SEWARD HIGHWAY:
92nd Avenue Connector

DESIGN STUDY REPORT
PROJECT NO. 59770

DRAFT

Prepared for:
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

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November 2011

STATE OF ALASKA
Department of Transportation
and Public Facilities

Design Study Report

for

SEWARD HIGHWAY:
92nd Avenue Connector

Project No. 59770

Prepared By:

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Recommended for Approval:

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Approved By:

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Kenneth M. Morton, P.E. Date
Preconstruction Engineer

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 Alaska Department of Transportation and Public Facilities for the most current design. Contact the Project Manager, James Amundsen, P.E., at 269-0595 for this information.

PLANNING CONSISTENCY

The Alaska Department of Transportation and Public Facilities 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 Alaska Department of Transportation and Public Facilities hereby certifies that this document was prepared in accordance with Section 520.4.1(2) of the current edition of the Department's 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 Central Region Division of Design and Construction, Highway Design, 4111 Aviation Avenue, Anchorage, Alaska 99519-6900.

Kenneth M. Morton, P.E. DATE	Jennifer Witt DATE
Preconstruction Engineer	Chief, Planning & Administrative Services

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AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADOT&PF	Alaska Department of Transportation and Public Facilities
ASR	Alternative Study Report
CE	Construction Engineering
EA	Environmental Assessment
ESCP	Erosion and Sediment Control Plan
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
LOS	Level of Service
LRTP	Long Range Transportation Plan
MIS	Major Investment Study
MOA	Municipality of Anchorage
MPH	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
PCM	Alaska Highway Preconstruction Manual
PER	Preliminary Engineering Report
PGDHS	A Policy on Geometric Design of Highways and Streets
ROW	Right-of-Way
SWPPP	Storm Water Pollution Prevention Plan

PROJECT LOCATION

This Design Study Report covers a 1-mile section of the Seward Highway between O'Malley Road and Dimond Boulevard and a section of 92nd Avenue (Abbott Road) between the Old Seward Highway and the Seward Highway. The project is located within the Municipality of Anchorage (MOA), Alaska. See Figure 1 – Project Location.

INTRODUCTION AND BACKGROUND

The Seward Highway is functionally classified as an Interstate Freeway and is a critical transportation link that serves recreational, industrial, urban, and residential land uses and is the primary north-south traffic carrier for the Anchorage Bowl.

Major Investment Study - Seward Highway Corridor: Rabbit Creek to 36th Avenue:

As part of the long-range planning efforts, the Alaska Department of Transportation and Public Facilities (ADOT&PF) completed a Major Investment Study (MIS) in 2002 for the Seward Highway between Rabbit Creek Road and 36th Avenue. The MIS examined the transportation demand and system performance, and identified potential solutions to reduce congestion, promote mobility, and increase safety. One potential solution identified in this study included a new half-diamond interchange to be located at 92nd Avenue.

Preliminary Engineering Report and Environmental Assessment - Seward Highway Corridor: Rabbit Creek to 36th Avenue:

A Preliminary Engineering Report (PER) was completed in September 2004 where additional data was gathered, engineering analysis performed, and potential solutions were screened for feasibility. Two build alternatives were advanced for further analysis in an Environmental Assessment (EA). The preferred alternative included adding an additional lane in each direction to be constructed between the existing mainline and the frontage roads, constructing a half-diamond interchange at 92nd Avenue, constructing a half-diamond interchange at 76th Avenue, constructing grade separated crossings at 68th Avenue and at International Airport Road, and reconstructing the Tudor Road interchange. Other improvements include noise barriers, fencing, illumination, pathways, and other safety improvements. The EA was completed and a Finding of No Significant Impact (FONSI) was signed by the Federal Highway Administration (FHWA) on November 4, 2006 for the preferred alternative.

Seward Highway: 92nd Avenue Grade Separation Project:

The build alternative proposed in the 2004 PER and preferred in the 2006 EA for this project segment includes widening the Seward Highway from the existing four lanes to six lanes. On the west side, the southbound Homer Drive frontage road is extended from Dimond Boulevard to O'Malley Drive. A multi-use pathway is proposed for the west side along Homer Drive frontage road and along Brayton Drive frontage road on the east side.

The half-diamond interchange at Seward Highway and 92nd Avenue as proposed in the 2004 PER and EA is a grade separated interchange with slip ramps between the highway and the frontage roads south of 92nd Avenue. The grade separated interchange would raise the Seward Highway over 92nd Avenue utilizing a bridge, and construct a new link of 92nd Avenue between

Brayton Drive and Homer Drive. The existing portions of 92nd Avenue between Old Seward Highway and Vanguard would be improved as necessary.

In November 2009, an Alternative Selection Report (ASR) for the New Seward Highway: 92nd Avenue Grade Separation project was completed. The 2009 ASR evaluated intersection alternatives for the previously described preferred alternative. Additional data was gathered, engineering analysis performed, and potential solutions were screened for feasibility. The results were evaluated, and the roundabout intersections alternative was selected as the preferred intersection treatment for the grade separation project. The 2009 ASR estimated the total project cost of the grade separation project to be $36,700,000.

Due to funding constraints, the Seward Highway: 92nd Avenue Grade Separation project is divided into two separate projects:

Seward Highway: 92nd Avenue Connector Project:

In order to stay within the current available funding limits, an abbreviated project was selected that still provides connectivity and capacity improvements to the project area. The current project, Seward Highway: 92nd Avenue Connector, includes the following elements:

- An additional Seward Highway southbound lane from the Dimond Boulevard on-ramp to the O'Malley Road off-ramp.
- Seward Highway southbound on and off ramps at 92nd Avenue.
- Upgrades to 92nd Avenue between the Old Seward Highway and the new highway ramps.
- Traffic signal at the Old Seward Highway and 92nd Avenue intersection.

Seward Highway: Future 92nd Avenue Interchange Project:

A future project will complete the grade separated interchange and would include the following elements:

- New crossing of the Seward Highway over 92nd Avenue.
- Extend 92nd Avenue eastward to connect the current project improvements with Academy Drive on the east side.
- Roundabouts at the Brayton Drive and 92nd Avenue intersection and at the on and off ramps and 92nd Avenue intersection.
- Seward Highway northbound off-ramp south of 92nd Avenue.
- Widen the Seward Highway to a six-lane section.
- Upgrades to Academy Drive from Brayton Drive to Vanguard drive.
- Construct the frontage road on the west side of the Seward Highway from O'Malley Road to 92nd Avenue.

The focus of this report is the current project, Seward Highway: 92nd Avenue Connector.

EXISTING FACILITIES

The segment of the Seward Highway between Dimond Boulevard and O'Malley Road is currently a four-lane divided freeway with controlled access. The posted speed is 65 miles per hour (MPH). The 2010 average annual daily traffic (AADT) was about 45,000 vehicles/day.

The existing portion of 92nd Avenue west of the Seward Highway (currently named Abbott Road) serves as a local road, providing access to a strip mall and a residential subdivision.

Existing pedestrian facilities are provided by a 10-foot paved pathway located along the west side of the Seward Highway right-of-way (ROW), and by pathways and sidewalks along both sides of the Old Seward Highway. There are no existing pedestrian facilities along 92nd Avenue.

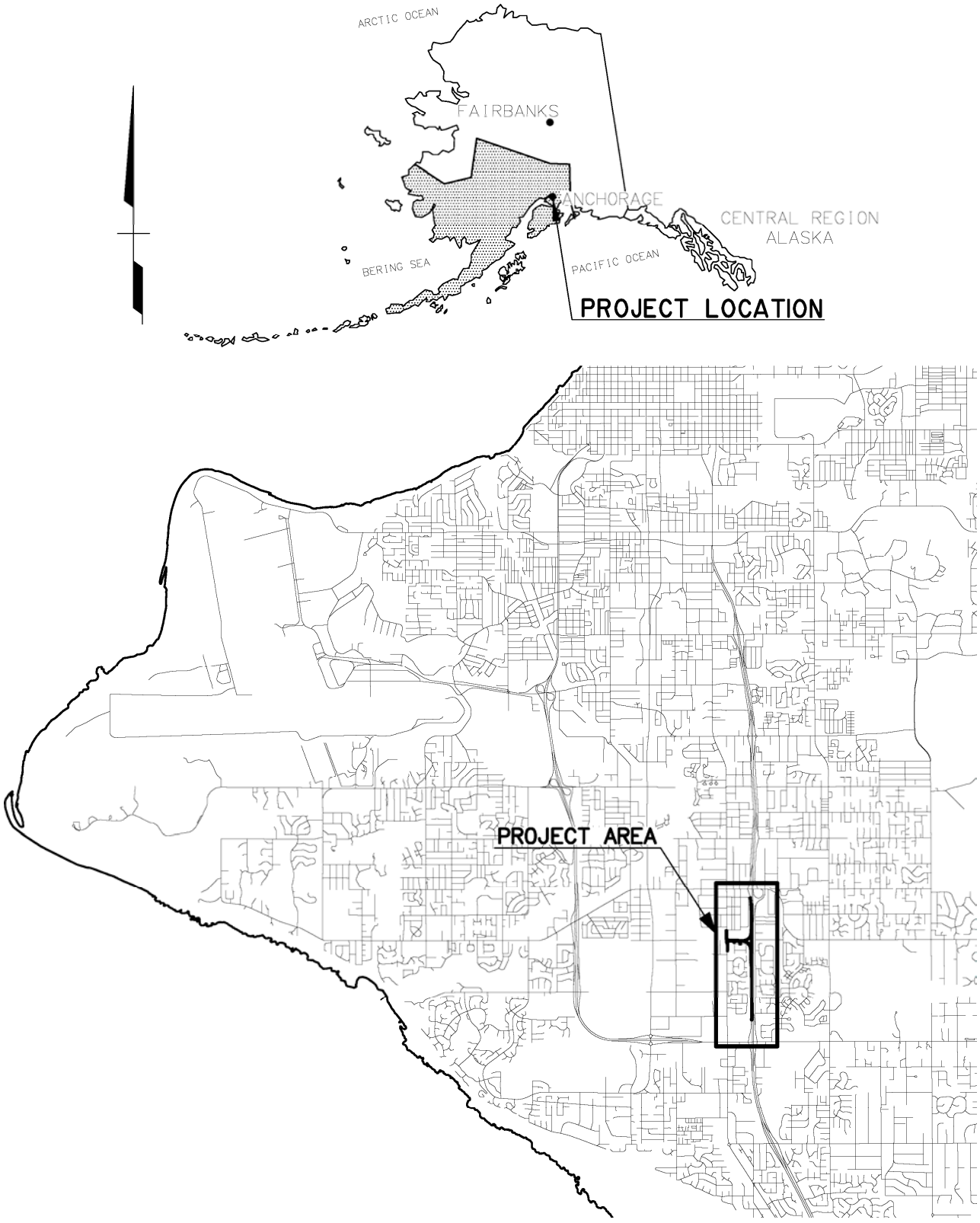

Figure 1– Project Location

PURPOSE

The purpose of this project is to:

- Improve project area connectivity;
- Improve project area traffic capacity and reduce demand on Dimond Boulevard; and
- Improve pedestrian facilities.

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.

3. Manual of Uniform Traffic Control Devices (MUTCD), 2003, as amended, U.S. Department of Transportation, Federal Highway Administration (FHWA), and modified by the Alaska Supplement, December 22, 2005.

4. Design Criteria Manual (DCM), January 2007, Municipality of Anchorage, Project Management & Engineering Department (PM&E).

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

ALTERNATIVES

A. Alternative 1 - No Action

Under this alternative, the existing highway and roadways would remain unchanged with no improvements. Consequences of this action would be increased congestion and demand on Dimond Boulevard near the project area. Project area vehicle and pedestrian connectivity would also not be improved. This alternative does not meet the purpose and need of the project.

B. Alternative 2 - Construct Seward Highway/92nd Avenue Connection

This alternative would add a third southbound lane along the Seward Highway between Dimond Boulevard and O'Malley Road, provide new southbound on and off ramps at 92nd Avenue, upgrade the existing 92nd Avenue from the Old Seward Highway to the new ramps, and provide a new traffic signal at the intersection of Old Seward Highway and 92nd Avenue. See Figure 2 - Proposed Improvements.

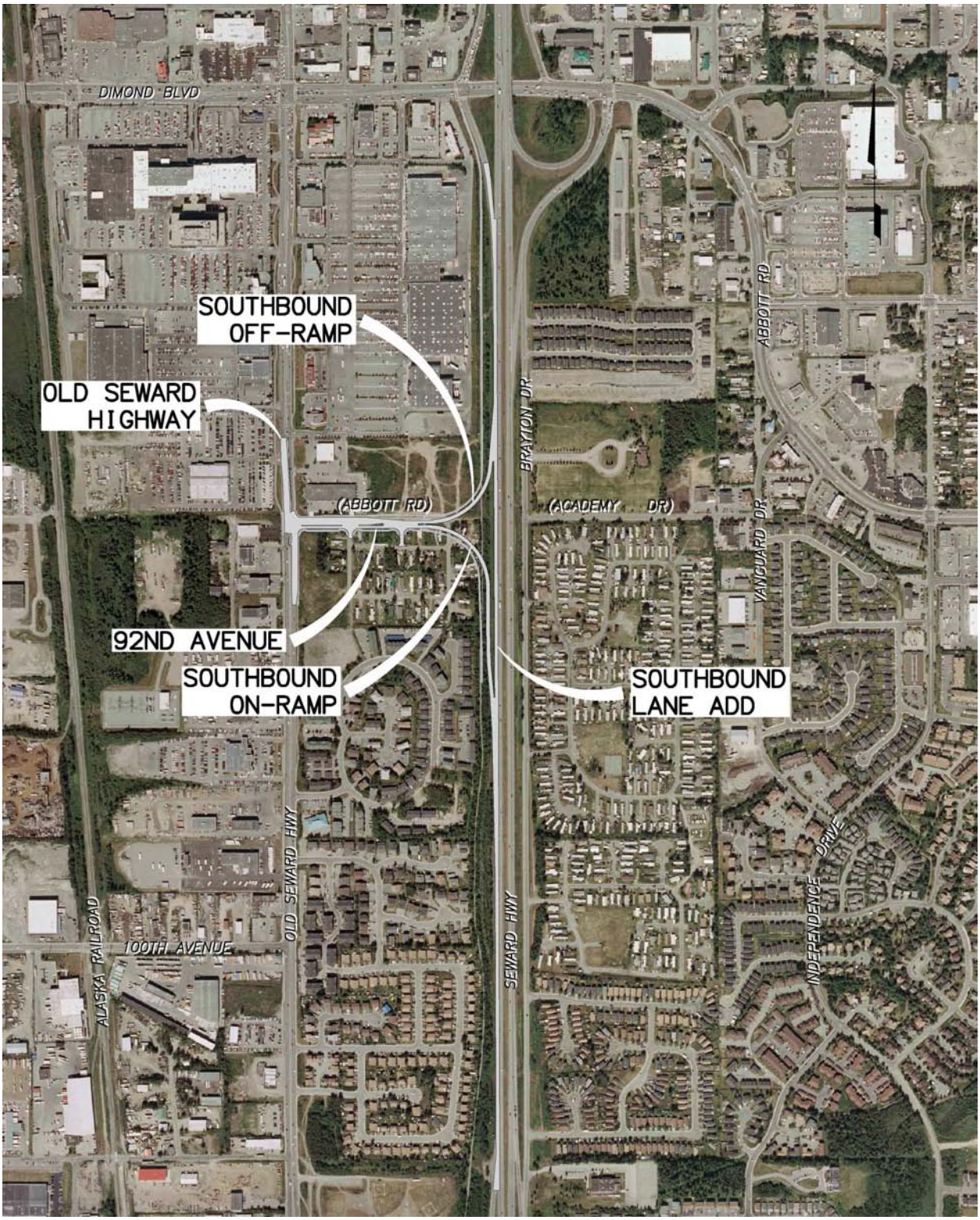

Figure 2– Proposed Improvements

TYPICAL SECTIONS

Seward Highway:

The Seward Highway widening improvements will consist of adding a 12-foot southbound lane with a 10-foot shoulder on the right side. This will provide for a total of three 12-foot southbound lanes with an existing 8-foot shoulder on the left side, and a 10-foot shoulder on the right. The existing 36-foot grass lined ditch median will be maintained between the northbound and southbound traveled ways. The existing 6H:1V foreslopes to the edge of the clear zone will be maintained with the new widening. The typical cut and fill slopes off of the edge of the clear zone will be 2H:1V maximum.

Existing Ramps:

The existing southbound off-ramp at O'Malley Road and the existing southbound on-ramp at Dimond Boulevard consist of 12-foot lanes with 4-foot shoulders on the left side, and 8-foot shoulders on the right. Typical existing foreslopes are 6H:1V to the clear zone. Typical cut and fill slopes off the edge of the clear zone are 2H:1V. This project will maintain the existing typical section lane, shoulder, foreslope, and cut and fill slope configurations.

Proposed Ramps:

The new southbound on and off ramps at 92nd Avenue will consist of one 12-foot lane with a 4-foot shoulder on the left side, and a 8-foot shoulder on the right. Typical foreslopes will be 4H:1V to the edge of the clear zone. Typical foreslopes in the physical gore areas will be 6H:1V. The typical cut and fill slopes off of the edge of the clear zone will be 2H:1V maximum.

92nd Avenue:

The 92nd Avenue improvements will consist of two 12-foot lanes in each direction, a 16-foot center two way left turn lane, 5-foot shoulders, and curb and gutter on both sides. A 6-foot concrete sidewalk will be offset 7.5-feet from the face of curb on the north side and a 10-foot paved pathway will be offset 7.5-feet from the face of curb on the south side. The 7.5-foot sidewalk/pathway setback distance is to allow for snow storage per the Municipality of Anchorage Design Criteria Manual. The typical cut and fill slopes off of the edge of the sidewalk and pathways will be 2H:1V maximum.

Typical sections are provided with the plans in Appendix H.

GENERAL ALIGNMENTS

Seward Highway:

The Seward Highway runs in a north-south direction with one small horizontal angle break and no horizontal curves within the project area. The existing profile is generally level with one crest vertical curve. The existing vertical alignment was checked with current design standards for the design speed of 70 MPH, and was found to be within the design criteria for new construction. This project does not change the existing horizontal or vertical alignments.

Existing Ramps:

The horizontal and vertical alignments of existing southbound on-ramp at Dimond Boulevard and the off-ramp at O'Malley Road were checked with current design standards for the design speed of 50 MPH, and were found to be within the design criteria for new construction. This project will modify the existing ramps horizontal and vertical alignments to transition into the new southbound lane along the Seward Highway. The modifications to the horizontal and vertical alignments will meet new construction standards.

New Ramps:

The new southbound on and off ramps horizontal and vertical alignments will be constructed to new construction design standards for a design speed of 35 MPH.

92nd Avenue:

92nd Avenue runs in a east-west direction with no horizontal curves. The existing profile is generally level with small grade breaks and no vertical curves. This project will re-align the horizontal alignment approximately 40-feet south in order to minimize right-of-way and utility impacts. The vertical alignment will be raised as high as feasible in order to minimize conflicts with the roadway typical section and the high groundwater water table, while maintaining a profile grade that will accommodate the future interchange project.

EROSION AND SEDIMENT CONTROL

The Contractor will provide a Storm Water Pollution Prevention Plan (SWPPP) prior to construction that follows the guidelines as described in 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, preservation of mature vegetation, and other appropriate measures. Structural controls may include fiber rolls, silt fence, inlet protection devices, 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, excess runoff within the project area is collected in a series of vegetated conveyance ditches where it is routed to existing piped storm drain systems located along the Old Seward Highway and along Dimond Boulevard. The Old Seward Highway system flows to the north and enters the Dimond Boulevard system at the intersection of these roads. The Dimond Boulevard storm drain system flows to the west to its eventual outlet into Campbell Creek near the intersection with C Street.

The proposed drainage improvements include the use of vegetated conveyance ditches, curb and gutter, inlets, and piped storm drain systems to collect and dispose of storm water to the existing storm drain systems. Groundwater depth in the project area generally varies from 0 to 19-feet below the existing ground surface. Due to the high groundwater table in the project area, a subdrain system to convey water away from the roadway structural section is recommended. The subdrain will connect to the proposed piped storm drain system. Treatment of the project storm water is will be provided by two oil and grit separators.

The detailed design recommendations are included the Hydrologic and Hydraulic Summary Report (Draft) provided in Appendix E.

SOIL CONDITIONS

Preliminary geotechnical information for the project was provided by ADOT&PF in the "Draft Geotechnical Report Seward Highway: 92nd Avenue Grade Separation Project" (April, 2011). Final geotechnical information will be provided as this project progresses. Soils in the project area generally consist of silty sand with some gravel and clay. The project area soils have a very limited infiltration capacity.

ACCESS CONTROL

Within the project area, the Seward Highway is functionally classified as an Interstate Freeway whose intended purpose is to provide preference to through traffic mobility. Existing access is fully controlled and limited to on and off ramps. A break in the existing controlled access line along the west side of the Seward Highway will be required in order to accommodate the two new on and off ramps at 92nd Avenue.

With this projects improvements, 92nd Avenue will function as an Urban Collector. Access will be limited to local streets and commercial driveways. Raised medians will be provided to limit left turn movements at approaches near the intersection of Old Seward Highway and 92nd Avenue.

TRAFFIC ANALYSIS

As part of the project development, a Traffic Analysis Report (Draft), dated August 2011, was prepared for this project and is provided in Appendix C. The report forecasts the future project area roadway design year volumes and intersection turning movements based on the Anchorage Metropolitan Area Transportation Solutions (AMATS) traffic model. The traffic model includes all of the future connections identified in the Anchorage 2025 Long Range Transportation Plan (LRTP). The design year chosen for this project is 2024.

The traffic study shows that this project will have a significant impact on the peak hour traffic distribution at the existing project area intersections in the design year compared with the "No Action" alternative. The project area intersections included in the traffic report are Dimond/Homer, Dimond/Old Seward, Old Seward/88th, and Old Seward/92nd.

Results of the traffic study show a significant volume reduction in both the southbound right turn movement at the Dimond Boulevard and Homer Drive intersection and the westbound left turn movement at Dimond Boulevard and Old Seward Highway intersection. These movements currently have high volumes and associated long queue lengths. The reductions in turning movement volumes provided by this project at these locations will reduce the overall demand on Dimond Boulevard within the project area.

The traffic study also determined the existing and design year level of service (LOS) for each intersection under both the "No Action" and "Construct" alternatives. The intersection of Dimond Boulevard and Old Seward Highway will benefit from this project based on the projected LOS. This intersection is currently operating at a high LOS D, and without this project, the intersection will deteriorate to a LOS E by 2024. The intersection will perform at a LOS D in 2024 with this project, primarily due to the reduction in the westbound left turn volumes.

Based on the traffic study, a signal is warranted at the intersection of the Old Seward Highway and 92nd Avenue.

SAFETY IMPROVEMENTS

An accident analyses for this project is included in the Draft Traffic Analysis Report, dated August 2011 and is provided in Appendix C. The accident analysis shows a number of turning movements at project area intersections have a higher than average crash rate when compared to the state population average rates. The number of left turn, rear end, and sideswipe crash types are generally higher than the state population average. This overrepresentation of these crash types may be related to congestion and long queue lengths at these intersections.

The project area intersection accident rates demonstrate a need to improve safety in this area. The creation of the on and off ramps at 92nd Avenue will reduce the volume of traffic for several of the movements at the project area intersections. The southbound right turn at Homer Drive and Dimond Boulevard and the westbound left turn at Dimond Boulevard and Old Seward Highway currently experience significant queuing. Excessive queuing can reduce the available deceleration space in auxiliary lanes, forcing drivers to decelerate in the through lanes prior to entering the turn lane. The reduction in these turning movement volumes may reduce the incidences of rear end and sideswipe crashes.

RIGHT-OF-WAY

The existing ROW along 92nd Avenue is 80-feet wide. Acquisition of additional ROW will be required for the widening of 92nd Avenue and the new on and off ramps. Approximately 34 properties will be affected by the proposed improvements, including 15 total acquisitions and 19 partial acquisitions. It is anticipated that 10 structures will be acquired.

A preliminary right-of-way impact and cost estimate was prepared based on the 2009 Municipality of Anchorage tax appraisals for land and building values. The estimated cost for right-of-way acquisition and relocation for this project is $3.0 million.

PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian and bicycle facilities will be improved by providing paved sidewalk and pathways. A 6-foot concrete sidewalk will be provided on the north side of 92nd Avenue and a 10-foot paved pathway will be provided on the south side of 92nd Avenue. Additional bicycle facilities will be provided by the 5-foot shoulders along both sides of 92nd Avenue.

The existing paved pathway along the west side of the Seward Highway between 92nd Avenue and Dimond Boulevard is performing poorly and will be reconstructed. Other existing sidewalks and pathways in the project area will be reconstructed where they are re-aligned.

A new mid-block crosswalk is provided at the end of 92nd Avenue in order to maintain the existing north-south pedestrian and bicycle movements along the west side of the Seward Highway corridor. Push button actuated flashers will be provided for advanced warning of pedestrians and bicyclists using this crosswalk.

ILLUMINATION

Existing illumination is provided by hightower lights at the Dimond and O'Malley interchanges. This project will not affect these existing facilities. Additional offset luminaires will be provided along both sides of 92nd Avenue, along the new southbound on and off ramps, and at the intersection of Old Seward Highway and 92nd Avenue.

UTILITY RELOCATION AND COORDINATION

The existing utilities along the project generally consist of overhead electrical power lines operated by Chugach Electric Association; buried and overhead telephone lines operated by Alaska Communications Systems (ACS); buried fiber optic cables operated by ACS and General Communications Inc (GCI); buried television cables operated by GCI; water and sewer mains operated by Anchorage Water and Wastewater; and natural gas lines operated by Enstar Natural Gas Company.

Preliminary engineering was performed to identify utility conflicts for the future interchange project. Utilities located on the west side of the Seward Highway impacted by this project and the future interchange project will be relocated as necessary to be outside of the future project footprint to the extent feasible. A Preliminary Utility Conflict Report is provided in Appendix F. The estimated cost for utility relocations is $1.7 million.

PAVEMENT DESIGN

ADOT&PF has prepared a preliminary pavement design for Seward Highway: 92nd Avenue Connector and is provided in Appendix D. Utilizing this information the assumed pavement section is:

Seward Highway - Southbound Lane Add
- Remove existing pavement
- 2" Hot Mix Asphalt, Type II, Class A
- 4" Asphalt Treated Base
- 2" Aggregate Base Course Grading, D-1
- 36" Selected Material, Type A

Existing Ramps - Reconstruction
- Remove existing pavement
- 2" Hot Mix Asphalt, Type II, Class A
- 4" Asphalt Treated Base
- 2" Aggregate Base Course Grading, D-1
- Selected Material, Type A

Proposed Ramps
- 2" Hot Mix Asphalt, Type II, Class A
- 4" Asphalt Treated Base
- 2" Aggregate Base Course Grading, D-1
- 36" Selected Material, Type A

92nd Avenue - Reconstruction
- Remove existing pavement
- 2" Hot Mix Asphalt, Type II, Class A
- 4" Asphalt Treated Base
- 2" Aggregate Base Course Grading, D-1
- 12" Selected Material, Type A
- 4" Sand Blanket
- 2" Insulation Board
- 2" Sand Blanket
- 24" Selected Material, Type A
- Geotextile, Drainage, Class I
- 8" Porous Backfill Material
- Geotextile, Drainage, Class I
- 30" Selected Material, Type A

Old Seward Highway - Northbound Right Turn Lane Add
- 2" Hot Mix Asphalt, Type II, Class A
- 3" Asphalt Treated Base
- 2" Aggregate Base Course Grading, D-1
- 36" Selected Material, Type A

Asphalt Pathways
- 2" Asphalt Pathway
- 4" Aggregate Base Course Grading, D-1
- 24" Selected Material, Type A

Concrete Sidewalks
- 4" Concrete Sidewalk
- 4" Aggregate Base Course Grading, D-1
- 24" Selected Material, Type A

COST ESTIMATE

The primary for this project has been appropriated through the State of Alaska General Obligation Bonds enacted in 2007. A construction cost estimate was developed utilizing 2011 unit prices for major construction items. The right-of-way cost estimate is based on the MOA's 2009 tax appraisals for land values. The cost estimates for this project is as follows:

Design Engineering	$	1,600,000
Right of Way	$	3,000,000
Utilities	$	1,700,000
Construction & CE	$	10,800,000
Total	$	17,100,000

ENVIRONMENTAL COMMITTMENTS

Coordination with the various federal, state, and local agencies occurred according to the National Environmental Policy Act. An Environmental Assessment document was prepared by ADOT&PF for the Rabbit Creek to 36th Avenue project and approved by FHWA in July 2006. The FONSI was signed on November 4, 2006 and is provided in Appendix G.

Environmental commitments and mitigation measures for this project will comply with the measures listed in the signed FONSI.

STRUCTURES

There are no structures included in this project.

EXCEPTION TO STANDARDS

There are no exceptions to the design standards for this project. No waivers to the design criteria for new construction are required for this project.

MAINTENANCE CONSIDERATIONS

The Seward Highway is maintained by the ADOT&PF. The Municipality of Anchorage owns and maintains 92nd Avenue. Once this project is complete, there will be approximately 3.0 additional lane-miles of roadway. The additional lanes, storm drain systems, traffic signal, illumination, and channelization will increase some maintenance costs. However, the project improvements will reduce overall congestion and driver delay by improving project area connectivity.

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