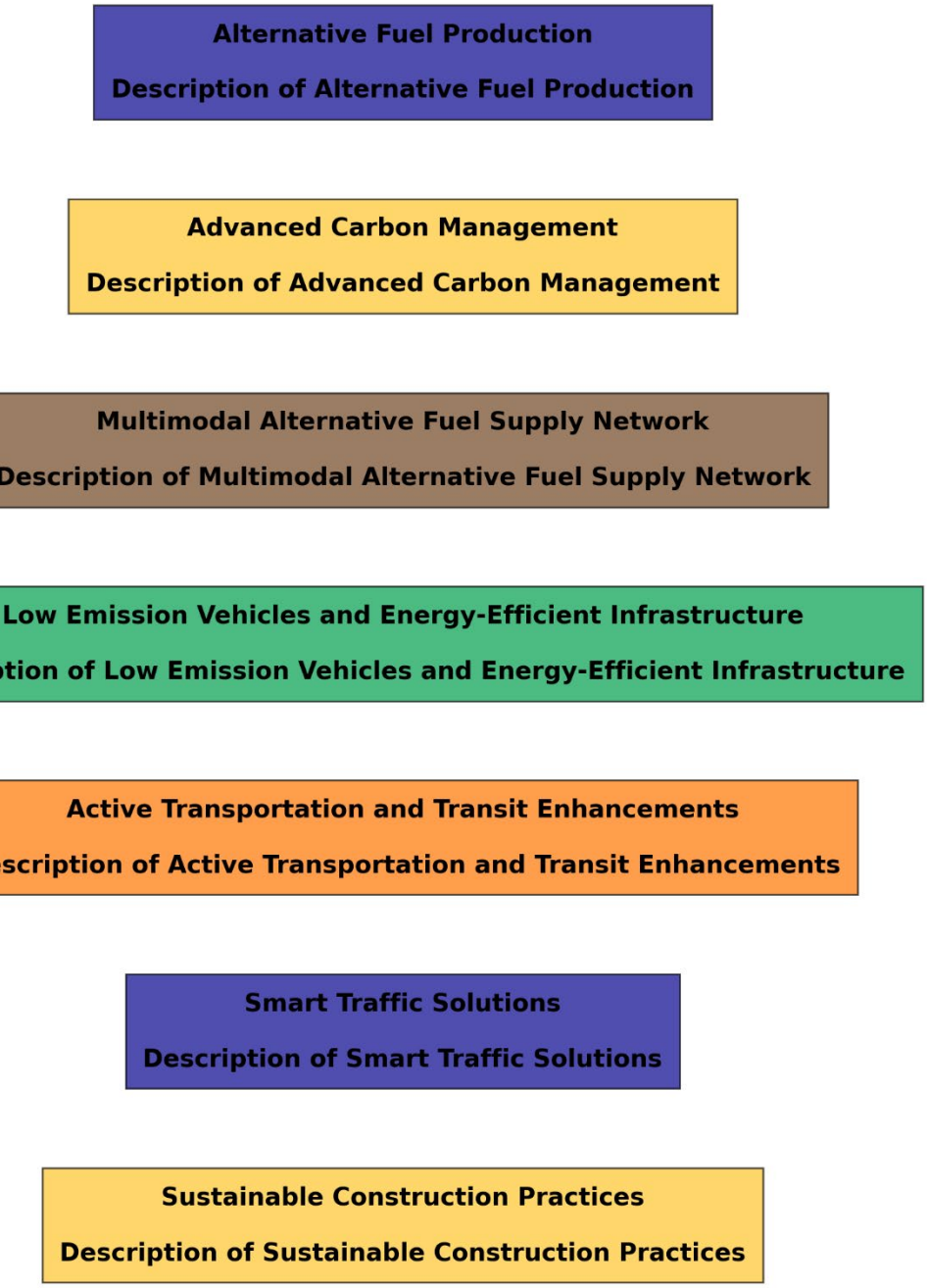

Figure 4: DOT&PF Transportation Carbon Reduction Strategies

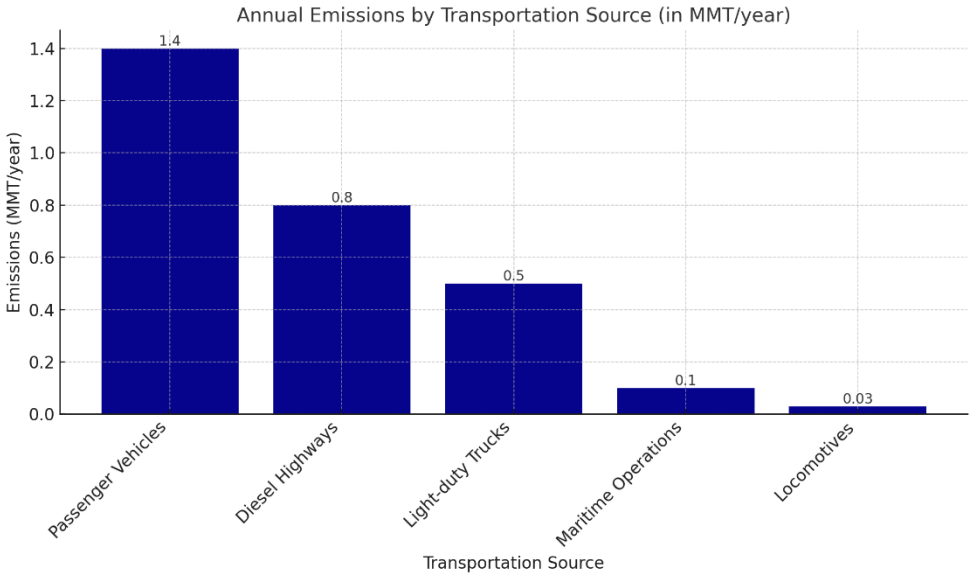

Figure 5: Carbon Emissions by Transportation Source

By targeting these significant emission sources, DOT&PF aims to make substantial strides in carbon reduction. For all efforts, implementation involves a collaborative effort between various agencies, including DOT&PF, AEA, Metropolitan Planning Organizations (MPOs), municipalities, boroughs, cities, local governments, and tribal entities overseeing transportation and transit services.

7.1 Alternative Fuel Infrastructure Development

Objective. This strategy aims to integrate alternative and renewable fuels into the transportation sector, thereby reducing reliance on traditional fossil fuels and to significantly lower greenhouse gas emissions and CO2 from transportation. It emphasizes the adoption of hydrogen, natural gas, propane, alcohols (e.g., ethanol, methanol, butanol), and vegetable/waste-derived oils.

Strategic Focus. Developing a comprehensive transportation infrastructure that connects critical hydropower, geothermal, wind, solar, and carbon sequestration sites, which are currently hindered by limited road access. This includes conducting thorough assessments to identify hydropower, geothermal, wind, solar, and carbon sequestration areas lacking adequate road access, prioritizing based on potential energy output, environmental impact, and economic feasibility. The focus is on embracing domestically produced fuels, including renewable options, to reduce dependence on foreign oil. This strategy offers the dual benefits of cutting upstream greenhouse gas emissions linked to fuel production and reducing CO2 emissions from vehicles. Key implementation measures include diesel engine retrofits, transitioning fleets to alternative fuel-powered vehicles, and establishing alternative fueling infrastructure to cater to a diverse range of vehicles, such as mass transit vehicles, private cars, marine vessels, and freighters.

Table 7: Alternative Fuel Infrastructure Development Surface Transportation Strategies

Renewable Diesel Refinery	Establishing refineries that convert organic materials like vegetable oils into diesel, which is chemically similar to petroleum diesel but with significantly lower greenhouse gas emissions. This initiative will promote cleaner fuels, reduce reliance on imported diesel, and align with sustainability goals by reducing the transportation sector's carbon footprint.

Hydrogen Fuel Production	Supporting pilot projects for electrolytic hydrogen production, scaling to full production, and coordinating with the Port of Alaska on a hydrogen pilot project to demonstrate hydrogen fuel cell yard tractor performance.
Clean Ammonia Production	Collaborating with the Alaska Gasline Development Corporation (AGDC) and a Japanese-led team to produce carbon-free ammonia using gas from the Alaska LNG Project, involving carbon capture and sequestration in Cook Inlet. DOT&PF can play a role in supporting infrastructure development that aligns with this initiative, potentially aiding in the transportation and export of clean ammonia.
Enhanced Oil Recovery and Sequestration	A significant amount of carbon dioxide (approximately 202 million metric tons) is projected to be captured and either used for Enhanced Oil Recovery (EOR) or sequestered on the North Slope over the life of the Alaska LNG Project. DOT&PF can contribute to this by ensuring that the transportation infrastructure in and around these areas is optimized for supporting EOR activities and the secure transportation of captured carbon dioxide.
Road Development for Energy Sites	Build and improve roads to facilitate access to renewable energy sites, enhancing the state's ability to harness and utilize its natural energy resources. This project prioritizes the construction of roads to these vital energy resource locations.

Table 8: Alternative Fuel Infrastructure Development Aviation and Rail Transportation Strategies (Not-FHWA Eligible)

Sustainable Aviation Fuel (SAF) Refinery	Support the pilot project for sustainable aviation fuel production and scale up to full production.
Future Fuels Locomotive Pilot	Pilot project to evaluate the performance of hydrogen fuel-cell and renewable diesel locomotives and scale up successful technology.

7.2 Advanced Carbon Management

Objective: This strategy aims to leverage Alaska's natural and technological resources for effective carbon management and sustainable energy integration. The focus is on harnessing geological formations for carbon sequestration and utilizing the state's vast forested areas for carbon capture. Additionally, the strategy aims to integrate sustainable energy sources into transportation infrastructure, supporting Alaska's environmental goals and contributing to the nation's goal of net-zero greenhouse gas emissions by 2050[27].

Strategic Focus: The strategic focus combines geological carbon sequestration, sustainable forestry management, and green bank financing to reduce the transportation sector's carbon footprint through initiatives like electrifying public transport and enhancing energy-efficient infrastructure. It aligns with the Office of Energy Innovation's initiatives to leverage Alaska's potential in carbon storage and sequestration while investing in research for sustainable transportation technologies such as autonomous vehicles and electric marine vessels. The strategy includes monitoring and evaluating carbon emission performance, fostering sustainable practices through carbon credit programs and promoting renewable energy and electric vehicle infrastructure within DOT&PF's rights-of-way.

Table 9: Advance Carbon Management Strategies

Leveraging Alaska LNG Project's	The Alaska LNG Project is set to utilize a significant portion of the natural gas reserves in Prudhoe Bay and Point Thomson. It includes an Arctic

[27] https://www.nature.com/articles/s41467-022-31806-2.pdf

Carbon Capture Capabilities	Carbon Capture (ACC) plant, which will remove carbon dioxide and hydrogen sulfide from the feed gas. By ensuring that this captured carbon dioxide is not vented, the project contributes significantly to carbon capture and sequestration. DOT&PF can support this initiative by integrating transportation projects that facilitate or complement the LNG project's infrastructure, thereby enhancing overall carbon capture efforts.
Lower Upstream Emissions (Alaska LNG Project)	Focused on reducing emissions associated with oil production in the North Slope, including carbon sequestration at the production point and a pipeline design with fewer compressor stations to reduce fugitive and combustion emissions.
Green Bank Financing for Transportation Projects	The establishment of a green bank, as proposed by Senate Bill 125 and House Bill 154, provides a unique opportunity for DOT&PF to access new financing mechanisms. This green bank could fund projects that reduce the carbon footprint of transportation infrastructure, such as electrifying public transportation, upgrading existing infrastructure to be more energy-efficient, and investing in renewable energy sources for DOT&PF facilities. This may include renewable energy generation, energy storage, energy efficiency improvements, and cleaner transportation methods, such as hydrogen, ammonia, and tidal energy sources.
Supporting the Office of Energy Innovation Initiatives	Governor Dunleavy created the Office of Energy Innovation to coordinate efforts in carbon capturing, storage, and utilization. DOT&PF can align its transportation development strategies with the initiatives of this office, particularly in areas that contribute to Alaska's significant potential for carbon storage and sequestration. By collaborating with this office, DOT&PF can ensure that its projects support the state's overall carbon market opportunity and leverage Alaska's vast carbon sequestration resources.
Sustainable Transportation Research	Delving into innovative methods and technologies to enhance transportation sustainability. Invest in research and innovation in transportation technology, such as autonomous vehicles, vehicle-to-grid integration, electric and hybrid-electric marine vessels, new mobility solutions, and behavioral science.
Sustainable Forestry Management	Silviculture, the art and science of managing forests, offers a holistic approach to forest management. Enhance forest health, productivity, and biodiversity through the application of scientific forestry principles, ensuring sustainable timber production while optimizing carbon sequestration and supporting diverse ecosystems. Restore areas affected by logging, wildfires, or other disturbances to their natural forested state.

7.3 Multimodal Alternative Fuel Supply Network

Objective. The objective of the Multimodal Alternative Fuel Supply Network strategy is to establish a comprehensive infrastructure supporting the widespread adoption of alternative fuels across various transportation modes in Alaska. This strategy aims to enhance access to and utilization of diverse energy resources, focusing on creating a robust network for electric vehicles (EVs), hybrids, and other alternative fuel vehicles, including in marine and aviation sectors.
Strategic Focus Areas: The focus is on developing and expanding infrastructure that facilitates the transition from fossil-fueled to electric and hybrid vehicles. This includes projects under the

National Electric Vehicle Infrastructure (NEVI) initiative and Charging and Fueling Infrastructure (CFI) to equip Alaska's transportation corridors and communities with adequate electric vehicle supply equipment (EVSE). Additionally, the strategy encompasses electrification and alternative fuel conversion in marine transportation and supports pilot projects in aviation and rail sectors.

Table 10: Multimodal Alternative Fuel Supply Network Surface Transportation Strategies

National Electric Vehicle Infrastructure (NEVI)	Install public Electric Vehicle Supply Equipment (EVSE) along Alaska's Alternative Fuel Corridor and statewide communities.
Charging and Fueling Infrastructure	Install public EVSE in later phase NEVI communities, rural communities, and at ports serving ground vehicles and vessels.
International Airport Electric Vehicle Charging Stations	Implement Direct Current Fast Charging (DCFC) and Levels 1 and 2 charging at airports for travelers, fleet vehicles, taxis and ride-share vehicles.
Green Corridor Development	Revise rules to encourage renewable energy, battery energy storage systems, and EV charging equipment to be located within the DOT&PF rights-of-way[28] on road systems and at airports.
Ride-Hailing Electrification	Promote electrification in ride-hailing services and establish a rental program for electric bikes/scooters.
Reduced Idling	Develop infrastructure for plug-in heating and block heater programs
Vehicle-to-Grid (V2G)	Implement a Vehicle-to-Grid incentive program

Table 11: Multimodal Alternative Fuel Supply Network Marine Transportation Sector Strategies

Lo-No Emission and Hybrid Electric Ferries	Construct hybrid and battery electric ferries for various routes. Convert hybrid ferries to hydrogen fuel cell or ammonia-fueled hybrid electric systems.
Port Electrification	Ports, given their heavy machinery, ships, and cruise liners powered by fossil fuels, stand as significant contributors to greenhouse gas emissions. Transitioning to electric cranes, forklifts, and other equipment, coupled with enabling both ships and cruise liners to tap into the electrical grid through shore power while docked, can markedly reduce these emissions. The establishment of charging stations and electrical substations on port facilities amplifies this shift, steering ports towards a greener and more sustainable operation.
Cruise Ship and Cargo Vessel Future Fuels Preparation	Prepare infrastructure for future fuels like hydrogen fuel cells and ammonia for cruise ships and freight operators.
Hybrid Electric Fishing Vessel Pilot	Demonstrate and support the adoption of hybrid electric fishing vessels and port equipment.
Port Service Equipment	Demonstrate and compare the performance of battery electric and hydrogen fuel-cell port service equipment.

[28] State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance

Table 12: Multimodal Alternative Fuel Supply Network Aviation and Rail Transportation Sector Strategies (Not FHWA Eligible)

Hybrid and Hydrogen Fuel-Cell Aircraft	Conduct pilot projects for hybrid electric and hydrogen fuel-cell aircraft for short and long-haul flights.
Airport Ground Service Equipment	Demonstrate and compare the performance of electric and hydrogen fuel-cell ground service equipment. Coordinate with operators at Ted Stevens International Airport for hydrogen fuel cell ground service vehicles and aircraft
Alaska Railroad (ARR) Freight Connection	Establish a connection from Alaska Railroad (ARR) to the Lower 48 states for freight service.

7.4 Low Emission Vehicles and Energy-Efficient Infrastructure

Objective: This strategy is dedicated to implementing energy-efficient measures across Alaska's transportation sectors. The primary goal is to significantly reduce energy consumption and greenhouse gas emissions, particularly in regions dependent on conventional energy sources like coal and natural gas.

Strategic Focus: The focus is on integrating sustainable solutions such as LED lighting for streets and facilities and expanding the adoption of electric vehicles (EVs), hybrids, and hydrogen-powered trucks, especially in freight transportation. As of May 2023, with EV adoption in Alaska at a mere 0.36%, there is considerable potential for growth in this area. This strategy also includes the electrification of state-owned light-duty fleet vehicles and the promotion of alternative fuel vehicles. Additionally, the development of a comprehensive EV charging network, as outlined in the National Electric Vehicle Infrastructure Plan, is a key component, aimed at enhancing the appeal and practicality of EVs for various purposes, including work, leisure, and tourism.

Table 13: Low Emission Vehicles and Energy-Efficient Infrastructure Strategies

Light up the Highways	Replace street lighting and traffic control devices with energy-efficient LED solutions, significantly reducing energy consumption and enhancing sustainability in street and facility lighting
Energy-Efficient Urban Infrastructure	Retrofit urban areas with LED street lighting and traffic control devices. This initiative will reduce energy consumption, improve safety, and contribute to a greener urban environment. Energy Efficiency
Statewide Equipment Fleet Modernization	Transition state-owned light-duty fleet vehicles to electric models, setting an example for eco-friendly practices and reducing the carbon footprint of government operations.
Rural Micro Mobility	Pilot and demonstrate the performance of battery electric All-Terrain Vehicles (ATVs), side-by-sides, and snowmobiles, focusing on rural areas to assess their efficiency and adaptability to Alaska's unique conditions.
Fuel Additives	Piloting fuel additives to verify their performance and facilitate their adoption in Alaska.

7.5 Active Transportation and Transit Enhancements

Objective: This strategy is centered on diversifying transportation modes to create more inclusive streets for all users. It aims to reduce CO2 emissions by minimizing reliance on fossil fuels and promoting safer, alternative transportation options.

Strategic Focus: This strategy will focus on enhancing public transit and active transportation. It aims to shift reliance from single-occupancy vehicles to mass transit options like buses, trains, and shuttles, while improving pedestrian and cyclist infrastructure through the construction of sidewalks, bike lanes, and safe crosswalks. This strategy also includes incentivizing the use of the Alaska Railroad for passenger services and developing sustainable transit initiatives, such as dedicated bus lanes and smart transportation technologies. The overarching goal is to reduce carbon footprints, increase the use of non-motorized transport modes, and ensure accessible, safe transportation options for all residents, contributing to a healthier, more sustainable community environment.

Table 14: Active Transportation and Transit Enhancement Strategies

Alaska Railroad (ARR) Service Incentivization	Focusing on incentivizing the use of Alaska Railroad (ARR) for passenger services. This strategy intends to increase the utilization of ARR for commuting and leisure travel, thereby reducing the carbon footprint associated with personal vehicle use.
Mass Transit Enhancement	Encouraging a shift from single-occupancy vehicle trips to mass transit options such as shuttles, buses, and trains. This involves enhancing the efficiency, accessibility, and appeal of public transportation systems.
Pedestrian and Cyclist Infrastructure	Developing infrastructure that facilitates safe and convenient mobility for pedestrians and cyclists. This includes constructing sidewalks, bike lanes, safe crosswalks, median islands, and installing accessible pedestrian signals. By improving these facilities, we aim to motivate a higher uptake of non-vehicular transportation modes.
Sustainable Transit	Creating and promoting transit options to reduce both the number of single-occupancy vehicle trips and the total vehicle miles traveled. Enhancements may include dedicated bus lanes, upgraded public transportation stops, and integration of smart transportation technologies.
Active Transportation	This includes the construction of safe sidewalks, bike lanes, crosswalks, and median islands. These projects not only reduce carbon footprints but also ensure that transportation is accessible to all.

7.6 Smart Traffic Solutions

Objective: In Alaska, where congestion is less prevalent but still impactful in key areas, the objective of this strategy is to intelligently manage traffic flow and reduce emissions in targeted locations. The focus is on applying advanced technology solutions in strategic areas to optimize traffic movement, reduce idling, and minimize environmental impacts, particularly greenhouse gas emissions, in the unique Alaskan context.

Strategic Focus: The strategic focus centers on implementing efficient congestion management solutions and technological advancements. This includes the deployment of intelligent technology solutions to interlink traffic signals and centralized control systems for real-time traffic flow optimization, thus reducing stops and starts. Advanced warning systems will provide timely alerts about traffic conditions, enabling real-time travel decisions that ease congestion. The strategy also encompasses demand management for sustainable commuting, such as implementing congestion pricing and encouraging off-peak travel. The development of roundabouts and redundant routes, particularly in areas with limited alternative paths, will further aid in reducing congestion and its associated emissions.

Table 15: Smart Traffic Strategies

Operational Efficiency Through Improved Weather Observations	Support state-funded remote weather observation stations to enhance transportation operational efficiency, particularly in challenging Alaskan weather conditions.
Intelligent Technology Solutions	Optimize traffic flow by interlinking traffic signals and implementing vehicle-to-infrastructure communications, including retrofitting existing DSRC technology to C-V2X technology for more efficient traffic management.
Advanced Warning Systems	Install systems for crash and closure warnings, providing crucial real-time information to travelers, especially crucial in Alaska where many routes are singular. Prompt information about obstructions or closures enables travelers to make informed decisions, either delaying their journey or seeking alternative routes, thus minimizing idling and associated emissions.
Roundabouts	Construct roundabouts to facilitate smoother traffic flow and create redundant routes to reduce congestion during peak hours. Beyond their role in traffic calming and enhancing neighborhood safety, roundabouts are effective in mitigating congestion. They facilitate a smoother flow of traffic, reducing the need for vehicles to stop and start, which in turn minimizes emissions.
Redundant Routes	Creating alternative routes for major commuting corridors, especially in areas where only one primary route exists, enhances transportation system resilience. In Alaska, certain routes lack alternatives, leading to extensive queues during peak hours if there's a closure or crash. Offering redundant routes can significantly reduce such delays and the associated emissions from idling.

7.7 Sustainable Construction Practices

Objective: The objective of this strategy is to prioritize the use of eco-efficient construction equipment and methods that substantially minimize carbon emissions. This involves a comprehensive approach to sustainable construction practices in the transportation sector, emphasizing the reduction of environmental impact at every stage, from material procurement to equipment operation.

Strategic Focus: The strategic focus is on transitioning to construction equipment powered by electricity or alternative fuels and adopting environmentally friendly material procurement methods. Emphasis is placed on encouraging contractors to use low-emission or zero-emission machinery, incentivizing the adoption of green construction practices. The strategy also includes the utilization of solid waste and local manufacturing resources for material sourcing, reducing the dependency on virgin materials and minimizing the carbon footprint of transportation construction projects.

Table 16: Sustainable Construction Strategies

Solid Waste Utilization	Implement practices to reduce the use of virgin materials in transportation construction by leveraging solid waste materials, promoting recycling and reusing practices.

Transition to EV or Hybrid Equipment	Encourage the adoption of construction machinery running on electric or alternative fuels to reduce emissions and enhance efficiency.
Contractor Eco-Incentives	Refine procurement guidelines and contractor selection criteria to incentivize the use of eco-friendly construction equipment. Offer incentives for sourcing materials using green or low-emission transportation methods.
Local Manufacturing Sourcing Software-3D Printing	Provide access to software and services for sourcing locally manufactured spare parts on demand, reducing transportation emissions associated with material delivery.
Advanced Pavement Management System	Adopt a pavement management system that selects maintenance and rehabilitation projects based on their life-cycle GHG performance. These technologies, which reduce embodied carbon during the manufacturing and construction of highway projects, align well with the goal of selecting maintenance and rehabilitation projects based on their life-cycle GHG performance. Utilizing a lifecycle assessment (LCA), specifically tools like the LCA Pave Tool, can help in assessing and demonstrating substantial reductions in CO2 emissions compared to typical pavement-related practices.
Eco-Friendly Material Procurement	Establish guidelines for the procurement of construction materials that prioritize eco-friendly production and transportation methods.
Green Construction Training and Certification	Develop training programs and certification for contractors and workers in sustainable construction practices, ensuring a skilled workforce capable of implementing these strategies effectively.

8.0 Measuring Progress: Emissions Calculations

The DOT&PF Carbon Reduction Strategy serves as a roadmap for project selection and implementation.

8.1 CO2 Emission Reduction Calculations

Quantifying the CO2 reduction associated with each mitigation strategy involves analysis of several key variables. These include, but are not limited to, reductions in vehicular operational durations, diminishment in fossil fuel utilization, and declines in single-occupancy vehicle usage. The impact of these variables is often localized and subject to variation even within the same geographic area, dependent on the nature of the intervention (for example, the implementation of Bus Route A may result in a 15% increase in ridership, whereas Bus Route B may yield a 35% increase). The diverse range of variables complicates the process of conducting straightforward comparative assessments of strategy effectiveness. Nonetheless, after consultation with Metropolitan Planning Organizations (MPOs), a representative selection of projects aligned with each strategy was identified. The CO2 reduction metrics for these projects were then calculated. Table 3 presents a subset of these projects, aligns them with their respective strategies, and details the annual CO2 reductions in pounds. The impact of these projects on CO2 emissions varies significantly, from 1.9 million lbs/year to 15,000 lbs/year.

To provide a reference point, the total annual CO2 emissions from on-road sources in 2018 amounted to approximately 6.1 billion lbs. Therefore, a 1% decrease in this value represents a reduction of about 61 million lbs/year.

Table 17: Example Carbon Emission Assessments

Project Name	Strategy	Project Location	CO2 Emission Reductions / lbs per year
MACS Transit SaaS	Mass Transit	Fairbanks	1,940,101
Airport Way Fairbanks Signal Interconnect	Intelligent Technology Solutions	Fairbanks	503,570
Shore Power at Sitka Ferry Terminal	Electrification	Sitka	138,230
MSB Shaw Elementary School Roundabout	Roundabout	MSB	134,050

8.2 Carbon Emission Assessment for Transportation Projects

DOT&PF will implement a CO2 emissions reduction evaluation for projects, using a framework aligned with the Carbon Reduction Program (CRP) objectives and Federal Highway Administration (FHWA) goals. A detailed matrix, provided in Appendix: Emissions Calculations, outlines the proposed evaluation metrics. This matrix delineates the rationale for each criterion and proposes quantitative benchmarks. It is recommended that recipients of CRP funding utilize this matrix to assess projects, ensuring alignment with the CRP's strategic goals, federal mandates, and principles of transportation excellence, which include safety and cost-efficiency considerations.

The FHWA's Congestion Mitigation and Air Quality (CMAQ) Emissions Calculator is the preferred tool for this analysis. Augmented by data from sources such as the Environmental Protection Agency's (EPA) Emissions and Generation Resource Integrated Database (eGRID) and the EPA Motor Vehicle Emission Simulator (MOVES) program, it facilitates comprehensive emission assessments. The CMAQ tool, recognized by the FHWA for its applicability to CMAQ projects, excels in project-specific emission computations. It integrates data from various sources, including EPA MOVES, and incorporates default values for scenarios with limited data, such as average lengths of transit journeys.

For an in-depth comparison of CO2 emissions and operational costs between light-duty electric vehicles and traditional combustion engine vehicles, the Alaska Center for Energy and Power's Alaska Electric Vehicle Calculator is advised. This tool is especially proficient in adjusting for efficiency variations in cold climates, offering more accurate assessments than many standard national tools.

Other Analysis Models

TRIMMS™ (Trip Reduction Impacts of Mobility Management Strategies) Model: This model conducts a comprehensive analysis of various emission pollutants and assesses the influence of

land use strategies on transit ridership. It employs the emission data from the Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES2010a), which is suitable for state-level implementation of air quality plans (SIP) and regional emission analysis in accordance with transportation conformity requirements.[29].

Comparative Analysis of Washington Ferries and Road Transport: This research compares the carbon emissions of Washington's ferry services with road transportation, using methodologies developed by Trozzi and Vaccaro and the Greatest Integer functions. The findings indicate that maritime transport, in terms of CO2 emissions per ton-mile, is more eco-friendly compared to road transportation[30].

Forest Carbon Sequestration in China: This analysis highlights the critical role of China's state-operated forest farms in carbon sequestration. The study advocates for reforms in forest management strategies and operational adjustments tailored to local ecological conditions, promoting sustainable forest management practices. The recommendation is to adapt cultivation strategies to enhance the effectiveness of these forests in carbon capture and storage.[31].

9.0 Carbon Reduction Implementation

An agile and comprehensive Carbon Reduction Strategy implementation plan will lay the groundwork by determining the initial carbon emissions, develop metrics to quantify the carbon emission reductions, and periodically update the carbon reduction strategy. These efforts ensure that transportation initiatives are in line with environmental conservation goals and are constantly evolving to incorporate the latest sustainable technologies and practices. The implementation plan will have an emphasis on consistent planning, performance metrics, and iterative refinement of strategies using the latest data. It will also prioritize regular monitoring and updating of strategies based on tangible outcomes.

Key Implementation Strategies:

1. **Periodic Update of Carbon Reduction Strategy**: Mandated by 23 USC 175, this strategy involves the creation and regular update (at least every four years) of the carbon reduction strategy. Each update will factor in the evolving knowledge of CO2 reduction technologies and adapt to the changing transportation landscape in Alaska.
2. **Establishing Carbon Emission Baselines**: Laying the groundwork by determining the initial carbon emissions, which will serve as a reference for future performance evaluations. The subsequent section of this CRS delves deeper into the methodology for calculating baseline carbon emissions.
3. **Monitoring & Evaluating Carbon Emission Performance**: Developing metrics to quantify the carbon emission reductions achieved through CRP projects. This facilitates transparent reporting on the efficacy of the carbon reduction initiatives and allows for strategy adjustments in subsequent CRS updates to align with CRP objectives.
4. **Collaborate with state and federal agencies:** Work Alaska Department of Environmental Conservation and Alaska Energy Authority on monitoring and reporting.

[29] https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1123&context=cutr_nctr

[30] https://link.springer.com/content/pdf/10.1007/s11356-023-28281-7.pdf
[31] https://www.mdpi.com/1999-4907/13/5/778/pdf?version=1652925620

9.1 DOT&PF Draft 2024-2027 Statewide Transportation Improvement Program (STIP) Project List

The Alaska Department of Transportation & Public Facilities (DOT&PF) Statewide Transportation Improvement Program (STIP) is a vital framework that directly impacts the transportation infrastructure of our state. Serving as a crucial planning tool for the DOT&PF, the STIP guides efforts to maintain, enhance, and expand Alaska's transportation system. It is a comprehensive document that outlines transportation programs and projects scheduled for implementation over a four-year period. These initiatives encompass a wide range of activities, including highway improvements, bridge repairs, waterways projects, public transportation enhancements, and more.

As Alaskans, we recognize that our transportation system is the backbone connecting our communities, businesses, and industries. The STIP plays a pivotal role in increasing the safety of our transportation system, ensuring its proper maintenance, promoting statewide economic growth, and enhancing resilience and sustainability in our systems and communities. Through the STIP, we can strategically plan and prioritize transportation investments to address the evolving needs and challenges of our state. The STIP provides a transparent and accountable process for allocating resources and managing transportation projects. It aligns our objectives with the State's priorities as outlined in the Capital Budget approved by the legislature and signed into law by the Governor, as well as federal requirements to maintain eligibility for federal funding opportunities. This systematic and fully aligned approach enables us to effectively leverage both state and federal resources, maximizing the impact on our transportation infrastructure.

Beyond its significance for the DOT&PF, the STIP is a valuable tool for the general public. It offers a clear and concise overview of planned transportation projects, providing visibility and transparency to the residents of Alaska. By understanding the projects outlined in the STIP, individuals can stay informed about upcoming improvements in their communities, make necessary arrangements, and even provide valuable feedback on proposed initiatives. This transparency is also important for our contracting and consulting partners across the state, allowing their businesses to thrive with confidence in the expected work opportunities in the coming years.

The projects included in the Statewide Transportation Improvement Program (STIP) are in alignment with and implement the policies set forth in the Long-Range Transportation Plan (LRTP). Serving as a strategic alignment and investment tool, the STIP ensures consistency with the Family of Plans and the LRTP. The LRTP establishes investment areas for the State, encompassing:

1. Safety
2. State of Good Repair
3. Economic Vitality
4. Resiliency
5. Sustainable Transportation

Table 18 outlines the projects and programs under development by DOT&PF towards sustainable transportation.

Table 18: DOT&PF STIP Programs and Projects 2024-2027

STIP ID	Draft 2024-2027 STIP Programs and Projects	2024	2025	2026	2027
34197	Data Modernization and Innovation	$10,839,809	$10,919,116	$13,697,790	$10,800,001
9299	Congestion Mitigation Air Quality Improvements (CM	$2,486,632	$2,553,772	$2,622,723	$2,622,723
34196	International Airport Charging Stations	$3,000,000	$3,000,000	0	0
34195	Southeast Alaska Port Electrification	$3,500,000	$1,400,000	$1,400,000	$1,400,000
26161	Air Quality Planning Project: Fairbanks	$80,000	$80,000	$80,000	$80,000
26168	Air Quality Mobile Source Modeling	$200,000	$200,000	$200,000	$200,000
17663	CMAQ: non-AMATS MPOs	$1,600,000	$1,600,000	$1,600,000	$1,600,000
34200	Transportation Workforce Development and Training	$6,665,883	$7,450,000	$5,602,559	$5,100,000
33861	Carbon Reduction Program: Rural	$4,300,000	$4,428,839	$4,450,000	$4,522,090
33862	Carbon Reduction Program: AMATS	$3,804,540	$3,907,263	$4,012,759	$4,012,759
33865	National Electric Vehicle Infrastructure Program	$12,456,478	$12,643,325	$12,832,975	$13,025,470
18791	Congestion Mitigation and Air Quality Improvements	$4,961,031	$3,402,210	$4,561,768	$4,811,768
33863	Carbon Reduction Program: non-AMATS MPOs	$944,267	$944,267	$944,267	$944,267
34198	**Light up the Highways**	**$5,000,000**	**$5,000,000**	**$0**	**$5,000,000**
	Egan Drive Lighting Improvements	*$2,400,000*	*$0*		
	Anchorage Pedestrian Lighting Improvements	*$1,000,000*	*$0*		
	Glenn Highway Lighting Improvements	*$0*	*$2,500,000*		
	Light Up the Highways Placeholder	*$1,000,000*	*$2,500,000*		
34199	**Sustainable Transportation and Energy Program**	**$4,389,559**	**$8,390,321**	**$13,843,900**	**$12,454,924**
	Charging and Fueling Infrastructure	*$300,000*	*$3,000,000*		
	Fuel Additives and Future Fuel Development	*$750,000*	*$700,000*		
	Renewable Diesel Implementation Study	*$300,000*	*$500,000*		
	Advanced Pavement Management System	*$85,000*	*$150,000*		
	Construction Material Waste	*$85,000*	*$150,000*		
	Sustainable Transportation Data Collection & Management	*$250,000*	*$128,174*		
	Rural Dust Mitigation Program	*$1,100,000*	*$1,200,000*		
	DOT&PF Fleet Conversion	*$75,000*	*$300,000*		
	Low-emission Construction Equipment	*$85,000*	*$500,000*		
	Micro-Mobility for Rural Alaska	*$500,000*	*$1,100,000*		
	MatSu to Eagle River Bike Lane	*$200,000*	*$400,000*		

Appendix: Emissions Calculations

Table 1
Project GHG Emission Reductions
MACS Transit SaaS
Fairbanks, AK

Input		
Description	**Input**	**Reference**
Project Name[1]	MACS Transit SaaS	
Project Description[1]	The scope includes evaluating, selecting, and purchasing a subscription(s) to a suite of SaaS technologies with the following goals via public-facing apps: Trip planning, route tracking (real-time bus locations, estimated time of arrival, text notifications), purchasing electronic tickets, and booking on-demand transportation rides	Public Information on FAST website[1]
Evaluation Year	2021	Provided by FAST
Number of days the bus operates annually	312	Provided by FAST
Transit Bus annual mileage (bus miles/year)	54,794	Provided by FAST
Transit Bus annual ridership (boardings/year)	161,102	Provided by FAST
Reduction in Annual Vehicle Trips across the population due to SaaS[2]	5-8%	Provided by FAST
Average trip length (mile)[3]	4.52	CMAQ Toolkit Default
Analysis and Output		
Analysis Method	The analysis estimates annual project CO_2 emission reductions based on the transit ridership increase before and after project implementation. Based on the Project design, the SaaS will allow transit planning and bus route tracking to support to encourage the use of transportation alternatives in place of single occupancy vehicles. The App will connect to on-demand transportation rides that can effectively expand the transit access to more destinations. Based on literature review and project-specific evaluations, it is estimated that these features of the SaaS can together reduce driving by approximately 5%-8%. These data were applied in the CMAQ Tookkit[4] to estimate CO_2 emissions. As a conservative estimate, this analysis uses the lower bound of 5% and further assumes that 50% of these transit trips still need first/last mile travel by vehicle, which leads to a overall equivalent driving trip reduction of 2.5%. The level of reduction calculated is consistent with literature.[5]	
Total Daily CO_2 Reductions (kg/day)	2,411	
Total Annual CO_2 Reductions (lbs/year)	**1,940,101**	

Notes:

1. The Project information is available at: https://fastplanning.us/wp-content/uploads/2023/02/25_FAST_MACS_SaaS_Apps_Technology.pdf
2. The estimated project impact of 5%-8% is an engineering judgement considering multiple effects of the SaaS based on literature and the local condition, and is consistent with the project planning document at https://fastplanning.us/wp-content/uploads/2023/02/25_FAST_MACS_SaaS_Apps_Technology.pdf
3. Due to limited data, the analysis used CMAQ national default for average transit trip length
4. The CMAQ Toolkit from FHWA, available at: https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/
5. According to a GHG analysis guideline document in California (Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities), providing community-based trip planning can result in a trip and GHG reduction of up to 2.3%, available at: https://www.caleemod.com/documents/handbook/full_handbook.pdf

Table 2
Project GHG Emission Reductions
Airport Way Fairbanks Signal Interconnect
Fairbanks, AK

Input		
Description	**Input**	**Reference**
Project Name	Airport Way Fairbanks Signal Interconnect	Provided by DOWL
Project Description	AK DOT will replace existing highway lights in the Kenai Spur Hwy with LED lights that are less energy intensive and reduce electricity consumption	Provided by DOWL
Evaluation Year	2027	Confirmed by DOWL
Area Type	Urban	Confirmed by DOWL
Corridor Length (miles)	3.14	Provided by DOWL
Number of Signalized Intersections in the corridor	11	Provided by DOWL
Average Number of Lanes (one direction)	2	Provided by DOWL
Average Posted Speed Limit	45	Confirmed by DOWL
Average Cycle Length (second)	90	Provided by DOWL
Truck Percentage in the corridor	4%	Provided by DOWL
Annual Average Daily Traffic (AADT) (both directions)[1]	12,900	Provided by DOWL
Peak-hour Traffic Volume (sum of both directions)[2]	1,410	Provided by DOWL
Existing Corridor Travel Time (minutes)[3]	8	Provided by DOWL
Total peak hours per day (AM+PM)[4]	4.5	Confirmed by DOWL
Analysis and Output		
Analysis Method	The method calculates emission reductions from signal synchronization based on the calculation of time savings for travel along the project corridor by reducing delay at each intersection. The improved travel speed improves speed-specific emission factors as well as reduce emissions from idling. With the application of the CMAQ toolkit[5], this analysis estimates the time savings based on the volume to capacity ratio at intersections based on the 2010 Highway Capacity Manual[6], and the resulting emission savings.	
Total Daily CO_2 Reductions (kg/day)	626	
Total Annual CO_2 Reductions (lbs/year)	**503,570**	

Notes:

1. The AADT of the corridor is estimated based on the average of AADTs in the 3 signalized intersections within the project.
2. The peak hour traffic volume is estimated based on the average of volumes in the 3 signalized intersections within the project.
3. Total time in minutes that it takes for a vehicle to travel the length of the entire corridor
4. Peak hours are assumed to be 7:00-8:00, 11:00-13:00, and 16:15-17:45
5. The CMAQ Toolkit from FHWA, available at: https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/
6. Highway Capacity Manual. (2010). Washington, D.C. :Transportation Research Board

Table 3
Project GHG Emission Reductions
Shore Power at Sitka Ferry Terminal
Sitka, AK

Input		
Description	**Input**	**Reference**
Project Name	Shore Power at Sitka Ferry Terminal	
Project Description	The scope involves providing shore power to the ferries visiting the Sitka Terminal in the Alaska Marine Highway System.	
Vessel Name	Columbia	AMHS[1]
Average Time at berth (hrs/week)	2.5	AMHS[1]
Visits per week	1	AMHS[1]
Engine Model Year	2018+	AMHS
Engine Type	Auxilliary	AMHS
Vessel Engine Power Range (kW)	600 - 1000 kW	AMHS
Power demand at berth (kW)	710	EPA[2]
Analysis and Output		
Analysis Method	The electricity supplied at the Sitka ferry terminal is primarily low emission hydropower; therefore, the calculation of potential emission reductions is based on the emissions that would occur if berthing activities were carried out without utilizing shore power. This is assumed to represent total potential emission reductions from installing shore power at the ports and retrofitting the ferries for shore power. Vessel berthing activity for the Sitka port ferry (Columbia) was estimated using the ferry schedules from AMHS. It was assumed that the vessel schedule obtained for July 2023 is valid for the entire year. Emissions factors for the Columbia ferry at the Sitka port were sourced from EPA's Port Emissions Inventory Guidance, and averaged based on model year, rated power range, and engine type. The total CO_2 emissions are estimated using Load (kW), Berthing Time (hrs/year) and Emission Factor (g/kWh).	
Total Berthing Time (hrs/year)	130	
Ferry Auxiliary Engine Emission Factor for Columbia (g/kWh)[3]	679.5	
Total Annual CO2 Reductions (lbs/year)		**138,229.8**

Notes:

It was assumed that there is no large cargo handling equipment due to the small size of the freight transported on the ferry

[1] Ferry Schedule at the Sitka Port obtained from AMHS website: https://dot.alaska.gov/oars/reservations/CalendarFM.amhsf?_gl=1*2opib2*_ga*MTY2NjM4ODU2My4xNjg5NzA1OTI0*_ga_42D0W9NC07*MTY4OTk1ODg1NS40LjAuMTY4OTk1ODg1NS42MC4wLjA

[2] EPA assumes that larger (M/V Columbia) RORO ferries use 710 kW power while at berth. Source : EPA's Port Emissions Inventory Guidance. Available at : https://www.epa.gov/state-and-local-transportation/port-emissions-inventory-guidance

[3] Due to the Unavailability of exact vessel model information, EPA emission factors were averaged based on model year, rated power range, and engine type.

Table 4
Project GHG Emission Reductions
MSB Shaw Elementary School Roundabout
Mat-Su Valley, AK

Input					
Description	**Input**				**Reference**
Project Name	MSB Shaw Elementary School Roundabout				Provided by DOWL
Project Description	Construction of a Roundabout at Paradise Lane and Wasilla-Fishhook Drive intersection				Provided by DOWL
Evaluation Year	2025				Confirmed by DOWL
Area Type	Urban				Confirmed by DOWL
Business District	No				Confirmed by DOWL
Total peak hours per day (AM+PM)[1]	1				Confirmed by DOWL
Existing intersection is	Un-signalized				Confirmed by DOWL
Number of Circulating Roundabout Lanes	1				Confirmed by DOWL
	Approach 1 (WB)	**Approach 2 (SB)**	**Approach 3 (EB)**	**Approach 4 (NB)**	
Peak Hour Traffic volume	352	418	34	392	Confirmed by DOWL
Existing Delay per Vehicle (sec/veh, refer to table on right)	381	9	21	8	Confirmed by DOWL
K Factor [2]	13.3%				Confirmed by DOWL
Analysis and Output					
Analysis Method	The method calculates emission reductions from roundabout project based on the calculation of time savings for travel along the project intersection with and without the roundabout The improved travel speed improves speed-specific emission factor at the intersection. With the application of the CMAQ toolkit, this analysis estimates the delays and delay controls based on the volume to capacity ratio and maximum lane capacities based on the 2010 Highway Capacity Manual [3], and the resulting emission savings.				
	Approach 1 (WB)	**Approach 2 (SB)**	**Approach 3 (EB)**	**Approach 4 (NB)**	
Average Annual Daily Traffic volume (AADT)[4]	5900	4900	400	6800	Calculated based on peak hour volume and K Factor
Existing Intersection % Left Turns[5]	69%	31%	10%	6%	Calculated based on 2025 peak hour volume provided by Client
Existing Intersection % Right Turns[5]	30%	1%	83%	38%	Calculated based on 2025 peak hour volume provided by Client
Total Daily CO_2 Reductions (kg/day)	167				
Total Annual CO_2 Reductions (lbs/year)	**134,050**				

Notes:

1. The morning peak hour occurs from 8:30 to 9:30 AM, and the evening peak hour occurs from 3:45 to 4:45 PM, based on the MSB Shaw Elementary School Traffic Impact Analysis Draft Report
2. K factor is the percentage of the Average Annual Daily Traffic (AADT) in both directions during the peak hour.
3. Highway Capacity Manual. (2010). Washington, D.C. :Transportation Research Board
4. AADT is calculated based on peak hour traffic and K factor.
5. Percentage of vehicles turning left or right. The remainder would be going straight. Calculated based on the MSB Shaw Elementary School Traffic Impact Analysis Draft Report, Figure 8A: 2025 Opening Year AM and PM Peak totals

Table 5
Project GHG Emission Reductions
UAF EV Shuttle Buses Replacement
Fairbanks, AK

Input		
Description	**Input**	**Reference**
Project Name[1]	UAF EV Shuttle Buses and EV Bus Charging Station Infrastructure	
Project Description[1]	This scope includes 1. Conversion of the UAF Shuttle Bus fleet from diesel to electric by purchase of up to 5 buses over a period of time, and 2. Construction of a electric bus fueling station on the UAF campus to support the conversion of the shuttle bus fleet from diesel to electric.	Public Information
Evaluation Year	2027	Confirmed by FAST
Type of vehicles replacing	Shuttle Bus	Provided by FAST
Model year of existing buses	2001 FORD BUS MINI 14 PASS GIRARDIN DIESEL (5000 miles/yr), 1992 THOMAS BUS 31 PASS TRANSIT LINER (7500 miles/yr), (3x) 2006 INTERNATIONAL 21 PERSON BUS, VT365, ALLISON (10000 miles/year each)	Provided by FAST
Fuel type of existing bus	Diesel	Confirmed by FAST
Model year of new alternative fuel bus[2]	2027	Confirmed by FAST
Fuel type of new bus	Battery Electric	Provided by FAST
Number of buses	5	Confirmed by FAST
Annual vehicle mileage[3]	2001 FORD BUS MINI 14 PASS GIRARDIN DIESEL (5000 miles/yr), 1992 THOMAS BUS 31 PASS TRANSIT LINER (7500 miles/yr), (3x) 2006 INTERNATIONAL 21 PERSON BUS, VT365, ALLISON (10000 miles/year each)	Provided by FAST
Will the fueling stations used for other alternative fuel vehicles?[4]	No	Confirmed by FAST
Will the fueling distance increase or decrease with the new infrastructure?[5]	N/A	Confirmed by FAST
One-way fueling distance increase/decrease (miles)	No change	Confirmed by FAST
Analysis and Output		
Analysis Method	Replacing diesel shuttle buses to electric bus can eliminate all tailpipe CO_2 emissions during bus operation. Therefore, annual emission reductions are calculated based on the emission rate of existing diesel vehicles and the fleet activities. In the CMAQ toolkit, the emission reductions in this analysis are first estimated separately based on the vehicle model year and the corresponding annual VMT of the 3 existing vehicle types, and then added together as the total Project emission reductions. Because of the diesel bus emission factors from the CMAQ toolkit[6] and the EPA MOVES model data are only available since 1997, this analysis used the emission factor of the Model Year 1997 school bus as a conservative estimate for replacement of the Model Year 1992 Thomas Bus.	
CO_2 reductions from 2001 FORD BUS (kg/day)	33	
CO_2 reductions from 1992 THOMAS BUS (kg/day)	10	
CO_2 reductions from one 2006 INTERNATIONAL 21 PERSON BUS (kg/day)	34	
Total Daily CO_2 Reductions (kg/day)	145	
Total Annual CO_2 Reductions (lbs/year)	**116,615**	

Notes:

1. The Project is an alternative to the UAF CNG Bus. The base project information is available at: https://fastplanning.us/wp-content/uploads/2023/02/06_UAF_CNG_Shuttle_Buses.pdf, https://fastplanning.us/wp-content/uploads/2023/02/07_UAF_CNG_Bus_Fueling_Station_Infrastructure.pdf
2. The project will purchase the latest model years EV buses with zero tailpipe CO_2 emissions when the project starts.
3. The vehicle mileage data corresponds to the vehicle types provided above. It's assumed that the vehicle replacement will not change the mileage.
4. According to the CMAQ/CRP nomination form for fueling station infrastructure, the scope of the new EV stations is to fuel the new EV shuttles only.
5. This question is to evaluate whether charging distance will increase or decrease compared to the existing fueling station(s).
6. The CMAQ Toolkit from FHWA, available at: https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

Table 6
Project GHG Emission Reductions
LED Street Lighting Replacement
Kenai, AK

Input		
Description	**Input**	**Reference**
Project Name	LED Street Lighting Replacement	
Project Description	AK DOT will replace existing highway lights in the Kenai Spur Hwy with LED lights that are less energy intensive and reduce electricity consumption	Provided by AKDOT
Evaluation Year	2027	Provided by AKDOT
Length of Project (mile)	3.2	Provided by AKDOT
Are streetlights installed on both sides?	Yes	Confirmed by AKDOT
Number of existing streetlights to be replaced[1]	140	Provided by AKDOT
Power rate of existing streetlights (Watt)	250	Provided by AKDOT
Streetlight Daily Operation Hours (hr/day)	10	Provided by AKDOT
Number of LED streetlights to be installed[2]	140	Provided by AKDOT
Power rate of proposed LED streetlights (Watt)	120	Provided by AKDOT
Local Grid Carbon Intensity (lb CO_2/MWh)[3]	1,068	EPA eGRID based on Project location
Analysis and Output		
Analysis Method	The CO_2 emission reduction from this Project is from electricity savings. Electricity saving is calculated based on the difference of existing and new streetlight power ratings, the number of streetlights and the local streetlight operational patterns as shown above. CO_2 emission reductions are then estimated based on electricity savings and local grid carbon intensity from the EPA eGRID. This analysis used carbon intensity of AKGD, which serves Central and Southeast Alaska, including the Project area.	
Total Daily CO_2 Reductions (kg/day)	88	
Total Annual CO_2 Reductions (lbs/year)	**70,927**	

Notes:

1. The value is based on number counts from aerial photo.
2. Assuming replacing fixtures only, so the number of streetlight remain unchanged
3. The local grid carbon intensity is used to estimate the grid CO_2 emission reductions due to the power saving from LED streetlights. The data source is EPA eGRID: https://www.epa.gov/egrid/power-profiler#/AKGD. The carbon intensity used in the analysis is the ASCC Alaska Grid that serves Central and Southeast Alaska.

Table 7

Project GHG Emission Reductions
Chena Lake Recreation Area Bike & Pedestrian Infrastructure
Fairbanks, AK

Input		
Description	**Input**	**Reference**
Project Name	Chena Lake Recreation Area Bike & Pedestrian Infrastructure	
Project Description	This project includes the construction of a bike/pedestrian pathway separated from the unpaved section of the road roughly a ½ mile long on Plack Road, connecting recreation users to Chena Lake Recreation Area (CLRA) with a small off-street parking area. Also included in this project is the construction/rehabilitation of roughly 910 feet of trail for nonmotorized use. The Project will allow visitors access to the park from a new entrance through the bike/pedestrian pathway at the intersection of Plack Road.	Provided by client
Evaluation Year	2028	Confirmed by client
New Bikeway Length (mile)[1]	0.67	Confirmed by client
Existing Daily Vehicle trips to CLRA[2]	822	Provided by client
Vehicles will use New Entrance (vehicles / day)	20-30	Provided by client
New Entrance One-way Driving Trip Length Savings (miles)	6	Provided by client
Average Bike Trip Length (mile)[3]	2	CMAQ Toolkit Default
Total existing bikeway length in the Project Area (miles)[4]	2	Measured through Google Maps
Analysis and Output		
Analysis Method	The method calculates emission reductions from bike and pedestrian infrastructure based on the calculation of vehicle trips and VMT savings associated with the project. Based on the project description, this consists of two parts: (1) vehicle detour related to the access to the new entrance, and (2) bike trip increase due to the lane expansion. We estimated the VMT decrease related to detour based on the Project design and estimated per trip VMT savings. For VMT reductions related to the bike trip increase, we used input data, available bike mode share data, and elasticity from a multivariate analysis that evaluates the impacts of bike lanes on cycling levels in the 100 largest U.S. cities, which found that a 0.25 percent increase in cycling occurs for every 1 percent increase in bike lane distance.[5] With the application of the CMAQ toolkit[6], this analysis estimates the emission savings from vehicle trip and VMT reductions.	
Daily VMT Reductions (miles/day)[7]	306	
Total Daily CO_2 Reductions (kg/day)	51	
Total Annual CO_2 Reductions (lbs/year)	**41,103**	

Notes:

1. The project includes 0.5 miles of bike/pedestrian lane, plus a 910 ft. non-motorized access trail.
2. It is estimated that CLRA has about 300,000 visitors per year.
3. Due to lack of local data, this analysis used a one-way bike trip length of 2 miles, which is the default national average from the CMAQ toolkit.
4. Measured through Google Maps with self-identified Project boundary, as the local communities all have a separated path on Plack rd up until the Project site.
5. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity, Available at : https://www.caleemod.com/documents/handbook/full_handbook.pdf
6. The CMAQ Toolkit from FHWA, available at: https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/
7. The VMT reductions are estimated based on the combined effect of vehicle detour and bike trip increase as discussed in the method row.

Table 2
Project GHG Emission Reductions
UAF CNG Shuttle Buses Replacement
Fairbanks, AK

Input		
Description	**Input**	**Reference**
Project Name[1]	UAF CNG Shuttle Buses and CNG Bus Fueling Station Infrastructure	Public Information[1]
Project Description[1]	This scope includes 1. Conversion of the UAF Shuttle Bus fleet from Diesel to CNG by purchase of up to 5 buses over a period of time, and 2. Construction of a compressed natural gas (CNG) fueling station on the UAF campus to support the conversion of the shuttle bus fleet from Diesel to CNG.	Public Information[1]
Evaluation Year	2027	Confirmed by FAST
Type of vehicles replacing	Shuttle Bus	Provided by FAST
Model year of existing buses	2001 FORD BUS MINI 14 PASS GIRARDIN DIESEL, 1992 THOMAS BUS 31 PASS TRANSIT LINER , (3x) 2006 INTERNATIONAL 21 PERSON BUS, VT365, ALLISON (10000 miles/year each)	Provided by FAST
Fuel type of existing bus	Diesel	Confirmed by FAST
Model year of new alternative fuel bus[2]	2027	Confirmed by FAST
Fuel type of new bus	Compressed Natural Gas (CNG)	Confirmed by FAST
Number of buses	5	Confirmed by FAST
Annual vehicle mileage[3]	2001 FORD BUS MINI 14 PASS GIRARDIN DIESEL (5000 miles/yr), 1992 THOMAS BUS 31 PASS TRANSIT LINER (7500 miles/yr), (3x) 2006 INTERNATIONAL 21 PERSON BUS, VT365, ALLISON (10000 miles/year each)	Provided by FAST
Will the fueling stations used for other alternative fuel vehicles?[4]	No	Confirmed by FAST
Will the fueling distance increase or decrease with the new infrastructure?[5]	N/A	Confirmed by FAST
One-way fueling distance increase/decrease (miles)	No change	Confirmed by FAST
Analysis and Output		
Analysis Method	Annual emission reductions for the total number of conventional fuel vehicles being replaced by alternative fuel vehicles are calculated based on the difference of the emission rate between existing conventional fuel (e.g., diesel) vehicles and the target renewable fuel vehicles and the fleet activity. By applying the CMAQ toolkit[6], the emission reductions in this analysis are first estimated separately based on the vehicle model year and the corresponding annual VMT of the 3 existing vehicle types, and then added together as the total Project emission reductions. Note that because the diesel bus emission factors from the CMAQ tool and the EPA MOVES model data are only available since 1997, this analysis used the emission factor of the Model Year 1997 school bus as a conservative estimate for replacement of the Model Year 1992 Thomas Bus.	
CO_2 reductions from 2001 FORD BUS (kg/day)	2.285	
CO_2 reductions from 1992 THOMAS BUS (kg/day)	3.17	
CO_2 reductions from 2006 INTERNATIONAL 21 PERSON BUS (kg/day)	4.408	
Total Daily CO_2 Reductions (kg/day)	18.677	
Total Annual CO_2 Reductions (lbs/year)	**15,029**	

Notes:

1. The Project information is available at: https://fastplanning.us/wp-content/uploads/2023/02/06_UAF_CNG_Shuttle_Buses.pdf, https://fastplanning.us/wp-content/uploads/2023/02/07_UAF_CNG_Bus_Fueling_Station_Infrastructure.pdf
2. The project will purchase the latest model years CNG buses when the project starts
3. The vehicle mileage data corresponds to the vehicle types provided above. It s assumed that the vehicle replacement will not change the mileage
4. According to the CMAQ/CRP nomination form for fueling station infrastructure, the scope of the new fueling stations is to fuel the new CNG shuttles only.
5. This question is to evaluate whether fueling distance will increase or decrease compared to the existing fueling station(s).
6. The CMAQ Toolkit from FHWA, available at: https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

Appendix: Public Engagement

Carbon Reduction Strategy
FAST Planning Staff & Technical Committee Update

Date/Location: Wednesday, May 3, 2023, 12:00 – 2:00 p.m.
Zoom

Staff Present: DOT&PF: Judy Chapman
DOWL: Theresa Dutchuk, Adam Morrill, and Morgan McCammon

Summary

The Fairbanks Area Surface Transportation (FAST) Planning Committee discussed their project nominations for consideration and funding strategy. The specific topics included congestion mitigation, air quality, and a carbon reduction program as Fairbanks is considered a serious non-attainment area due to wintertime air quality issues. This list of projects will be shared with the project team.

Theresa Dutchuk and Adam Morrill presented the Carbon Reduction Strategy. The presentation included the project overview, background, schedule, and input needs.

Discussion and Comments

Committee member Danny Wallace, City of North Pole, asked for clarification on how the State's Carbon Reduction Strategy would coordinate with the FAST Planning carbon reduction efforts. The project team shared that funding allocation is based on population. This would be a competitive process that incorporates a benefit analysis and would award project funding for those that sync with the State's plan. Jackson Fox, FAST Planning Executive Director, shared that FAST Planning has developed a list of projects ahead of State's planning process. FAST Planning can provide strategies applicable to the State's cold-weather climates.

A committee member commented on $29 million allocated for the Municipal Planning Organization (MPOs) and separate State-wide funding, asking if the MPO could apply for those State-wide funds in addition. Judy Chapman, Department of Transportation and Public Facilities (DOT&PF) Planning, responded that this would be possible and depends on how DOT&PF manages funds.

Committee member Kevin McKinley, Fairbanks North Star Borough (FNSB) Planning Commission, requested clarification on the federal administration goals included in the presentation, specifically about safety and complete streets, equity, and urban versus rural considerations. The project team shared that the Bipartisan Infrastructure Law (BIL) outlined funding would be disbursed based on population centers and densities, focusing on populations over 250,000.

A committee member requested additional information on carbon existing conditions in Alaska and the contributions presented. The project team shared that Alaska is different from other states, with approximately 33% of carbon emissions related to transportation and 49% is related to industrial sources. Examples of industrial carbon sources include many of Alaska's economic sectors, like oil and gas operations on North Slope and use of natural gas to regulate the systems.

A committee member stated that the Fairbanks area had CO issues 20 years ago, but they have been addressed. The main challenge the area is facing today is particulate matter (PM), requested clarification on how this Carbon Reduction Strategy coordinate with $PM_{2.5}$. The project team shared details on National Ambient Air Quality Standards (NAAQS) and greenhouse gases (GHG) being separate issues. Nick Czarnecki, Department of Environmental Conservation (ADEC) Air Quality Division, further shared that NAAQS are separate from GHG when looking at emissions reductions. Nick Czarnecki shared that lowering GHG emissions will have a beneficial impact on other air quality standards. The CRP is looking to lowering fuel combustion and lower all emissions.

Robert Pristash, City of Fairbanks Engineering Department, asked for clarity on how projects would be scored and weighted, as FAST Planning has developed a scoring system. The project team shared that they would like to work with FAST Planning to incorporate recommendations consistent with prior efforts.

Jackson Fox requested additional details on how emissions by transportation mode were calculated. The project team shared that a combination of methods was used, including fuel sales and vehicle miles traveled on road. Aviation and other transportation modes were determined from fuel sales.

Jackson Fox asked if this funding would be required to be used for on-road transportation and if aviation projects could be eligible. The project team shared that some aviation and marine projects could be included, however, because this is a national program, it is based on reducing carbon emissions by the most common source, nationally. Alaska is unique in that aviation is the highest carbon emission source versus on-road sources in lower 48.

Jackson Fox commented that FAST Planning has developed a competitive process, scoring projects to improve air quality in the area.

Jackson Fox offered to share the reduce carbon projects list and supporting documents developed by FAST Planning.

Recommendations

- Include alternative vehicle charging stations
- Signal interconnect projects to improve traffic flow
- Increase transit usage and access to transit
- Develop a quantifiable method to show air quality improvements to score projects
- Include roundabouts
- Develop methods to reduce traffic start and stop

The project team thanked the FAST Planning Committee and staff for their time and committed to updating the Committee following the release of the draft Carbon Reduction Strategy Plan in July 2023.

Carbon Reduction Strategy
FAST Planning Policy Board Update

Date/Location: Wednesday, May 17, 2023, 12:00 – 2:00 p.m.
Zoom

Staff Present: DOT&PF: Randi Bailey
DOWL: Adam Morrill and Morgan McCammon

Summary

The Fairbanks Area Surface Transportation (FAST) Planning staff recently met with Anchorage Metropolitan Area Transportation Solutions (AMATS) and the new Mat-Su Valley Planning (MVP) Metropolitan Planning Organizations (MPOs). As a group, they would like to eliminate DOT&PF discretionary funding set-aside from the statewide budget to fund MVP with two full time staff members.

The FAST Planning Policy Board discussed their project nominations for consideration and funding strategy. The specific topics included congestion mitigation, air quality, and a carbon reduction program.

Adam Morrill presented the Carbon Reduction Strategy. The presentation included the project overview, background, schedule, and input needs. Additionally, Adam shared the list of recommendations from the Staff and Technical Committee:

- Include alternative vehicle charging stations
- Signal interconnect projects to improve traffic flow
- Increase transit usage and access to transit
- Develop a quantifiable method to show air quality improvements to score projects
- Include roundabouts
- Develop methods to reduce traffic start and stop

Discussion and Comments

A board member requested the emissions break down on type of aviation (commercial vs public)? Adam shared that Green House Gas Inventory reports this information and committed to sharing an answer. **A board member** requested also checking on military aviation emissions.

A board member asked if speed limits based on vehicle mileage on interstates would be considered. Adam shared that carbon emissions are highest between 0-10 mph, then decline until a certain speed before increasing again. This concept could be included in the Carbon Reduction Strategy.

Recommendations and Follow Up

- Determine the source of aviation carbon emissions
- Consider adjusting speed limits to minimize carbon emissions

The project team thanked the FAST Planning Board and staff for their time and committed to updating the Board following the release of the draft Carbon Reduction Strategy Plan in July 2023.

Carbon Reduction Strategy
AMATS Technical Advisory Committee Update

Date/Location:	Thursday, July 13, 2023, 2:30 – 4:30 p.m. Teams
Project Team Present:	DOWL: Theresa Dutchuk, Adam Morrill, and Morgan McCammon

Summary

Jon Cecil, Municipality of Anchorage (MOA), Transportation Planner, introduced the project and the consultant team members, Theresa Dutchuk and Adam Morrill, to the Anchorage Metropolitan Area Transportation Solutions (AMATS) Technical Advisory Committee (TAC).

Theresa and Adam presented an introduction to the Carbon Reduction Strategy (CRS), which included the project overview, background, schedule, and input needs.

Committee Discussion and Comments

Committee Member Yemi Alimi shared that he invited his colleague with the Department of Environmental Control (DEC), who is an expert on Green House Gas (GHG) emissions. **Committee Member Alimi** further commented on ways to reduce carbon emissions: reduce congestion, increase use of transportation modes such as transit and walking, reduce individual vehicle miles traveled, and incentivize zero emission vehicle use.

A **Committee Member** mentioned the Vanpool Program (Rideshare). A subsidy could expand this program to offer the service more broadly to Matanuska-Susitna Valley and Girdwood areas. Strategies should include ways to make transit more competitive with personal vehicles.

A **Committee Member** mentioned AMATS has programed Carbon Reduction Plan (CRP) funding and asked how the CRS would coordinate with already programmed projects. Theresa responded that coordinating with Metropolitan Planning Organizations (MPOs) is an important part of this process.

Committee Member Melinda Kolhass requested examples of emissions sources in the industrial category, as it accounts for a substantial percentage of the state's emissions.

Paul Goodfellow, DEC, shared that the state's GHG Inventory is available online for review. Industrial emissions are mostly from oil and gas drilling and refining. He further shared in the meeting chat: *I would encourage everyone to review the state's GHG Inventory, as it has technical details which may answer some questions posed here: https://dec.alaska.gov/air/anpms/projects-reports/greenhouse-gas-inventory*.

Committee Member Kolhass shared an about idea fast food drive throughs to incentivize, minimize, or eliminate idling while at drive throughs.

Committee Member Kolhass requested clarification on why emissions testing is no longer required and commented that it could be worth explaining to public.

Committee Member Brad Coy requested clarification on how aviation emissions were calculated. Adam shared that the largest source of aviation carbon emissions is international freight, and 5% came from transportation to remote communities. **Committee Member Coy** followed up by asking what ways this plan could minimize aviation emissions without jeopardizing jobs. Adam responded that the CRS plan focuses on on-road emissions. This is explicitly stated in the legislation because, in most states, the highest levels of carbon emissions come from on-road sources.

Committee Member Coy requested clarification on AMATS's flexibility for funding use. Adam responded that additional funding is available, and the funds shown in this presentation are DOT&PF projections. The CRS will be updated every four years and include allocations. This funding can be used for capital expenditures, maintenance projects, and non-motorized, if the use demonstrates reductions to on-road carbon emissions.

A **Committee Member** asked about cold engine starts contributing to carbon emissions. A **Committee Member** corrected that cold engine starts increase carbon monoxide (CO) rather than carbon dioxide (CO_2).

Public Comment

James Starzec, Department of Transportation and Public Facilities (DOT&PF) Transportation Planner, noted that this CRS is required to focus on on-road carbon emissions and requested clarification on the Alaska Marine Highway. Adam responded that for purposes of this plan, the Alaska Marine Highway system would be included.

James Starzec questioned if AMATS would be constrained by the CRS. Adam responded that the Federal Highway Administration (FWHA) would approve funding use if projects reduce carbon emissions, and that the CRS is being developed in coordination with MPOs to make it consistent with other state plans.

Adam Moser, DOT&PF Program Development Chief, shared in the meeting chat: *DOT&PF will not require AMATS to program its suballocation of CRP funding to conform to the plan, so long as the programming is an eligible activity for CRP. The plan is to provide options and inform the data driven investment of CRP funds.*

A member of the public mentioned that DOT&PF is evaluating electric vehicles (EVs), and if power comes from natural gas, no carbon emissions reduction benefit is realized.

A member of the public asked if the financial costs to Alaska residents have been considered for these strategies, and if this plan would have meaningful reductions compared to costs due to the low levels of on-road carbon emissions in the state.

Recommendations

The Committee stated that they could not provide recommendations before the Policy Committee meets in two weeks. A Committee Member made a motion, that passed, to request staff schedule a work session in the next month for the Committee to provide recommendations.

The project team thanked the TAC for their time and committed to updating the Committee following the release of the draft Carbon Reduction Strategy Plan in September 2023.

Carbon Reduction Strategy
AMATS Policy Committee Update

Date/Location:	Thursday, July 27, 2023, 1:30 – 3:30 p.m. Teams
Project Team Present:	DOWL: Renee Whitesell, Theresa Dutchuk, Adam Morrill, and Morgan McCammon

Summary

Aaron Jongenelen, Municipality of Anchorage (MOA), Transportation Planner, introduced the project and the consultant team members, Renee Whitesell, Theresa Dutchuk, and Adam Morrill, to the Anchorage Metropolitan Area Transportation Solutions (AMATS) Policy Committee (PC).

Renee began the presentation by introducing the Carbon Reduction Strategy (CRS). Theresa and Adam continued by presenting background, schedule, and input needs.

Committee Discussion and Comments

Committee Member Daniel Volland mentioned that AMATS has strategies and projects in the Transportation Improvement Program (TIP). He asked how the state program intersects with TIP and whether the funding would be in addition to funding already programmed. Aaron responded that AMATS has programmed all CRP funding through 2026.

Adeyemi Alimi, Department of Environmental Conservation (DEC), recapped comments he shared from Technical Advisory Committee (TAC). He suggested strategies of reducing total particulate matter (PM) 10, reduction of the carbon footprint, increasing carpooling and van pooling programs, and increasing renewable energy for electric car charging.

Committee Member Volland mentioned the Complete Streets Program as a strategy to reduce carbon emissions, increase quality of life, and increase availability of transportation choices.

Adeyemi Alimi questioned the concept of reducing carbon emissions in aviation sector and combining those strategies with the on-road carbon emissions. The project team reiterated that the funding in this program is not available for strategies to reduce aviation sector carbon emissions.

Aaron Jongenelen added that a work session is being schedule for the PC and TAC members to make recommendations for the CRS.

Public Comment

A public participant mentioned they had difficulty hearing the presentation and PC conversation from the public seating area. The PC members said they would speak louder.

Some public participants expressed concern with the idea of reducing surface transportation carbon emissions and the cost to Alaska taxpayers for this program. Main concerns were that this strategy would reduce the options for personal vehicles, increase costs for residents now and in the future, and climate change science debate.

A public participant was concerned with the focus of on-road transportation carbon emissions when 71% of transportation carbon emissions in Alaska come from aviation. He suggested focusing on the aviation sector as a primary way to reduce carbon emissions in the state.

A public participant commented that climate change is a problem, and this year has been the hottest July on record. He was glad to see carbon emission reduction projects in the draft 2024-2027 Statewide Transportation Improvement Program (STIP). He added that some communities in Alaska can use smaller personal electric or short-range vehicles that are obsolete in other larger communities.

One public participant urged AMATS to schedule a presentation by the CO_2 Coalition.

Additional Committee Discussion and Comments

Committee Member Volland mentioned that the presentation and eligible projects do not include suggestions to take personal property and seems to be about increasing transportation choices.

Adeyemi Alimi commented that the Anchorage emissions testing was discontinued. He reiterated the voluntary nature of programs such as the van pool program to decrease CO emissions.

A Committee Member raised concerns with renewable energy coming from imported materials from countries with slave labor equivalent, exploiting vulnerable populations, to increase electrification of transportation systems in Alaska.

Recommendations

AMATS staff will host a work session for PC and TAC members to make recommendations on the CRS early enough in August 2023 and to present strategies at the next PC meeting, in time for comment on the draft CRS.

Carbon Reduction Strategy
AMATS Freight Advisory Committee Update

Date/Location:	Wednesday, August 9, 2023, 3:00 – 4:30 p.m. Teams
Project Team Present:	DOWL: Theresa Dutchuk and Morgan McCammon

Summary

Jonathan Cecil, Municipality of Anchorage (MOA), introduced the project and consultant team member, Theresa Dutchuk, to the Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Advisory Committee (FAC). Theresa presented an introduction to the Carbon Reduction Strategy (CRS), background, schedule, and input needs.

Committee Discussion and Comments

Committee Chair Joe Michel asked for specific language in infrastructure bill discussing freight vehicles. Theresa will email this language to Joe. **Committee Chair Michel** requested examples of strategies applicable to freight movement. Theresa shared a few examples: transitioning freight vehicles to alternative fuels, developing infrastructure to support alternative fuel vehicles, and using alternative fuels for the Alaska Marine Highway System (AMHS) and facilities.

Committee Chair Michel asked about other non-freight specific recommendations, such as bike paths. Theresa shared that the project team is developing an example list of strategies to reduce on-road carbon emissions in the state. These include recommendations such as the Complete Streets program and others.

Recommendations

The FAC had no recommendations at this time.