PARKS HIGHWAY
Alternative Corridor PEL Study

TECHNICAL MEMORANDUM

Alternative Design Criteria Technical Memorandum

TO:	Kelly Summers, P.E., Project Manager – Department of Transportation and Public Facilities (DOT&PF)
FROM:	Joseph Taylor, P.E., Lounsbury
THRU:	Renee Whitesell, PTP, Project Manager, DOWL
DATE:	November 16, 2022
PROJECT:	Parks Highway Alt. Corridor Planning PEL Study Project Numbers: Federal-0A41039/004210000 State-CFHWY00421/0A41039

Purpose

This memorandum identifies the project design criteria and relevant policies, codes and standards that will govern the design of the Parks Highway Alternative Corridor. The design criteria is attached as Figure *1100-2 Project Design Criteria for New and Reconstruction Projects.* This memorandum and figures rely on information contained in the Desired System Performance Memorandum and Traffic Forecast deliverables developed under other Articles of the subject project. Proposed typical sections that depict the information contained in Figure 1100-2 are included with this memorandum.

Figure 1: Probable Limits of the Alternatives

Design Codes and Standards

The Central Region and Statewide Design and Engineering Services (D&ES) staff of the DOT&PF have jurisdictional authority for the design and engineering of the Parks Highway within the PLA. The DOT&PF develop and administer the Alaska Highway Preconstruction Manual (HPCM) which describes the project development process and highway design standards governing this project. The HPCM dated July 2020 is the primary source of design standards shown in Figure 1100-2.

The HPCM incorporates by reference the American Association of State Highway and Transportation Officials (AASHTO) publication *A Policy of Geometric Design of Highways and Streets* (2018). The Policy provides supplemental information to the HPCM and is the second primary source of standards for the project. This Policy is commonly referred to as the Green Book, and abbreviated "GB" as shown in Figure 1100-2.

Prior Planning and Permitting

Current and historical planning documents, as well as current access management permits, describe the long-term vision for access management of the Parks Highway through the proposed corridor. These plans include the *Parks Highway Visioning Document* (2006), the *City of Wasilla's Comprehensive Plan* (2011), and the *Matanuska-Susitna (Mat-Su) Borough Long Range Transportation Plan* (2017) as well as current access development permits between DOT&PF and the Mat-Su Borough. The previous plans and current permits demonstrate that the collective vision for the new facility is that of a controlled-access highway through rolling terrain. The highway will provide an alternative to the existing Parks Highway through the Wasilla urban core and will have a primary focus on high mobility, high speed, and limited access. Access along the new highway will be provided with interchanges at key north-south arterials and major collector roadways. Access across the highway will be a design consideration for all modes per the *Matanuska-Susitna (Mat-Su) Borough Long Range Transportation Plan* (2017) and the *Matanuska-Susitna Borough Recreational Trails Plan* (2016). The highway will be designed with a 30-year design life starting from 2025. The design vehicle used in the project criteria is a WB109-D, a turnpike double-semi trailer with a length of 114 feet.

Data Collection Methods and Limitations

Traffic information including Annual Average Daily Traffic (AADT), percentage of trucks, and directional split of vehicles was obtained from the DOT&PF's Traffic Analysis and Data Application website https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp.

For the year 2019, AADT's for the existing Parks Highway ranged from a low of 11,000 at the north end of the project area to a high of approximately 38,000 near the intersection of Crusey Street. An AADT of 34,000 is recorded near Milepost 39.9 at the Broadview Avenue traffic collection site, which was selected as the reference site. This site counted 6 percent of trucks in the traffic stream and an approximate 50/50 directional split for all traffic in the north and southbound directions. The DHV percentage was calculated by multiplying the AADT by the k-factor provided on DOT&PF's website.

Projected mid-design and final-design AADT volumes are not available at the time of the development of this draft memorandum. Figure 1100-2 will require updating once that information is available. However, this information is not likely to change the criteria presented in Figure 1100-2.

Summary of Characteristics

The new highway will be classified as an Urban Principal Arterial Freeway. It will be a multi-lane facility within a controlled-access corridor where access is provided via on and off ramps at interchanges. The highway will have a design speed range of 55 to 70 mph and is proposed to have a standard lane width of twelve feet. Varying widths for inside and outside shoulders and auxiliary lanes are expected to range from six (6) to 12 feet. The highway will be paved, without curbing, and feature continuous lighting.

Median treatments could include a depressed ditch or a paved median with concrete barrier and may require a combination of both. The design of the project median, typical section, embankment widths and proposed Right-of-Way will include space for additional highway lanes and will be forward compatible with high-occupancy vehicle (HOV) or transit only lane designations in order to accommodate traffic growth beyond the design year.

Embankment fill slopes and cut slopes will be designed with traversable and recoverable slopes of sufficient width to provide roadside drainage ditches deep enough to convey drainage below the structural section of the highway. This combination of flat slopes and deep ditches will also strive to provide clear zone widths of 30 feet for the design speed and anticipated traffic volumes. Conceptual typical sections depicting these characteristics are attached to this memorandum.

PROJECT DESIGN CRITERIA

Project Name: Parks Highway Alternative Corridor

State Project No.: CFHWY00421 Federal Project No.: OA41039

Functional Classification: Interstate, Urban Principal Arterial Freeway – George Parks Highway Terrain: Rolling

Present ADT (2019): 34,000 Mid-Design ADT (2040): _____ Design ADT (2055): _____

DHV (%): 3200 Trucks (%): 6 Directional Split (%/%): 50/50

Pavement Design Year: 2055 Pavement Design ESAL: _____

Design Turning Vehicle: WB-109D

Project Type: New Construction/Reconstruction NHS: ☒ Non-NHS: ☐

FHWA 10 CONTROLLING DESIGN CRITERIA		SOURCE	STANDARD	AS PROPOSED	EXCEPTION[1]
Design Speed[1]		GB Section 8.2.1, p. 8-2	70 mph	55-70 mph	No
Lane Width	Travel	GB Section 8.2.4, p. 8-3	12 ft	12 ft	No
	Auxiliary	GB Section 9.7.1, p. 9-92	10-12ft	12 ft	No
Shoulder Width	Outside	GB Section 8.2.4, p. 8-3	10-12 ft	10 ft	No
	Inside	GB Section 8.2.4, p. 8-3	4-8 ft	6 ft	No
	Auxiliary	GB Section 9.7.1, p. 9-92	6-12 ft	6 ft	No
Horizontal Curve Radius, min		GB Section 3.3.3.3, Table 3-7, p. 3-34	2040 ft	2040 ft	No
Superelevation Rate, e, max		GB Section 8.2.6, p. 8-4 & HPCM Section 1160.5.6, p. 1160-22	6%	4-6%	No
Stopping Sight Distance (SDD), min		GB Section 3.4.6.2.1, Table 3-35, p. 3-170	730 ft	730 ft	No
Grade	Min.[2]	GB, Section 3.4.2.2.2, p. 3-130	0.5%	0.5%	No
	Max.	GB, Section 8.2.7, Table 8-1, p. 8-5	4%	4%	No
Cross Slope		GB Section 8.2.4, p. 8-3	1.5-2%	2%	No
Vertical Clearance	Bridge	HPCM Section 11300, Table 1130-1, p. 1130-5	16.5 ft	> 17 ft	No
	Overhead Utilities	HPCM Section 1130, Table 1130-1, p, 1130-5	20.5 ft	20.5 ft	No
Design Loading Structural Capacity[1]		GB Section 8.2.8, p. 8-5	HL 93	HL 93	No

[1] On low speed roadways (<50 mph) on the NHS, only Design Speed and Design Loading Structural Capacity require a Design Exception; all other criteria require a Design Waiver. For projects off the NHS, all criteria require a Design Waiver.

[2] Minimum grade is not one of the FHWA 10 Controlling Design Criteria and will require a Design Waiver for any variance.

OTHER DESIGN CRITERIA		SOURCE	STANDARD	AS DESIGNED	WAIVER
Superelevation Transition, Δ		GB Section 3.3.8.2.1, p. 3-62	0.5%	0.5%	No
Bridge Clear-Roadway Width		GB 8.2.8, p. 8-5	118-158 ft	150 ft	No
Vertical Curvature (min)	K (crest)	GB Section 3.4.6.2, Table 3-35, p. 3-170	247	247	No
	K (sag)	GB Section 3.4.6.3, Table 3-37, p. 3-176	181	181	No
Lateral Offset to Obstruction		GB Section 8.2.10, p. 8-6	2 ft	2 ft	No
Surfacing Material		HCPM Section 1180.3, p. 1180-1	Paved	Paved	No
Clear Zone	Slope (fill)	HCPM Section 1130, Table 1130-2, p. 1130-6	4:1 or flatter	6:1	No
	Width (fill)		30 ft	30+ ft	No
	Slope (cut)		4:1 or flatter	6:1	No
	Width (cut)		26-30 ft	30 ft	No
Bicycle Lane Width		N/A	N/A	N/A	No
Sidewalk/Pathway Width		N/A	N/A	N/A	No
Intersection Sight Distance*, Passenger Car	Crossing (GB Case B1)	N/A	N/A	N/A	No
	Left/Right Turn (GB Case B2)	N/A	N/A	N/A	No
	Crossing (GB Case B3)	N/A	N/A	N/A	No
Passing Sight Distance		GB Section 3.4.2, Table 3-4, p. 3-11	1200 ft	1200 ft	No
Degree of Access Control		HPCM Section 1190.3, p. 1190-2	Controlled	Controlled	No
Median	Treatment	GB Section 8.4.2, p. 8-13	Barrier or Depressed	Barrier or Depressed	No
	Width		10-30 ft	30 ft	No
Illumination	George Parks Highway	RPRL	N/A	N/A	No
Curb Type		N/A	N/A		No

* Attach calculations

Notes: GB – AASHTO “A Policy on Geometric Design on Highways and Streets”, 2018; RGD – AASHTO “Roadside Design Guide”, 2011; HPCM – Alaska Highway Preconstruction Manual 2020; RPRL – IES Recommended Practice for Roadway Lighting (RP-8-14)

Proposed by: Joseph Taylor, PE Date: November 16th, 2022

Designer (Consultant or Staff)

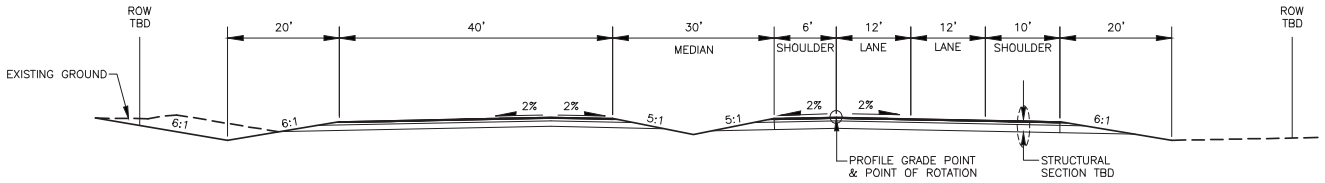
Recommended by: Kelly Summers Type text here Date: 1/23/23

Engineering Manager

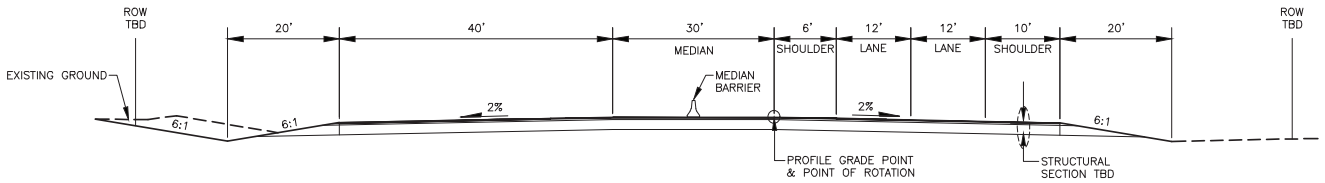
Accepted by: Luke Bowland Digitally signed by Luke Bowland Date: 2023.02.01 16:11:35 -09'00' Date: 2/1/2023

Regional Preconstruction Engineer

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	–	2022	1	1



4 LANE TYPICAL SECTION – DEPRESSED MEDIAN



4 LANE TYPICAL SECTION – BARRIER MEDIAN

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

PARKS HIGHWAY ALTERNATIVE
CORRIDOR PEL STUDY

ALTERNATIVE DESIGN CRITERIA
TYPICAL SECTIONS CONCEPT

PLANS DEVELOPED BY: LOUNSBURY & ASSOCIATES ADDRESS: 3230 C ST, SUITE 201, ANCHORGE AK 99503 PHONE: (907) 272-5451 CERTIFICATE OF AUTHORIZATION NUMBER: AECC391

FILE	DATE/TIME	DESIGNED	CHECKED	DRAFTED
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