

**PARKS HIGHWAY CONNECTIONS -  
MUSEUM DRIVE**

**DESIGN STUDY REPORT**  
PROJECT NO. 30099

MATANUSKA-SUSITNA BOROUGH

Prepared by:  
Hattenburg Dilley & Linnell, LLC  
3335 Arctic Blvd., Suite 100  
Anchorage, AK 99503

July 2010



MATANUSKA – SUSITNA BOROUGH  
Department of Public Works

**Design Study Report**

for

**PARKS HIGHWAY CONNECTIONS -  
MUSEUM DRIVE**

Project No. 30099

Prepared By:



Jeffrey M. Fuglestad 7/29/10  
Jeffrey M. Fuglestad, P.E. Date  
Project Manager,  
Hattenburg Dilley & Linnell, LLC

Recommended for Approval:

Shaune O'Neil 8-2-10  
Shaune O'Neil, P.E. Date  
Director of Public Works,  
Matanuska-Susitna Borough

Approved By:

Brad Sworts 7/29/10  
Brad Sworts Date  
Transportation and Environmental Manager,  
Matanuska-Susitna Borough



NOTICE TO USERS

This Report reflects the thinking and design decisions, at the time of publication. Changes frequently occur during the design process, so persons who may rely on the information contained in this document should check with the Matanuska-Susitna Borough, Department of Public Works for the most current design. Contact the Project Manager, James Rowland, P.E., at (907) 745-9811 for this information.

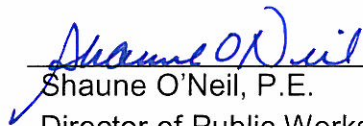
PLANNING CONSISTENCY

The Matanuska-Susitna Borough Department of Public Works has prepared this document in accordance with currently acceptable design standards and Federal Regulations, and with the input offered by the local government and public. The Department's Planning Section has reviewed and approved this document as being consistent with the present community planning.


CERTIFICATION

The Matanuska-Susitna Borough hereby certifies that this document was prepared in accordance with Section 450.5 of the current edition of the Alaska Department of Transportation and Public Facilities Highway Preconstruction Manual and CFR Title 23, Highways Section 771.111(h).

The Department has considered the project's social and economic effects upon the community, its impacts on the environment and its consistency with planning goals and objectives as approved by the local community. All records are on file at the Matanuska-Susitna Borough, Department of Public Works, 350 E. Dahlia Avenue Palmer, Alaska 99645.

  
\_\_\_\_\_  
Shaune O'Neil, P.E.  
Director of Public Works

8.2.10  
DATE

  
\_\_\_\_\_  
Brad Sworts  
Transportation and Environmental Manager

7/29/10  
DATE



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F	Traffic Analysis Report
G	Utility Conflict Report
H	Environmental Checklist
I	Plans

## TABLE OF ACRONYMS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
BMP	Best Management Practices
CE	Construction Engineering
CG	Curb and Gutter
COE	Corps of Engineers
EA	Environmental Assessment
ESCP	Erosion and Sediment Control Plan
FHWA	Federal Highway Administration
GCI	General Communications Inc.
LOS	Level of Service
LRTP	Long Range Transportation Plan
MEA	Matanuska Electric Association
MPH	miles per hour
MTA	Matanuska Telephone Association
MUTCD	Manual on Uniform Traffic Control Devices
NPDES	National Pollutant Discharge Elimination System
PCM	Alaska Highway Preconstruction Manual
PGDHS	A Policy on Geometric Design of Highways and Streets
ROW	Right-of-Way
RV	Recreational Vehicle
SHLD	Shoulder
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan

## PROJECT LOCATION

Museum Drive (formerly Neuser Drive) is located west of Wasilla within the Matanuska-Susitna Borough. The proposed project would extend the existing Museum Drive approximately 2 miles west to Sylvan Road. The location of the project is shown on Figure 1.

## EXISTING FACILITIES

Museum Drive currently provides access from the Parks Highway to the Wasilla Airport and residential areas. The road is classified as a Minor Collector. The posted speed is 35 MPH. All access is at-grade and stop/yield controlled. Along the existing roadway, there are no traffic signals or roadway illumination. Along the proposed corridor, the adjacent land use is primarily rural residential, with a few small commercial businesses scattered along the alignment.

## PURPOSE

This area of the Matanuska-Susitna Borough (Borough) has experienced rapid growth in the past few years resulting in a boom in land development and corresponding increase in local traffic. ADOT&PF is in the Environmental Assessment (EA) stage of a plan to upgrade the Parks Highway from Lucus Road to Big Lake Road to a 4-lane divided highway with limited access. The Borough recognizes the need for additional collector roads to be constructed in conjunction with this project. Collector roads are needed to enhance local traffic mobility and safety as well as to reduce the number of vehicle miles traveled and left turn movements onto the Parks Highway. The purpose of this project is to:

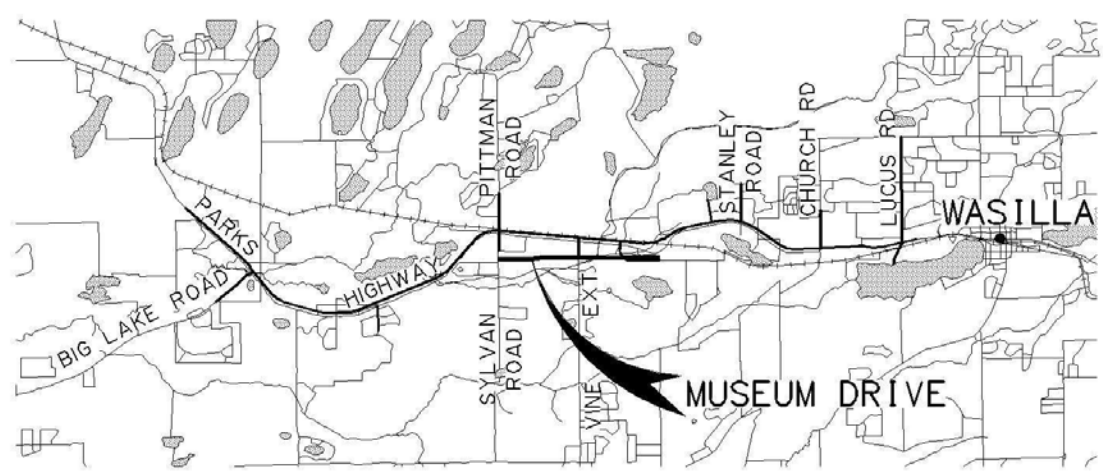
- Improve project area connectivity by extending Museum Drive to connect with Sylvan Road;
- Improve project area traffic capacity and reduce the demand on Parks Highway;
- Enhance local traffic mobility; and
- Enhance local traffic safety.

## DESIGN STANDARDS

The documents listed below provide the design standards for this project:

1. A Policy on Geometric Design of Highways and Streets (PGDHS), 2004, American Association of State Highway and Transportation Officials (AASHTO).
2. Alaska Highway Preconstruction Manual (PCM), January 2005, State of Alaska, Department of Transportation and Public Facilities (ADOT&PF).
3. Manual of Uniform Traffic Control Devices (MUTCD), 2001, as amended, U.S. Department of Transportation, Federal Highway Administration (FHWA), and modified by the Alaska Supplement, January 17, 2003.

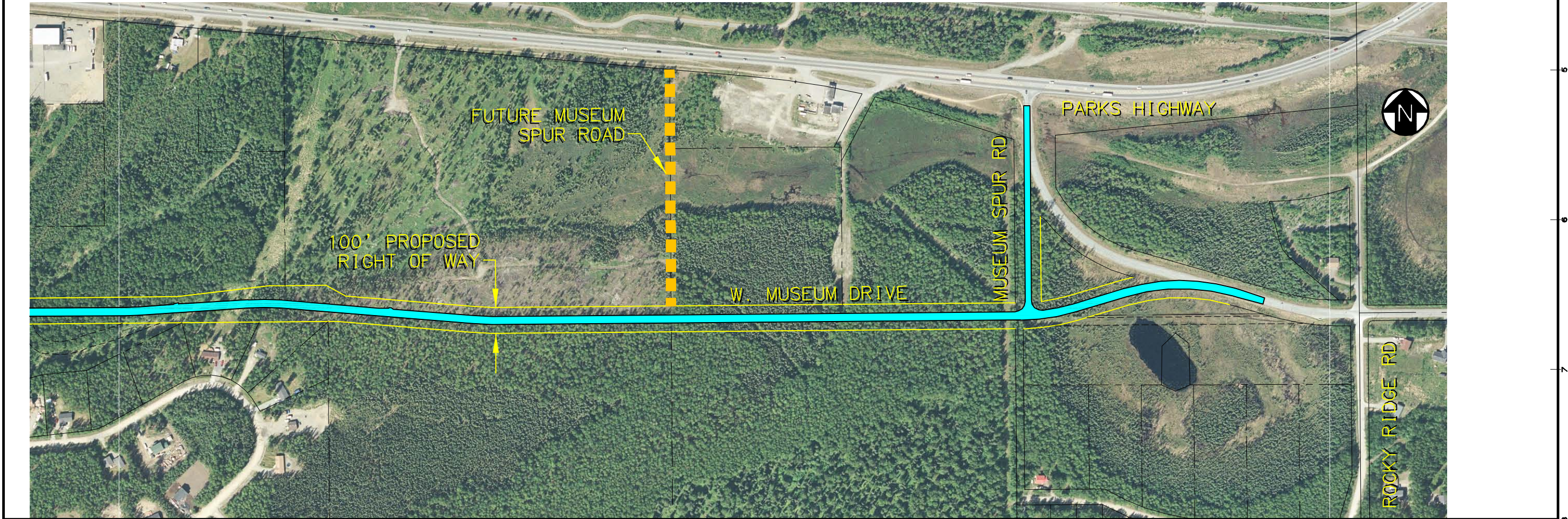
The Design Designations are provided in Appendix A. Appendix B contains the Design Criteria.



**Figure 1 - Vicinity Map**

H:\jobs\09-010 Parks Hwy Connections Museum Drive (MSB)\10-PS&E\CAD\Drawings\09010\_00\_Permits\_Map, 1=1, 07/14/10 at 12:06 by bcy  
 VIEW: FIG02\_F\_00800, FIG02\_H\_L5000, FIG02\_H\_X7700  
 XREF: 09010\_00\_IMAGE, 09010\_00\_WETLANDS, 09010\_00\_X01, 09010\_02\_ROW\_11-13-09

LAYOUT: 20 Scale



REVISIONS	MARK	DATE	DESCRIPTION
1			
2			
3			
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**HDL** HATTENBURG DILLEY & LINNELL  
 Engineering Consultants  
 • ENGINEERING • EARTH SCIENCE  
 • SURVEYING • PLANNING  
 • PROJECT MANAGEMENT • ENVIRONMENTAL  
 (907) 964-2120 - ANCHORAGE  
 (907) 748-9290 - PALMER  
 WWW.HDLALASKA.COM

MUSEUM DRIVE  
**MATANUSKA-SUSITNA BOROUGH**  
 WASILLA, ALASKA

SHEET TITLE  
 PROPOSED IMPROVEMENTS

SHEET  
**FIGURE 2**

DRAWN BY: NRY	CHECKED BY: JMF
DATE: 12/07/09	SCALE: 1" = 200'
JOB NUMBER: 09-010	

## ALTERNATIVES

### A. Alternative 1 - No Action.

Under the no-action alternative, the proposed roadway would not be constructed. Traffic congestion and delay will increase along the Parks Highway and project area connectivity would not be improved. This alternative does not meet the purpose and need for the project.

### B. Alternative 2 – Road Construction (Preferred Alternative)

This alternative would tie into, and extend Museum Drive westward to connect with Sylvan Road. The existing connection with the Parks Highway would be re-aligned to connect with the new extension. The extension of Museum Drive will function as a frontage road for the Parks Highway. This will improve local area connectivity, mobility, capacity, and reduce the local demand on the Parks Highway. Providing improved access for local traffic to Vine Road and Sylvan Road would also allow local traffic to enter or exit the Parks Highway at signalized intersections. This alternative meets the purpose and need, and is the preferred alternative. The proposed improvements are shown on Figure 2.

## TYPICAL SECTIONS

### Museum Drive extension:

Museum Drive extension will consist of two 11-foot lanes, one lane in each direction, with 5-foot paved shoulders on each side. Foreslopes from the shoulders to the clear zone will be 4:1. Typical cut and fill slopes outside the clear zone will be 2:1 maximum.

### Museum Spur Road:

Museum Spur Road realignment will match the existing Museum Drive typical section and would consist of two 12-foot lanes, one lane in each direction, with 2-foot unpaved shoulders on each side. Foreslopes from the shoulders to the clear zone will be 4:1. Typical cut and fill slopes outside the clear zone will be 2:1 maximum.

Typical sections are provided with the preliminary plans in Appendix I.

## GENERAL ALIGNMENT

### Museum Drive extension:

Museum Drive extension runs in a east-west direction with the alignment selected to minimize the impacts to the adjacent developed properties. There are 7 horizontal curves and 5 horizontal angle breaks. The profile is generally level and closely follows the surrounding terrain. There are 3 crest vertical curves, 5 sag vertical curves, and 3 grade breaks. Grades along this alignment range from 0.22% to 6.00%.

### Museum Spur Road:

The re-aligned Museum Spur Road runs in a north-south direction with no horizontal curves. The profile is generally level and closely follows the surrounding terrain. There is one sag vertical curve. The existing intersection of Museum Spur Road with the Parks Highway will not be modified in this project. However, the roadway is planned to be relocated approximately ¼-mile west of its present location under the ADOT&PF Parks Highway, Lucas Road to Big Lake Road, upgrade project as shown on Figure 2.

## **EROSION AND SEDIMENT CONTROL**

The Contractor will provide a Storm Water Pollution Prevention Plan (SWPPP) prior to construction that follows the guidelines for the Erosion and Sediment Control Plan (ESCP).

The Contractor will maintain the existing vegetation where possible and stabilize all disturbed areas of the site. Stabilization practices may include permanent seeding, mulching, geotextiles, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Structural controls may include straw wattles, silt fence, energy dissipaters, and gravel filters. The Contractor shall initiate structural controls prior to beginning construction and initiate stabilization measures as soon as practicable. On all portions of the site where construction activities have temporarily or permanently ceased, stabilization shall be initiated within 14 days.

## **DRAINAGE**

Currently, the surrounding drainage areas generally shed water into small creeks, ponds, or into natural low areas where it infiltrates into the subsurface soil. One of the project area creeks, Vine Creek, crosses Vine Road close to the proposed Museum Drive alignment. This creek continues to flow to the west for approximately 200 feet before it ends and infiltrates into the subsurface soil. Local flooding to the adjacent area properties has been reported to occur during springtime snow melt near this creek crossing. Vegetated ditches will be constructed to better contain and channelize the higher springtime snow melt flows away from this area.

The roadway improvements will not significantly change the existing drainage patterns. Vegetated ditches will be used to collect and dispose of the storm water through infiltration and flow to low points.

The Hydrologic and Hydraulic Summary Report with detailed design alternatives is provided in Appendix C.

## **SOIL CONDITIONS**

A geotechnical investigation and report was prepared for this project. Soil conditions within the project limits are typical of the Wasilla area, which consist of silty sands and gravels. Peat deposits were found at the eastern portion of the project, adjacent to the existing Museum Drive alignment. The geotechnical report is provided in Appendix D.

## **ACCESS CONTROL**

Controlled access is not required for this project. On roadways such as this, it is recommended that access be combined or limited to the extent feasible.

## **TRAFFIC ANALYSIS**

As part of the project development, a Traffic Analysis Report, dated October 2009, was prepared and is provided in Appendix F. The report forecasts the future project area roadway design year and mid design year volumes and intersection turning movements based on the Borough's 2025 traffic demand model. The traffic model includes all of the future connections identified in the City of Wasilla Official Streets and Highways Plan FY 2005-2025 and the Borough's Long Range Transportation Plan (LRTP). The design year for the project is 2031 and the mid design year is 2021.

The traffic study analyzed warrants for auxiliary left turn lanes at the intersections of Museum Drive with Sylvan Road, Vine Road, and Museum Spur Road. Auxiliary left turn lanes are recommended for all the approaches at these intersections based on LOS. The only approach that meets AASHTO warrants for a left turn lane is the northbound approach to the Museum Drive/Vine Road intersection. These auxiliary lanes are recommended for construction if sufficient funding is available, but are not included in the project design and cost estimate. The future intersection and lane configurations are shown in Figure 3.

## **SAFETY IMPROVEMENTS**

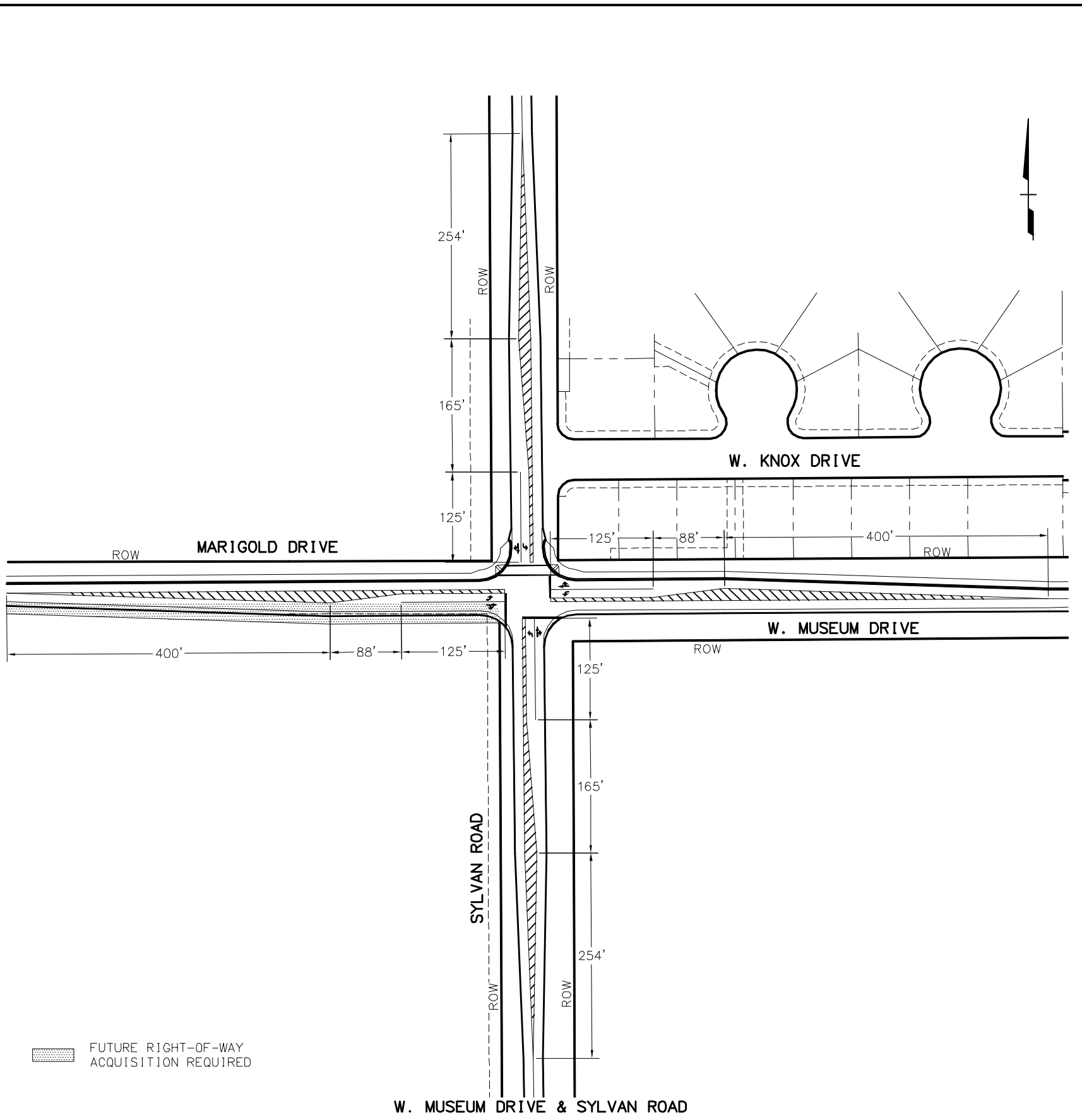
Providing improved access for local traffic to Vine Road and Sylvan Road will allow local traffic to enter or exit the Parks Highway at signalized intersections. Brush and trees will be cleared within the right-of-way to provide moose visibility and reduce moose browse.

## **RIGHT-OF-WAY**

There are no existing right-of-ways or roadway easements along the proposed roadway corridor. The roadway passes through and near a mixture of developed and undeveloped properties. A right-of-way corridor will need to be purchased from the local property owners. The recommended corridor width is generally 100 feet. Sufficient right-of way will be acquired along the extension corridor to provide for future widening at the intersections of Museum Drive with Sylvan Road and Vine Road, and for a future adjacent pathway. Additional right-of-way will be required along Marigold Drive for future intersection widening on the west side of Museum Drive/Sylvan Road.

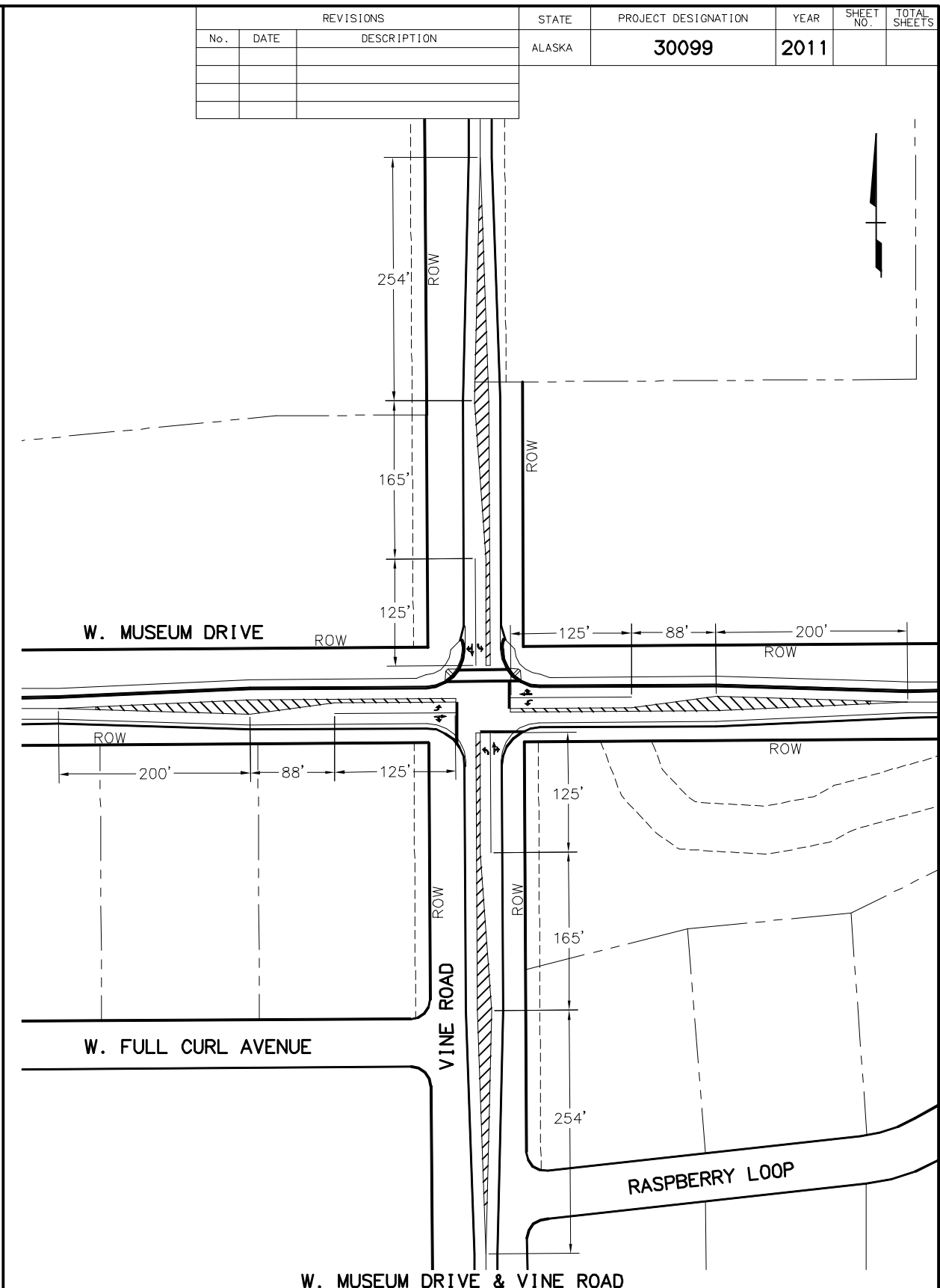
H:\pba\09-010 Parks Hwy Connections Museum Drive (MSB)\10-PS&E\CAD\Drawings\09010\_00\_Figure3\_1=1\_07/21/10 at 09:40 by bcy  
 XREFS: DIF  
 DESIGNED BY JMF  
 CHECKED BY JMF  
 DRAFTED BY BCY  
 SCALE: 1"=100'  
 COMPUTER DESIGNATION  
 PLOT SCALE: 1:1  
 PLOT VIEW:

LAYOUT: D2 (2)  
 VIEW: D04\_F\_D0900, D04\_F\_PDF, D04\_H\_PDF, D04\_H\_X7700  
 XREF: 09010\_00\_B001



W. MUSEUM DRIVE & SYLVAN ROAD

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
No.	DATE	DESCRIPTION	ALASKA	30099	2011		



W. MUSEUM DRIVE & VINE ROAD

**WORK IN PROGRESS**  
 This document represents  
 current concepts as of  
 (See date @ left border)

HATTENBURG DILLEY & LINNELL

MATANUSKA-SUSITNA BOROUGH  
 DEPARTMENT OF PUBLIC WORKS  
 PALMER, ALASKA

**PARKS HIGHWAY CONNECTIONS  
 W. MUSEUM DRIVE**

**FIGURE 3  
 FUTURE INTERSECTION  
 CONFIGURATIONS**

## PEDESTRIAN AND BICYCLE FACILITIES

The proposed 5-foot paved shoulders will serve pedestrians and bicyclists. A separated pathway facility would require additional right-of-way beyond the proposed general 100-foot corridor due to the drainage ditches required in this project. However, an 8-foot attached pathway may be constructed under a future project if funding becomes available. A typical section showing the future pathway configuration is shown in Figure 4.

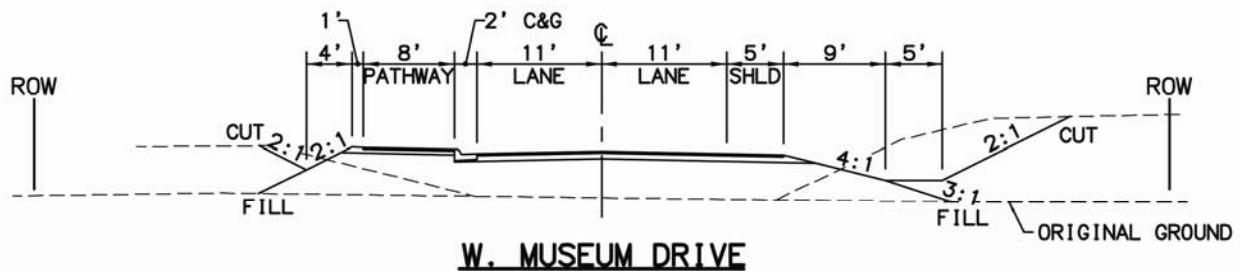


Figure 4 – Future Pathway Typical Section

## ILLUMINATION

Illumination is recommended at the intersections with Museum Spur Road, Vine Road, and Sylvan Road.

## UTILITY RELOCATION AND COORDINATION

The utilities found within the project area and their respective owners are listed below.

Electric / Illumination	MEA
Telephone / Fiber Optic	MTA
Television Cable	GCI
Natural Gas	ENSTAR
Water	RV Park (Private)
Sewer	RV Park (Private)
Drainage Structures	Matanuska-Susitna Borough\Alaska Department of Transportation and Public Facilities (ADOT&PF)

The majority of the utilities within the project area cross the proposed alignment and can be worked around without relocations. One overhead electrical line falls below the minimum 20.5 foot clearance and will require the adjustment of pole heights. Several water and sewer connections at the private RV park will need to be relocated.

A Utility Conflict Report is provided in Appendix G.

## PAVEMENT DESIGN

### Museum Drive extension:

A 10-year pavement life and a 20-year embankment life were used to develop pavement and structural section recommendations for the Museum Drive extension. The Excess Fines method was used to analyze the structural section. The results are contained in Appendix E, Geotechnical Recommendations, and summarized below:

- Station 10+00 to Station 103+50 & Station 108+50 to Station 112+26  
2" Hot Mix Asphalt, Type II, Class A  
6" Aggregate Base Course, Grading D-1  
30" Selected Material, Type A (Minimum)  
Selected Material, Type C
- Station 103+50 to Station 108+50  
2" Hot Mix Asphalt, Type II, Class A  
6" Aggregate Base Course, Grading D-1  
Selected Material, Type A (Muck Excavation)

### Museum Spur Road:

This roadway is planned for relocation approximately ¼-mile west of its present location under the ADOT&PF Parks Highway, Lucas Road to Big Lake Road, upgrade project. Therefore, the life of the embankment and pavement for Museum Spur Road is estimated to be 3 to 5 years. The re-alignment structural section for roadway will match the existing Museum Drive structural section and is summarized below:

- Station 11+17 to Station 18+50  
2" Hot Mix Asphalt, Type II, Class A  
4" Aggregate Base Course, Grading D-1  
24" Selected Material, Type A  
Selected Material, Type C

## COST ESTIMATE

A construction cost estimate was developed using 2009 unit prices for major construction items. The right-of-way cost estimate is based on the Borough's 2009 tax appraisals for land values. The cost estimates for this project are as follows:

Design Engineering	\$	637,000
Right-of-Way	\$	830,000
Utilities	\$	73,000
Construction & CE	\$	3,254,000
Total	\$	4,794,000

## ENVIRONMENTAL COMMITMENTS

Coordination with the various federal, state, and local agencies occurred according to the National Environmental Policy Act.

Environmental commitments and mitigation measures for this project include:

1. The project may result in minor discharges of storm water to waters of the U.S. during construction. To minimize erosion and sedimentation during construction, the Borough will utilize BMP's as described in the 2005 Alaska Storm Water Pollution Prevention Plan Guide. The construction Contractor will be required to prepare and implement a SWPPP in accordance with ADOT&PF's contract specifications and the NPDES General Permit for Construction Activities in Alaska.
2. All exposed project slopes and fills that are susceptible to erosion will be permanently stabilized at the earliest practicable date.
3. If cultural, archeological, or historical sites are discovered during project construction, the SHPO will be contacted and any work that might impact these sites will be stopped. Work shall not resume in the vicinity of the site until a written clearance from the SHPO is issued to the Project Engineer.
4. If contaminated or hazardous materials are encountered during construction, all work in the vicinity of the contaminated site will be stopped until ADEC is contacted and a corrective action plan is approved by ADEC and implemented.
5. Advanced public notice of construction activities and road closures will be published to reduce construction impacts on local businesses, residents, and road travelers.
6. Wetland impacts for this project will be unavoidable and mitigation will be required. Mitigation may include mitigation bank credits, in-lieu fee program credits, or permittee-responsible mitigation. The Matanuska-Susitna Borough will need to include a wetland delineation and functional assessment report with the COE Section 404 permit application.

A draft State Projects Environmental Checklist has been prepared for approval by the Matanuska-Susitna Borough and is provided in Appendix H.

## **STRUCTURES**

There are no structures within this project.

## **EXCEPTION TO STANDARDS**

There are no exceptions to the standards for this project.

## **MAINTENANCE CONSIDERATIONS**

Once this project is complete, there will be approximately 3.8 additional lane-miles along Museum Drive, 3 additional illuminated intersections, and additional drainage ditches and culverts. Maintenance is provided by the Borough.

**APPENDIX A**  
**DESIGN DESIGNATIONS**

**APPENDIX B**  
**DESIGN CRITERIA**

**APPENDIX C**

**HYDROLOGIC AND HYDRAULIC SUMMARY REPORT**

**APPENDIX D**  
**GEOTECHNICAL REPORT**

**APPENDIX E**

**GEOTECHNICAL RECOMMENDATIONS**

**APPENDIX F**

**TRAFFIC ANALYSIS REPORT**

**APPENDIX G**

**UTILITY CONFLICT REPORT**

**APPENDIX H**  
**ENVIRONMENTAL CHECKLIST**

**APPENDIX I**

**PLANS**