



PDC INC. ENGINEERS

Transforming Challenges into Solutions

**Anchorage
Fairbanks**

TECHNICAL MEMORANDUM

*Prepared by: Brandon Irvine, EIT
Reviewed by: Anne Ervice, PE*

Date: August 5, 2013

PDC #: 13035FB

Project Name: Nenana 9th Street Reconstruction

Subject: Abbreviated Design Study Report

Introduction/History

The City of Nenana, an Interior Alaska community located along the southern bank of the Tanana River near its confluence with the Nenana River, is seeking to improve 4,550 feet of 9th Street. 9th Street is a gravel road south of the downtown area that residents use as a secondary route to the Native village offices and the village health clinic.

Project Description

Front Street, the main route used to access the village health clinic and village offices, traverses an at-grade railroad crossing. This crossing is often blocked by train traffic, however, which greatly limits access to the buildings on the other side. The primary purpose of this project is to create a reliable alternate access to these buildings. As a secondary benefit, a local transportation company has expressed interest in using the improved route for access to barge landings and staging areas. This would reduce heavy truck traffic within the city center and thereby reduce dust near the village offices and the clinic.

The 9th Street roadway is between 10 and 13 feet wide. The majority of the road lies within a 60-foot-wide right-of-way (ROW), but the southern edge of the easternmost 1,200 feet extends beyond the ROW.

This project will widen the roadway to 24 feet and center it within the existing ROW. In order to do this, the centerline alignment will be adjusted and new road embankment will be constructed.

Previously, the U.S. Department of Interior, Bureau of Indian Affairs (BIA), developed a 90% design for reconstruction of both 9th Street and K Street (the northbound leg of the alternate route to the clinic). However, only the improvements to K Street were ever completed. This project is utilizing the topographic survey completed for the BIA project.

Design Alternatives

None.

Design Standards

- AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads, 2001
- Alaska Standard Specifications for Highway Construction, 2004

1028 Aurora Drive
Fairbanks, AK 99709
T: 907.452.1414
F: 907.456.2707

Horizontal and Vertical Design

The proposed horizontal alignment for the roadway will be a straight line centered within the 60-foot ROW.

The vertical profile will generally follow the existing ground. It is designed to minimize fill volumes while maintaining a minimum embankment height of 2 feet and providing a minimum of 1 foot of cover between the 24-inch culverts and the bottom of the base course. Grades of less than 1% were used. The low design speed, small difference in grades, and surfacing type make the design of vertical curves unnecessary.

Typical Section

The typical section will be the same throughout the corridor. There will be two 12-foot lanes with no defined shoulders, a 3% crown, and 2:1 side slopes. The pavement structure is 6 inches of D-1 with a high-float surface treatment. A layer of separation geotextile will be placed between the existing ground and the new embankment material. In general, the new vertical profile will be higher than the existing profile, so the new embankment will be constructed of new fill material. However, at the western end there will be minimal sections of cut into the existing embankment.

Drainage

Due to the 3% cross-slope, drainage will flow laterally away from the crown. To allow for water level equalization in the event of a flood, 24-inch culverts will be placed along the length of the roadway. There will not be water continuously flowing through the culverts. Culvert placement will be based on observation of the surrounding ground and existing drainage features; the intent is to position the culverts primarily near roads that intersect 9th Street or near low spots in the existing ground profile. The invert elevations will be set at the existing ground level, and the culverts will extend to the toe of the proposed road embankment.

Erosion and Sediment Control

The project design will contain basic erosion and sediment control measures. The contractor will develop a Storm Water Pollution Prevention Plan (SWPPP).

Safety Improvements

This project will replace signs to improve retroreflectivity. A new speed limit sign will be installed near the western end of the project, and curve warning signs will be added at the intersection of 9th and K Streets.

Right of Way Requirements

No acquisitions required; the entire project is located within the existing ROW.

Maintenance Considerations

The finished road surface will require minimal maintenance overall but may require spot and crack repair as time goes on. "Hot" or "Warm" asphalt mix may be used to repair ruts and potholes in the high-float surface treatment, while rubberized tar material may be used to repair longitudinal and transverse cracking. Because the culverts included in the project will not have any water continuously moving through them, they will need periodic cleaning, and their ends will need to be cleared of vegetation from time to time.

Material Sources

Material source to be furnished by contractor.

Environmental Commitments

Several environmental commitments apply to the design and construction of this project:

- A Categorical Exclusion document will be developed for approval by the Federal Highways Administration.
- A Wetlands permit will be obtained from the U.S. Army Corps of Engineers.
- A full Storm Water Pollution Prevention Plan must be developed by the contractor and approved by the engineer before construction begins.

Cost Estimate

Attached.



SITE MAP

DESIGN:	AME
DRAWN:	
CHECKS:	

AUG 5, 2013
 PROJ. No
13035FB

FIGURE

1



PDC INC. ENGINEERS
 1028 Aurora Drive, Fairbanks, Alaska 99709-5529

ENGINEER COST ESTIMATE: NENANA 9TH STREET BEI 8/5/2013

BASE BID		Engineers Estimate			UNIT PRICE	AMOUNT
ITEM NO.	DESCRIPTION	QUANTITY	PAY UNIT			
201(1A)	CLEARING	4.0	ACRE		\$3,000.00	\$11,934.00
203(5)	BORROW, TYPE A	11000	CUBIC YARD		\$32.50	\$357,500.00
301(1)	AGGREGATE BASE COURSE, GRADING D-1	4200	TON		\$36.25	\$152,250.00
405(7)	HIGH FLOAT AST	12171	SQUARE YARD		\$6.00	\$73,026.00
603(1)-24	24 INCH CSP	263	LINEAR FOOT		\$160.00	\$42,080.00
603(1)-36	36 INCH CSP	219	LINEAR FOOT		\$200.00	\$43,800.00
615(1)	STANDARD SIGN	48	SQUARE FOOT		\$130.00	\$6,240.00
618(1)	SEEDING	1.3	ACRE		\$2,000.00	\$2,600.00
630(1)	GEOTEXTILE, SEPARATION	18507	SQUARE YARD		\$1.50	\$27,761.00
640(1)	MOBILIZATION AND DEMOBILIZATION	ALL REQUIRED	LUMP SUM		\$50,000.00	\$50,000.00
640(4)	WORKER MEALS AND LODGING, PER DIEM	ALL REQUIRED	LUMP SUM		\$50,000.00	\$50,000.00
641(3)	TEMPORARY EROSION AND POLLUTION CONTROL	ALL REQUIRED	LUMP SUM		\$10,000.00	\$10,000.00
642(1)	CONSTRUCTION SURVEYING	ALL REQUIRED	LUMP SUM		\$10,000.00	\$10,000.00
643(2)	TRAFFIC MAINTENANCE	ALL REQUIRED	LUMP SUM		\$5,000.00	\$5,000.00
					Construction Cost	\$842,191.00
					Contingency (25%)	\$210,547.75
					BASE BID CONSTRUCTION COST	\$1,052,738.75