APPENDIX A

PROJECT DESIGN CRITERIA

lounsbury & associates, inc.

MEMORANDUM

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Project Management & Engineering
Municipality of Anchorage

Date: February 6, 2007
To: Howard Holtan, P.E. Municipal Engineer
From: Loren Becia, P.E.
Through: Steve Gillette, P.E., PM&E Project Manager
Subject: Project 00-026, Edward Street Upgrade

Mr. Holtan,

Lounsbury and Associates is currently working on the Design Study Report for the Edward Street Upgrade project. This project will upgrade Edward Street to collector standards. We have reviewed the current design criteria and recommendations in the 2007 Design Criteria Manual (DCM). Lounsbury is requesting a waiver to reduce the design speed for this project to 30 miles per hour (mph).

Edward St. is currently classified as a local street in the Official Street and Highways Plan with an AADT 1,992. The posted speed limit is currently 20 mph. The design speed established in the DCM for neighborhood collector roads is 35 mph. The 2004 AASHTO recommended design speed for urban collectors is 30 mph or greater depending on available right-of-way, terrain, adjacent development, and pedestrian presence. Since Ptarmigan Elementary School is located within the limits of the project corridor, school zone speed limits of 20 mph will continue to be in effect.

Design speed will significantly affect project components such as stopping sight distances, horizontal and vertical curve parameters, and the posted speed limit. Consequently, these components will also determine the extent of ROW acquisition and utility relocations, which will directly affect project costs. A project design criteria summary with a design speed of 30 mph is attached. Noteworthy changes are summarized in the following table:

DESIGN ELEMENT		CRITERION	
		35 MPH	30 MPH
POSTED SPEED (mph)		30	25
MINIMUM K-VALUE (ft) (VERTICAL CURVE)	*CREST*	29	19
	SAG	49	37
MINIMUM HORIZONTAL CURVE RADIUS (ft)		600	335
INTERSECTION DEPARTURE SIGHT DISTANCE (ft), b		390	335

If this waiver meets with your approval, please indicate by acknowledging below and return to Lounsbury & Associates, Inc.

2/8/07

Howard Holtan, P.E.
Municipal Engineer

cc File 06-046 G.5

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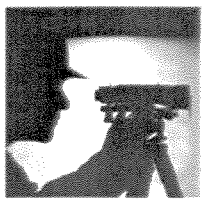

PROJECT DESIGN CRITERIA

ROADWAY CRITERIA

Project Name: Edward Street Upgrade

Project No.: PM&E Project 00-026

DESIGN ELEMENT	CRITERION		SOURCE
DESIGN FUNCTIONAL CLASSIFICATION	Neighborhood Collector		
DESIGN YEAR	2008		
PRESENT ADT (2005)	1,992		2005 Annual Traffic Report, P 61
DESIGN YEAR ADT			
DESIGN PERIOD	20 Years		
PERCENT TRUCKS	3		DCM 1.6 C, P 1-25
DESIGN VEHICLE	WB-50		DCM 6.4 B, P 6-11
LANE WIDTH (ft)	*MINIMUM*	*10*	DCM 1.6 C, P 1-26, Table 1-4
	DESIRABLE	11	DCM 1.6 C, P 1-26, Table 1-4
WIDTH OF SHOULDERS (ft)	*MINIMUM*	3.5	DCM 1.6 C, P 1-26, Table 1-4
	DESIRABLE	5	DCM 1.6 C, P 1-26, Table 1-4
MEDIAN TREATMENT	NA		DCM 1.6 C, P 1-26, Table 1-4
DESIGN SPEED (mph)	30*		DCM 1.6 C, P 1-26, Table 1-4
POSTED SPEED (mph)	25		DCM 1.6 C, P 1-26, Table 1-4
INTERSECTIONS	At Grade		DCM 1.6 C, P 1-26, Table 1-4
NUMBER OF LANES	2		DCM 1.6 C, P 1-26, Table 1-4
PARKING	Permitted		DCM 1.6 C, P 1-26, Table 1-4
CURB USAGE AND TYPE	Type 1		DCM 1.6 C, P 1-29, Fig 1-12
ALLOWABLE GRADE (%)	*MINIMUM*	0.5	DCM 1.9 D, P 1-46
	DESIRABLE	6	DCM 1.9 D, P 1-46
	MAXIMUM	10	DCM 1.9 D, P 1-46
CURB RETURN GRADE (%)	0.5		DCM 1.9 D, P 1-47
CROSS SLOPE GRADE (%)	2		DCM 1.9 D, P 1-47
ALGEBRAIC DIFFERENCE BETWEEN SLOPES (VERTICAL CURVES)	*≤ 1%*	Grade Break	DCM 1.9 D, p 1-48
	> 1%	Curve	DCM 1.9 D, p 1-48
MAXIMUM SIDE SLOPE RATIOS	*FORESLOPE*	2H:1V	DCM 1.9 D, P 1-48
	BACKSLOPE	2H:1V	DCM 1.9 D, P 1-48
MINIMUM K-VALUE (ft) (VERTICAL CURVE)	*CREST*	19	DCM 1.9 D, P 1-49, Fig 1-17
	SAG	37	DCM 1.9 D, P 1-50, Fig 1-18
STOPPING SIGHT DISTANCE (ft)	250		DCM 1.9 D, P 1-49 & 50, Fig 1-17 & 18
MINIMUM HORIZONTAL CURVE RADIUS (ft)	335		AASHTO PGDHS 2004, P 149
VERTICAL CLEAR ZONE AT INTERSECTIONS	Region Between 2-8 ft		DCM 1.9 E, P 1-52, Fig 1-19
INTERSECTION DEPARTURE SIGHT DIST. (ft)	*b*	335	DCM 1.9 E, P 1-53, Fig 1-20
CLEAR ZONE (ft)	1.5		DCM 1.9 E, P 1-55
SURFACE TREATMENT	*TRAVEL WAY*	ACP	DCM 1.9 F, P 1-62
	SHOULDERS	ACP	
SCHOOL ZONE SPEED LIMIT	20 mph		13 AAC 02.325
SCHOOL ZONE LIMITS (ft) (FROM PROPERTY LINE)	300		MUTCD Figure 7B-1 & 13 AAC 02.325

* by design waiver

PROJECT DESIGN CRITERIA

PATHWAY CRITERIA

Project Name: Edward Street Upgrade

Project No.: PM&E Project 00-026

DESIGN ELEMENT	CRITERION		SOURCE
DESIGN FUNCTIONAL CLASSIFICATION	Multi-Use Paved Trail / Sidewalk		DCM 4.1.B, P 4-1 & 2
SURFACE TREATMENT	*SIDEWALK*	PCC	DCM 4.1 B, P 4-2
	PATHWAY	ACP	DCM 4.2 A, P 4-4
	SHOULDERS	Vegetated	DCM 4.2 M, P 4-10, Table 4.3
DESIGN SPEED (mph)	*MINIMUM*	20	DCM 4.2 B, P 4-4
	MAXIMUM	30	DCM 4.2 B.1, P 4-4
MAX. SUPERELEVATION (%)	3		DCM 4.2 B.2, P 4-4
RADIUS (ft)	*15° LEAN*	100	DCM 4.2 B.2, P 4-5, Table 4-1
	20° LEAN	90	DCM 4.2 B.2, P 4-5, Table 4-2
MIN. STOPPING SIGHT DISTANCE (ft)	125		DCM 4.2 C, P 4-5
CROSS SLOPE (%)	2		DCM 4.2 F, P 4-7
VERTICAL CLEARANCE (ft)	*MINIMUM*	10	DCM 4.2 G, P 4-7
	MAXIMUM	12	DCM 4.2 G, P 4-7
PATHWAY CLEAR ZONE (ft)	*SLOPE ≤ 3:1*	3	DCM 4.2 G, P 4-7
	SLOPE > 3:1	5	DCM 4.2 G, P 4-7
SEPARATION FROM ROAD (ft) (BUFFER)	*SIDEWALK*	0	DCM 1.6 C, P 1-26, Table 1-4
	PATHWAY	7	DCM 4.2 H, P 4-8
PATHWAY WIDTH (ft)	*MINIMUM*	*8*	DCM 4.2 I, P 4-8
	DESIRABLE	10	DCM 4.2 I, P 4-8
	MAXIMUM	12	DCM 4.2 I, P 4-9
PATHWAY SHOULDER WIDTH (ft)	*MINIMUM*	2	DCM 4.2 I, P 4-8
	MAXIMUM	3	DCM 4.2 I, P 4-8
SIDE SLOPE RATIOS	*DESIRABLE*	3H:1V	DCM 4.2 I, P 4-8
	MAXIMUM	2H:1V	DCM 4.2 I, P 4-8
SIDEWALK WIDTH (ft)	5		DCM 1.6 C, P 1-26, Table 1-4

PROJECT DESIGN CRITERIA

DRAINAGE CRITERIA

Project Name: Edward Street Upgrade

Project No.: PM&E Project 00-026

DESIGN ELEMENT	CRITERION		SOURCE
RAINFALL INTENSITY INFORMATION	Ted Steven's Int'l Airport		DCM 2.5 B, P 2-9
RUNOFF ANALYSIS METHOD	ILLUDAS		DCM 2.5 C, P 2-9
DESIGN STORM	10 year, 3 hour		DCM 2.5 C, P 2-12
WATER QUALITY DESIGN STORM	2 year, 6 hour		
RAINFALL INTENSITY MULTIPLIER	1.15		DCM 2.5 D, P 2-16, Fig 2-2
MIN. STORM DRAIN PIPE DIAMETER (in)	12		DCM 2.7, P 2-25
MIN. CATCH BASIN LEAD DIAMETER (in)	10		DCM 2.7 B, P 2-25
MINIMUM PIPE SLOPE (%)	0.30		DCM 2.7 B, P 2-25
PIPE FLOW VELOCITY (ft/sec)	*MINIMUM*	2	DCM 2.7 B, P.2-25
	MAXIMUM	13	DCM 2.7 B, P.2-25
DRIVEWAY CULVERT DIAMETER (in)	*MINIMUM*	8	DCM 2.7 C, P 2-27
	DESIRABLE	18	DCM 2.7 C, P 2-27
MIN. CULVERT COVER (in)	12		DCM 2.7 C, P 2-27
MIN. CROSS CULVERT INSIDE DIAMETER (in)	18		DCM 2.7 C, P 2-27
MAX. MANHOLE SPACING (ft)	300		DCM 2.7 D, P 2-27
DROP ACROSS MANHOLE (ft)	0.05		DCM 2.7 D, P 2-27
MIN. INSIDE MANHOLE DIAMETER (ft)	4		DCM 2.7 D, P 2-27
MIN. MANHOLE TRAP DEPTH (in)	18		DCM 2.7 D, P 2-27
MAX. CLEANOUT SPACING (ft)	150		DCM 2.7 F, P 2-28
MIN. CLEANOUT DIAMETER (in)	12		DCM 2.7 F, P 2-28
MIN. COVER OVER STORM DRAIN PIPE (ft)	4		DCM 2.7 J, P 2-22
MAX. INLET SPACING (ft)	1,100		DCM 2.8 D, P 2-35

PROJECT DESIGN CRITERIA

LIGHTING CRITERIA

Project Name: Edward Street Upgrade

Project No.: PM&E Project 00-026

DESIGN ELEMENT	CRITERION		SOURCE
ILLUMINANCE METHOD			
PEDESTRIAN CONFLICT AREA	Collector - Medium		DCM 5.4 B, P 5-3, Table 5-1
MIN ILLUMINANCE (lux/footcandles)	9.0/0.1.2		DCM 5.4 B, P 5-3, Table 5-1
UNIFORMITY RATIO (avg/min)	4.0		DCM 5.4 B, P 5-3, Table 5-1
VEILING LUMINANCE RATIO (vmax/min)	0.4		DCM 5.4 B, P 5-3, Table 5-1
LUMINANCE METHOD			
PEDESTRIAN CONFLICT AREA	Collector - Medium		DCM 5.4 B, P 5-4, Table 5-2
AVERAGE. LUMINANCE (cd/m^2)	0.6		DCM 5.4 B, P 5-4, Table 5-2
UNIFORMITY RATIO	*AVG/MIN*	3.5	DCM 5.4 B, P 5-4, Table 5-2
	MAX/MIN	6.0	DCM 5.4 B, P 5-4, Table 5-2
VEILING LUMINANCE RATIO (vmax/min)	0.4		DCM 5.4 B, P 5-4, Table 5-2
SMALL TARGET VISIBILITY			
PEDESTRIAN CONFLICT AREA	Collector - Medium		DCM 5.4 B, P 5-5, Table 5-3
STV CRITERIA	0.6		DCM 5.4 B, P 5-5, Table 5-3
AVERAGE. LUMINANCE (cd/m^2)	*< 7.3 m*	3.5	DCM 5.4 B, P 5-5, Table 5-3
	≥ 7.3 m	6.0	DCM 5.4 B, P 5-5, Table 5-3
UNIFORMITY RATIO (max/min)	0.4		DCM 5.4 B, P 5-5, Table 5-3
MAINTAINED ILLUMINANCE FOR PATHWAYS			
PEDESTRIAN CONFLICT AREA	Medium		DCM 5.4 C, P 5-6, Table 5-4
AVG. HORIZONTAL ILLUMINANCE (lux/fc)	5.0/0.5		DCM 5.4 C, P 5-6, Table 5-4
VERTICAL ILLUMINANCE (lux/fc)	2.0/0.2		DCM 5.4 C, P 5-6, Table 5-4
UNIFORMITY RATIO (avg/min)	4.0		DCM 5.4 C, P 5-6, Table 5-4
			DCM 5.4 C, P 5-6, Table 5-4
SEPARATION FROM PATHWAY (ft)	HORIZONTAL		
	VERTICAL		
ILLUMINANCE FOR INTERSECTIONS			
INTERSECTION LIGHTING CONFIGURATION	Collector/Local – Medium		DCM 5.4 H, P 5-9, Table 5-5
AVG. MAINTAINED ILLUMINANCE (lux/fc)	16.0/1.6		DCM 5.4 H, P 5-9, Table 5-5
UNIFORMITY RATIO (avg/min)	4.0		DCM 5.4 H, P 5-9, Table 5-5
GENERAL			
LAMP SIZE (W)	250w		DCM 5.4 D, P 5-6
LAMP TYPE	Metal Halide		DCM 5.4 D, P 5-6
LUMINAIRE HEIGHT ABOVE ROAD (FT)	*MINIMUM*	30	DCM 5.6, P 5-12
	MAXIMUM	35	DCM 5.6, P 5-12
POLE BASE	Concrete		DCM 5.8, P 5-13
CONDUIT BURIAL DEPTH (in)	30”		DCM 5.9, P 5-13
CONDUCTOR TYPE (AWG)	#8/3		DCM 5.9, P 5-13