VICTOR ROAD

100th Avenue to Dimond Boulevard

Design Study Report

ADOT & PF Project No: STP-001 (232)/55027

Department of Transportation:
4111 Aviation Drive
Anchorage, Alaska 99519

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NOTICE TO USERS

This report is intended to document the methodologies, findings, and conclusions at the time of publication. Changes frequently occur during the evolution of the design process. Persons who may rely on the information contained in this document should consult with the Alaska Department of Transportation and Public Facilities for the most current design decisions. Please contact Mr. Jim Amundsen, Project Manager at 269-0595 for this information.

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Common Acronyms

Agencies/Organizations

AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACS	Alaska Communication Systems, Inc.
ADEC	State of Alaska Department of Environmental Conservation
ADF&G	State of Alaska Department of Fish & Game
ADOT&PF	State of Alaska Department of Transportation and Public Facilities
AMATS	Anchorage Metropolitan Area Transportation Solution
AWWU	Anchorage Water & Wastewater Utility
CEA	Chugach Electric Association
COE	United States Army Corps of Engineers
DGC	State of Alaska Division of Governmental Coordination
ENSTAR	ENSTAR Natural Gas Company
EPA	United States Environmental Protection Agency
FHWA	Federal Highways Administration
GCI	GCI CABLE, Inc.
ITE	Institute of Transportation Engineers
MOA	Municipality of Anchorage
NMFS	United States National Marine Fisheries Service
PM&E	MOA Project Management and Engineering Department
SHPO	State Historic and Preservation Office
USCG	United States Coast Guard
USACOE	United States Army Corps of Engineers
USFWS	United States Fish & Wildlife Service

Publications

ADAAG	Americans with Disabilities Act Accessibility Guidelines
DCM	MOA Design Criteria Manual
DSR	Design Study Report
Green Book	AASHTO A Policy on Geometric Design of Highway & Streets
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
LRTP	Long-Range Transportation Plan
MUTCD	Manual on Uniform Traffic Control Devices
OS&HP	Official Streets and Highways Plan
PGDHS	AASHTO A Policy on Geometric Design of Highway & Streets
PCM	ADOT&PF Preconstruction Manual
PER	Preliminary Engineering Report
UCR	Utility Conflict Report

Terms

AADT	Annual Average Daily Traffic
ac	Acre
ACMP	Alaska Coastal Management Program
ADA	Americans with Disabilities Act
AM	Ante Meridian
AWSC	All Way Stop Control
BMP	Best Management Practice
CE	Categorical Exclusion
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CTWLT	Continuous Two-Way Left-Turn
cy	Cubic Yard
E	East
ESA	Environmental Site Assessment (Phase I)
ESAL	Equivalent Single Axle Load
ft	Feet
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
ICD	Inscribed Circle Diameter
in	Inch
LOS	Level of Service
mi	Mile
MPH	Mile per Hour
MSE	Mechanically Stabilized Earth
N	North
NEPA	National Environmental Policy Act
NFS	Non Frost Susceptible
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
PM	Post Meridian
R	Range
ROW	Right-of-Way
SIDRA	Signalized & unsignalised Intersection Design and Research Aid
STIP	Statewide Transportation Improvement Plan
SWPPP	Storm Water Pollution Prevention Plan
T	Township
TCP	Temporary Construction Permit
TIP	Transportation Improvement Program
W	West

1.0 Executive Summary

Victor Road is one of the oldest roads in Southwest Anchorage and improvements have been planned for many years. The existing road does not meet current standards and is currently a narrow, two-lane facility with narrow unpaved shoulders. This report documents the proposed improvements to Victor Road.

This project is being completed by the State of Alaska Department of Transportation and Public Facilities with the assistance of federal funding. The project will enhance the corridor facilities through the design year 2025. This phase of the project makes refinements to the improvements as documented in the Preliminary Engineering Report.

Reconstructing Victor Road will address the many needs of the project including: improvements to the vertical alignment, a more efficient typical sections, improved intersection capacity, a better driving surface, enhanced pedestrian/bicycle facilities, and a renovated illumination system.

Various design alternatives were investigated and are presented in the Preliminary Engineering Report. The Preliminary Engineering Report recommended the *3-Lane with Paved Shoulders Alternative* for selection as the preferred alternative. Following a cursory review, this alternative was discarded due to the enormous utility, ROW, and construction impacts. Based on the revaluation, the *3-Lane Alternative* has been selected as the preferred alternative.

The environmental review verified that the proposed action to construct the recommended alternative complies with *23 CFR 771 ENVIRONMENTAL IMPACT AND RELATED PROCEDURES, § 771.117 Categorical Exclusions*. FHWA concurred and granted on August 14, 2002 that a Categorical Exclusion is appropriate for the Victor Road project.

The total project cost with all associated improvements is estimated to be approximately $7,080,000.

2.0 Introduction

The Design Study Report (DSR) was developed to evaluate alternatives and provide recommendations to upgrade the existing roadway to current standards. The proposed improvements will include a 3-lane roadway, resurfacing, drainage, pedestrian facilities, traffic signals, landscaping, amenities, and intersection capacity. Previous project phases have included a Traffic Analysis[1], Hydrologic and Hydraulic Analysis[2], Preliminary Engineering Report[3], and Utility Conflict Report[4] which are available for review. The reader should consult these documents for additional information.

This project was originally initiated through the Anchorage Metropolitan Area Transportation Solutions[5] (AMATS) Road Transfer Program. The State of Alaska Department of Transportation and Public Facilities (ADOT&PF) assumes the responsibility to complete this project with the use of federal funding. The concepts

developed previously are being refined in concert with ADOT&PF in order to minimize construction costs. This phase of the project will move a modification of the 3-lane alternative forward. This project is funded by the Federal Highway Administration (FHWA) and managed by ADOT&PF.

2.1 Preliminary Engineering and Environmental Analysis

Preliminary engineering and environmental analysis of the Victor Road project began in February 2002. The Preliminary Engineering Report (PER) describes the analysis of the no-build alternative and six different build alternatives. The six build alternatives represented a range of choices for 3-lane streets, a 4-lane street, and a 5-lane street. The reader should consult the PER for additional information regarding those alternatives that were not selected for the construction of Victor Road. The PER recommended the 3-Lane with Paved Shoulders Alternative for Victor Road.

The environmental analysis is documented in Appendix E of the PER, including a Categorical Exclusion (CE) Checklist, which was approved by the Federal Highways Administration on August 14, 2002.

2.2 Purpose of this Document

The purpose of the design study is to identify and evaluate refinements for the street improvement proposal documented in the PER. This Design Study Report (DSR) supplements the PER and presents:

- The evaluation of traffic associated with Mears Middle School (Section 7.2);
- The recommendation for traffic control at the 100th Ave intersection (Section 7.3);
- The typical section refinement related to the lane transition for southbound traffic between the Dimond Boulevard intersection and Canary Court (Section 7.4);
- Refinements in the vertical alignment and associated retaining walls (Section 9.0);
- The evaluation of pedestrian facilities along both sides of Victor Road (Section 11.0);
- An update of utility conflicts (Section 12.0);
- An update of Right-of-Way (ROW) needs and identification of Temporary Construction Permit (TCP) needs (Section 18.0); and
- Landscaping enhancement proposals (Appendix F).

2.3 Project Description

Victor Road is a State-owned road (State Route # 133740) located between 100th Avenue and Dimond Boulevard. Improvements to Victor Road have been planned for many years. The road is narrow, has steep grades, poor sight distance, and the surface condition is poor. The road lacks shoulders, and left-turn channelization is needed at key intersections.

Victor Road is an important north-south transportation and utility corridor. It does not currently have the capacity to efficiently carry the traffic demand and excessive traffic delays are common in peak hours. Victor Road is located in an area that has experienced extensive growth since the mid 1970's. Growth in the surrounding areas is expected to continue as nearly 1800 new residential lots remain to be developed in the immediate area. This growth is expected to increase the traffic demand on Victor Road. Victor Road is a favorite route for those people traveling from the Bayshore/Southport/Klatt area to the shopping district on Dimond Boulevard and Dimond High School. In addition, Mears Middle School attracts traffic from the west Dimond area to Victor Road.

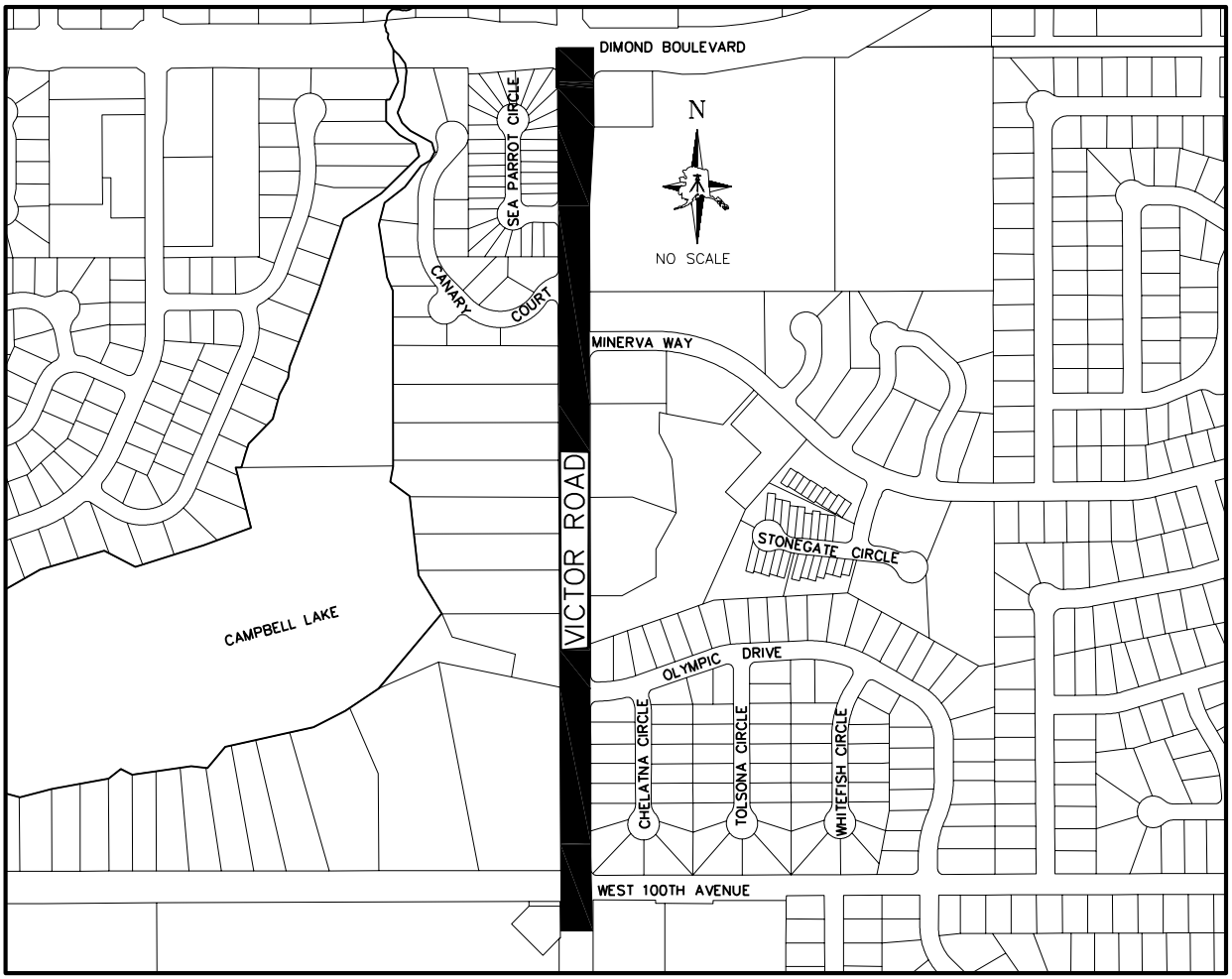
2.4 Location and Existing Conditions

Victor Road is located entirely within the Municipality of Anchorage in Southwest Anchorage near Campbell Lake. The project is located one-half mile west of Minnesota Drive, along the section line separating the Northwest ¼ of Section 13 from the Northeast ¼ of Section 14, T12N, R4W, Seward Meridian. Victor Road is approximately one-half mile long and connects 100th Avenue with Dimond Boulevard. Figure 2-1 presents the Location and Vicinity Map.

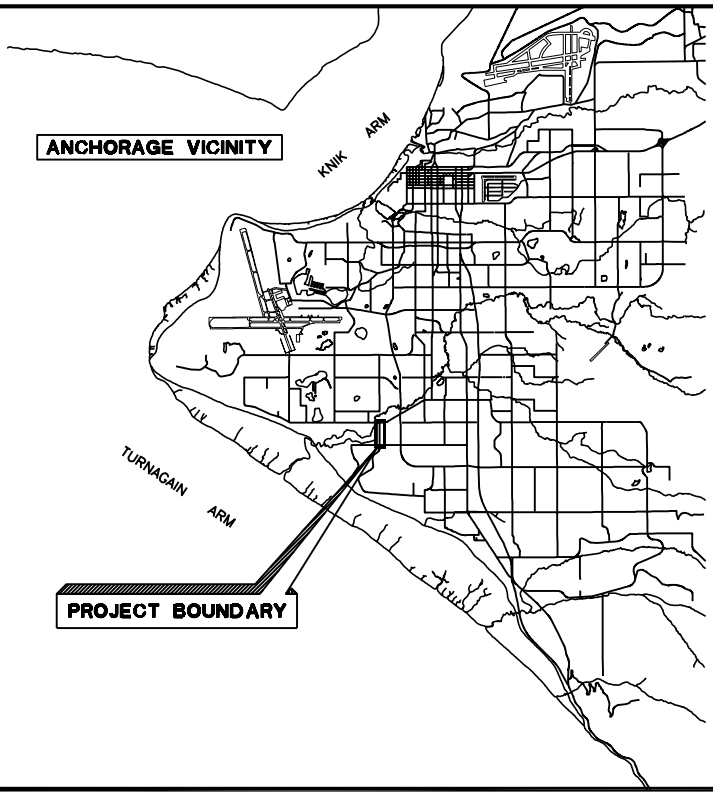
The Official Streets and Highways Plan[6] (OS&HP) classifies Victor Road as a minor arterial class II. Victor Road is classified as a collector by ADOT&PF in the Annual Traffic Volume Report for Central Region, 2005. In general, neighborhoods are oriented away from the street and access Victor Road from local streets. However, nine residential driveways directly access Victor Road. Two adjacent businesses, Fred Meyer and Chevron, also directly access Victor Road. The posted speed limit for Victor Road is 35 miles per hour.

Victor Road is one of the oldest roads in southwest Anchorage. The road originated prior to 1950 and was paved by the early 1970's. The existing facility is comprised of two 11-foot lanes. There are no paved shoulders. Unpaved shoulders varying in width from 1-2 feet exist along some of Victor Road. Near 100th Avenue (the Beginning of Project) and Dimond Boulevard (the End of Project), the street is bordered by curb & gutter, has a narrow raised median, and auxiliary lanes. Refer to Appendix I for some project photos of the existing conditions.

For the majority of Victor Road, the existing embankment is elevated above the surrounding ground with ditches immediately next to the traffic lanes. Drainage is conveyed away from the roadway by a ditch and culvert system. The existing pavement is in poor physical condition with numerous longitudinal and transverse cracks.



PROJECT AREA



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NO SCALE

VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

LOCATION AND VICINITY MAP

DATE: OCT. 2007
DRAWN: SAM
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FIGURE: 2-1

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This pavement degradation is related to several factors including the frost-susceptible subgrade, a high water table, traffic loads, and pavement age.

Victor Road has six street intersections in the project area: 100th Avenue, Olympic Drive, Minerva Way, Canary Court, Sea Parrot Circle, and Dimond Boulevard. The Dimond Boulevard intersection is the only one controlled by a traffic signal. The Victor Road/100th Avenue intersection is all-way stop controlled, but is plumbed for a future traffic signal system. All other intersections are stop controlled along the minor approaches. A residential driveway for Kingsford Park Condominiums is located on the east side of the street between Olympic Drive and Minerva Way. The Kingsford Park driveway serves enough units to have the characteristics of a street intersection. South of Canary Court, there are seven driveways for single-family residences on the west side of Victor Road. An eighth driveway is located opposite Olympic Drive; however, there is not yet a residence present on the lot.

Victor Road has steep grades and limited sight distance near the south end of the project. The existing grades in this area are approximately eight percent. The sag vertical curve, with the low point near the Olympic Drive intersection, does not meet current design standards for a design speed of 35 MPH. This vertical alignment adversely affects traffic on Victor Road especially during slick winter conditions. Higher standards are necessary at this time to accommodate the traffic projected to use Victor Road in the design year, 2025. All other grades in the project area are less than four percent.

On the east side of Victor Road, there is an existing detached multi-use pathway, extending from the south side of 100th Avenue to the north entrance into the Fred Meyer store. Between the Fred Meyer parking and Dimond Boulevard, the pathway is attached. On the west side, no pedestrian or bicycle facilities are present between 100th Avenue and Dimond Boulevard.

2.5 Purpose and Need

2.5.1 PURPOSE

This project was initiated for several reasons:

- To upgrade Victor Road to current standards;
- To correct pavement failures;
- To promote safety; and
- To construct a facility that can be efficiently maintained.

The project will improve the roadway conditions to accommodate traffic through the year 2025, enhance pedestrian/bicycle movements, accommodate drainage, and reconstruct the street to modern standards established in currently adopted planning documents. Other objectives that can be achieved include: minimizing adverse environmental impacts, minimizing Right-of-Way (ROW) and utility impacts, minimizing construction cost and creating an aesthetically pleasing facility.

2.5.2 NEED

The rising population in the area is increasing the traffic on Victor Road. Portions of Victor Road are currently operating at capacity during peak hours. This means traffic is congested and the road does not allow for efficient travel. As traffic increases, mobility will decrease and travel times will increase.

The primary needs include:

- Better street geometry – particularly the vertical alignment;
- A more efficient typical section that matches traffic demand;
- Intersection capacity improvements to match traffic demand;
- An improved driving surface;
- Illumination system renovations; and
- Enhancing pedestrian/bicycle facilities on the east side of Victor Road.

Victor Road needs to be upgraded to accommodate traffic volumes, provide sufficient pedestrian/bicycle facilities, and improve safety. Reconstruction will bring the roadway to current standards including: improvements to the pavement, drainage, road foundation, corridor lighting, sight distances, and intersection operations. Landscaping elements will be incorporated into the reconstruction project.

3.0 Project Design Standards

The objective of establishing project design standards and criteria is to promote a safe, functional, and durable roadway. The design criteria listed below provides the design standards adopted for this project. Applicable criteria are presented in Appendix A.

3.1 Street Design Criteria

The Victor Road project will be completed according to standards established by the ADOT&PF Highway Preconstruction Manual[7] (PCM). This manual reference's the latest edition of the Green Book[8]. In the event of conflict between the PCM and the Green Book, PCM provisions will prevail.

3.2 Pathway Design Criteria

The construction of the multi-use pathways along Victor Road will be completed according to the criteria established by the PCM, AASHTO's Guide for the Development of Bicycle Facilities[9], and the Areawide Trails Plan[10]. Design considerations will also reflect the Americans with Disabilities Act.

3.3 Drainage Evaluation and Design Criteria

The design of drainage systems is based on the importance of the storm drain and the roadway classification. The PCM requires that storm drain systems be designed based on 10-year, 25-year, or 50-year storm events. According to the PCM, the feeder storm drains in Victor Road should be designed for the 10-year storm event. The Hydrologic and Hydraulic Analysis was completed in a previous phase by MOA which also used the 10-year requirement. Since this phase of the project will not re-evaluate that study, the design standards and procedures for urban drainage design for this project were

determined from the MOA Design Criteria Manual[11] (DCM). Pipe size requirements were determined based on a 10-year storm. Water quality stipulations were determined based on a 2-year storm.

3.4 Identification and Justification of Exceptions to Standards

A requirement to seek an exception to standards has been identified. For most of this project, the design will be prepared to meet present standards and criteria established by ADOT&PF. However, the unique conditions along Victor Road require that certain criteria be tailored to this project. The project-specific criterion has been established for design speed, design vehicle, taper length, and width and placement of pedestrian/bicycle facilities. This specific criterion, Establishment of State of Alaska Design Criteria Waiver's, is presented at the end of Appendix A.

3.5 Design Designations

A detailed Traffic Analysis, see section 7.0, was completed to establish design designations for this project. In order to be sure the planning horizon extends at least 25 years, the analysis was based on full development of all land in the Victor Road study area. For all other project elements, the design year is set at 2025.

4.0 Public Involvement

Public input was considered in the development and analysis of alternatives and the selection of the preferred alternative. Refer to the PER, Appendix D, for public involvement records through the environmental phase. Additional public involvement activities will be presented in Appendix H. The public involvement process will continue through design and construction.

5.0 Design Considerations

An in-depth discussion of the project design issues can be found in the PER. The following sections revisit many of the important design considerations for this project.

5.1 Taper Length

At the north end of Victor Road, two southbound lanes near the Dimond Boulevard intersection are necessary to accommodate the future two left-turn lanes from westbound Dimond Boulevard to southbound Victor Road. These lanes must be available in the coming years, or there simply will not be enough green time available for efficient intersection operations. A taper[a] is needed, in the vicinity between Sta 118+28 and Sta 119+98, to safely transition traffic from the multiple lanes at the Dimond Boulevard intersection to the single proposed southbound lane on Victor Road.

[a] For guidance on acceleration and deceleration auxiliary lanes refer to American Association of State Highway Transportation Officials (AASHTO). A Policy on Geometric Design of Highways and Streets. Washington D.C.

This taper, between Canary Court and Sea Parrott Circle, would encroach into several guy wires and utility poles. The only way to avoid these utilities is to significantly reduce the taper length. A detailed discussion of the southbound lane drop transition is included in Section 7.4 Traffic Analysis.

5.2 Project Grades

Improving the Victor Road corridors vertical alignment is an important aspect of this project. The grades at the south end and middle of the project must be reworked to comply with modern design standards. The primary considerations in designing the vertical alignment include: drainage conditions, water quality control measures, improving sight distance, and controlling earthwork costs. Refer to Section 9.2 for the vertical alignment.

5.3 Access

Existing access to all current driveways along the project will be maintained. In some cases, multiple driveways may be reduced in number, driveway width may be reduced, and driveway location may be moved. Driveways in some locations may become right-in/right-out-only configurations due to raised median channelization.

5.4 Safety

Improvements to the traffic, horizontal, and vertical alignments are within the scope of this project. Considering paved shoulders, raised medians, and pedestrian facilities might benefit safety. A complete discussion on safety can be found in the PER.

5.5 Pedestrian Facilities

The pathways will constructed to meet the design criteria attached in Appendix A. The public has repeatedly voiced the need for pedestrian facilities throughout the public involvement process. Additional information is presented in Section 11 Pedestrian/Bicycle Facilities.

5.6 Utility Considerations

Utility impacts in the project area will vary according to typical section width. Utility impacts at the intersections are expected due to construction of new drainage facilities and pathway improvements. Many of the underground utilities located within the proposed road prism and/or cut limits must be lowered or relocated. Some of the overhead utilities will also be impacted and will need to be relocated. Refer to Section 12.0 for Utility Relocation and Coordination.

5.7 Right-of-Way Considerations

The intent of this project is to develop a design that meets the Purpose and Need while minimizing ROW takes. ROW impacts will vary according to the typical section width. ROW impacts at the intersections are expected for pathway reconstruction, drainage improvements, utility relocations, and sight distance triangles. Refer to Section 18.0 for the ROW requirements.

5.8 Environmental Concerns

Two environmental concerns limit the alignment choices available for Victor Road. First, the wetlands west of Olympic Drive and adjacent to Campbell Lake were identified as valuable by the Corps of Engineers. The approved project Categorical Exclusion (CE) allows the wetlands to be filled, but there can be no encroachment into the wetlands beyond the present-day ROW line. Second, Stonegate Park north of Olympic Drive also limits available alignment options. Because Stonegate Park is a 4(f) land, the CE prohibits any impacts to that parcel. The environmental commitments are presented in Section 19.0 Environmental Commitments and Coastal Zone Consistency Determination.

5.9 Drainage

A detailed discussion of drainage issues is included in Section 14 Drainage.

5.10 Landscaping and Amenities

Landscaping will be an important aspect of this project. Continued public involvement and refinement of specific landscaping and amenities details will continue through the design phase.

6.0 Design Alternatives

Several alternatives have been investigated, including: the no-build alternative, three different 3-lane alternatives, two 5-lane alternatives and a directional-split (4-lane) alternative.

6.1 No Build Alternative

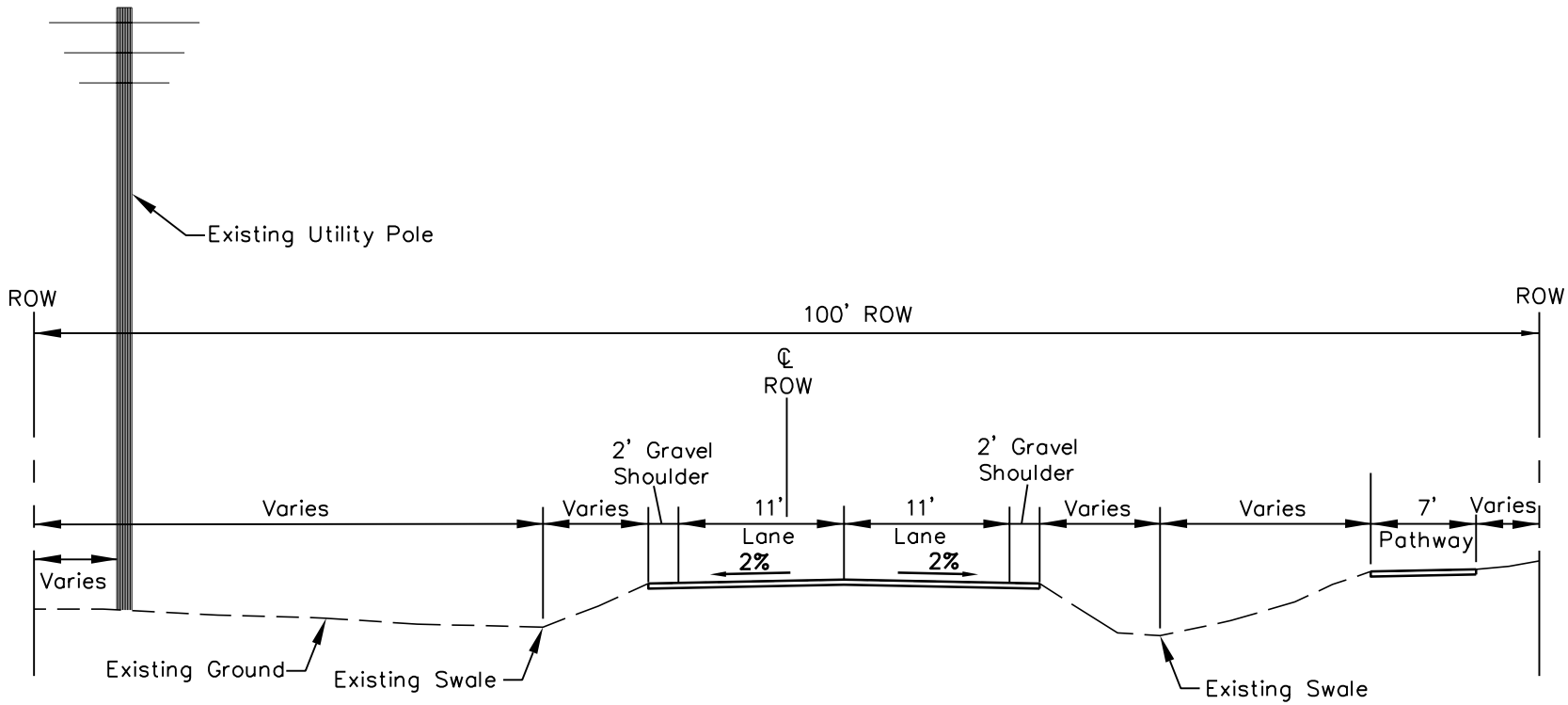
The No Build Alternative would leave Victor Road as it currently exists. Figure 6-1 presents the existing typical section. The No Build alternative was not selected because it would fail to address the purpose and need of the project.

6.2 Build Alternatives

As discussed in the PER, six build alternatives were originally proposed for evaluation. The six build alternatives represented a range of 3-lane streets, a 4-lane street, and a 5-lane street. Drawings of the alternatives that are no longer being considered can be found in the PER.

6.2.1 3-Lane with Paved Shoulders Alternative

The PER recommended the 3-Lane with Paved Shoulders Alternative for selection as the preferred alternative. Since the PER, this alternative has been discarded based on additional information during the design study process. The enormous expense associated with this alternative pertaining to the ROW and utility impacts were unjustified.



VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

EXISTING TYPICAL SECTION

DATE: OCT. 2007
DRAWN: CW/SAM
CHECKED: CW
FIGURE: 6-1

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6.2.2 3-LANE WITH SHORT TAPER AND EASTSIDE PATHWAY ALTERNATIVE

The 3-Lane with Short Taper and Eastside Pathway Alternative (3-Lane Alternative) refines the 3-Lane Alternative as described in the PER. In general, this alternative would convert the existing 2-lane street into a 3-lane street comprised of one lane in each direction with continuous two-way left turn (CTWLT) lane. A pathway would be included on the east side of Victor Road. On the west side of Victor Road, a sidewalk would be installed between Sea Parrott Circle and Dimond Boulevard.

6.3 Preferred Alternative

The 3-Lane with Short Taper and Eastside Pathway Alternative (3-Lane Alternative) has been selected as the preferred alternative. The 3-Lane Alternative is discussed in Section 9.0. Plan & profile views for the 3-Lane Alternative are shown on Figure C-1 in Appendix C.

6.4 Comparison of Environmental Effects

Following analysis of traffic projections, street geometry, utility impacts and ROW impacts, the 5-lane alternatives and the Directional-split (4-lane) Alternative were discarded. Because of the additional street width, the 4-lane and 5-lane street alternatives would have had the most environmental impacts.

Any of the 3-lane alternatives would have very similar environmental impacts to each other, because the intersection configurations at 100th Avenue and at Dimond Boulevard are identical. Approximately 0.2 acres of wetland within the ROW will be filled, but none of the wetlands beyond the ROW line will be filled.

6.5 Consistency with Community Plans

The proposed project is consistent with community plans including the Long Range Transportation Plan (LRTP), the Official Streets and Highways Plan (OS&HP), and the Areawide Trails Plan. Successions of LRTPs have recognized Victor Road improvements as a priority for decades. The OS&HP classifies Victor Road as a minor arterial class II, and the proposed project is in keeping with this classification.

In June 2001, the Municipality of Anchorage published the ***Freight Mobility Study***. In the project area, freight is delivered on a regular basis to the Fred Meyer store and Chevron Station near Dimond Boulevard. In keeping with the ***Freight Mobility Study***, this project will be designed to safely accommodate larger vehicles without damage to signs, signals, etc. A minimum of a WB-50 design vehicle will be used, and where possible, a WB-67 design vehicle will be used.

7.0 Traffic Analysis

A detailed traffic analysis was completed for this project. The design designations, traffic volume projections, and the level-of-service analysis are presented in the Traffic Analysis report.

The following is reprinted from the Traffic Analysis: Victor Road primarily serves the vehicle, pedestrian, and bicycle traffic generated by the adjacent residential neighborhoods. Other nearby destinations that generate traffic on Victor Road include Mears Middle School, Dimond High School, and the shopping district along Dimond Boulevard. Victor Road also carries pass-through traffic that does not have an origin or destination in the study area. The majority of pass-through traffic uses Victor Road to travel between Minnesota Drive and Dimond Boulevard west of Victor Road.

Present-day traffic counts have recorded the Annual Average Daily Traffic (AADT) on Victor Road of approximately 7510 vehicles. At full development of the surrounding area, the AADT on Victor Road is predicted to be approximately 14,720 vehicle trips. The traffic study concluded that one through lane in each direction is sufficient for the projected traffic volumes on Victor Road. Appropriate turn lanes and tapers are needed to improve the capacity of the 100th Avenue and Dimond Boulevard intersections. In addition, traffic accessing Mears Middle School must be evaluated to appropriately design the 100th Avenue intersection.

7.1 Traffic Modeling

The intersections at 100th Avenue and Dimond Boulevard were modeled and evaluated using forecasted peak hour turning movements. Institute of Transportation Engineers (ITE) trip-generation rates were applied to nearby land uses and the forecasted trips were assigned to each approach. Intersection operations were modeled using techniques described in the Highway Capacity Manual (HCM). Applicable computer software including: SIDRA (Signalized & unsignalized Intersection Design and Research Aid) release 5.20, Highway Capacity Software (HCS) release 3.1c based on the HCM, and Synchro 5 (Traffic Signal Coordination Software), were used to model intersection capacity, delay, and queue lengths for the various alternatives.

7.2 Mears Middle School Traffic

In the AM peak hour, long queues originating at Mears Middle School can back into the 100th/Victor intersection. This problem will have an adverse effect on all intersection alternatives and a solution is needed to avoid excessive delay on Victor Road.

Mears Middle School has two driveways on 100th Avenue; one near the east property line and one near the west property line. School buses turn into Mears in the east driveway, proceed around the building, drop children off at the west side of the school, and then exit out the west driveway. Parents turn into Mears at the east driveway and drop children off on the east or north side of the school. Approximately 80% of the passenger-car student drop-offs turn around and exit out the east driveway, while approximately 20% exit via the west driveway.

The public has voiced concern about the traffic queue turning into east driveway. Local drivers report that on some mornings the queue extends to, or into, the 100th/Victor intersection. The east driveway is approximately 1300 feet from the west side of the100th/Victor intersection. According to reports, this problem seems to be associated with special events (such as the first day of school) or inclement weather. Because the problem is intermittent, it has not been documented in available traffic counts.

7.2.1 TRAFFIC DATA

A traffic count was recorded at the Mears Driveway on April 2, 2003[b]. Counts were simultaneously recorded at the 100th/Victor intersection so that corresponding data could be analyzed. On that morning, 19 school buses were recorded at the 100th/Victor intersection traveling towards Mears Middle School. 420 vehicles entered Mears at the east driveway, 50 from the west and 370 from the east.

232 vehicles exited at the east driveway - all of them turned right to go east. 104 vehicles exited from the west driveway. 14 turned left to go west, 90 turned right to go east. By analyzing the traffic at both driveways, it appears that 86 drivers that entered the school did not leave during the peak hour. A check of Anchorage School District records[12] indicates as many as 93 staff members may work at Mears during any given day so 86 vehicles seems reasonable for one way traffic to Mears in the AM peak hour.

7.2.2 ANALYSIS

Based on the traffic counts, it appears that approximately two-thirds of the traffic on 100th Avenue in the vicinity of Mears Middle School in the AM peak is traveling to and from the school. It is reported that percentage increases on days with inclement weather. The queuing problem is exacerbated by traction problems in the sag vertical curve on Victor Road when the street is icy. Some cars have difficulty climbing towards the stop sign at the 100th/Victor intersection and long traffic delays can result.

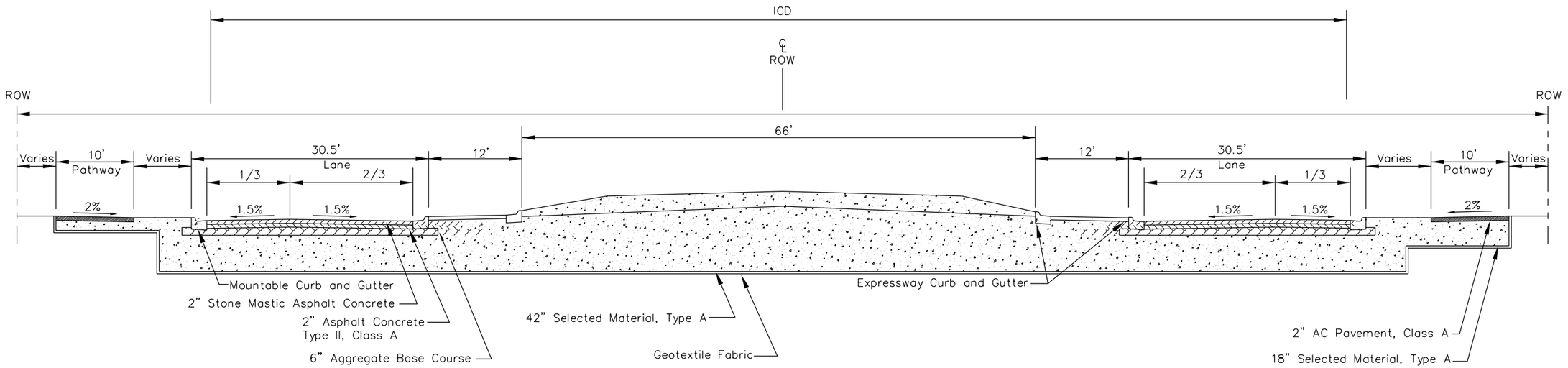
Computer modeling using SIDRA predicts the left-turn queue at the east driveway entering Mears would extend for over 2000-feet based on April 2, 2003 traffic counts. The predicted queue did not develop on that day, however it was noted that eastbound drivers stopped to let the queue clear several times during the peak. This behavior by eastbound drivers is not included in the SIDRA gap-acceptance model. It is likely that the modeled results would have occurred if eastbound drivers had not made a special effort to allow the queue to clear.

During the peak at the Mears Middle School driveway, a 22-vehicle southbound right turn queue was recorded on Victor Road on April 2, 2003.

7.2.3 ALTERNATIVE SOLUTIONS/ RECOMMENDATION

The queuing problem occurring in the AM peak hour has adverse effects on the operations of the 100th/Victor intersection. The solution for this problem should be considered in conjunction with the selection of the preferred intersection control on 100th Avenue at Victor Road. However, resolving the issues with Mears Middle School is outside the scope of the Victor Road project. The Municipality of Anchorage and the Anchorage School District will have to identify solutions to alleviate this queuing problem as part of another project. Consequently, the intersection control at 100th Avenue/Victor Road will be based on other factors.

[b] Traffic Counts are presented in Appendix E



NOTE: INSCRIBED CIRCLE DIAMETER = 150'

VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

MODERN ROUNDABOUT TYPICAL SECTION

DATE:	OCT. 2007
DRAWN:	CW/SAM
CHECKED:	CW
FIGURE:	7-1

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7.3 100th Avenue Intersection

The existing all-way stop controlled (AWSC) intersection provides an acceptable LOS[c] in the peak hours. However, the intersection will deteriorate to LOS "F" under AWSC within a few years if development continues at the present pace. Two options are available to correct the intersection operation back to LOS "C" or better: construct a modern roundabout or install a traffic signal.

7.3.1 100TH AVENUE/VICTOR ROAD MODERN ROUNDABOUT

A modern roundabout was evaluated for this intersection. Figure 7-1 presents the typical section. The roundabout would have a 150-foot inscribed circle diameter, a 30-foot circulating lane, and a 90-foot central island. A modern roundabout would provide the best intersection performance.

7.3.2 100TH AVENUE/VICTOR ROAD SIGNALIZATION

Based on the year forecasted turning-movements, constructing a traffic signal would improve the overall intersection performance in the design year to LOS "B" if the cycle length were optimized. If the cycle length is increased for coordination with Dimond Boulevard, the LOS will deteriorate to "C."

7.3.3 SIGNAL/ROUNDABOUT INTERSECTION DISCUSSION AND COMPARISON

A traffic signal has long been anticipated at 100th Avenue. The construction cost for a traffic signal is likely to be $150,000 - $200,000. The cost to build a modern roundabout would be approximately equal to the cost for a traffic signal because additional curb & gutter, paving, and landscaping is required.

Each form of intersection control would have certain advantages when compared to the other. Advantages of a Modern Roundabout:

- Lower delay in peak hours
- Significantly better performance in off-peak hours
- Lower maintenance and operational costs
- Improved safety[d]

[c] The Highway Capacity Manual does not have a method for calculating LOS for the lane configuration at the 100th Avenue intersection under AWSC because the intersection has three lanes on each of the approaches. HCM techniques are not applicable to AWSC intersections with more the two lanes in each direction. LOS approximations can be made observing queue lengths in peak hours, but definitive LOS calculations are not available.

[d] Several studies have shown that modern roundabout intersections in the U.S. are safer than other forms of intersection control. One available study is from the *Insurance Institute for Highway Safety* at www.hwysafety.org/srpdfs/sr3505.pdf

Advantages of a Traffic Signal:

- Less ROW is required
- A queue from Mears Middle School may be less problematic
- Building a traffic signal would be less disruptive to traffic during construction

A roundabout will have the best delay characteristics and the best LOS of the intersection choices:

Table 7-1, 100TH Avenue Intersection Performance

	Year 2025 AM Peak Hour		
	100th/Victor		
Intersection Geometry	2 Lane Roundabout	Traffic Signal	Traffic Signal
Cycle Length	- NA -	90 Seconds	110 Seconds (Coord w/ Dimond)
No. Phases	- NA -	3	3
Average Intersection Delay (seconds)	12.7	19.2	22.0
Largest Average Movement Delay (seconds)	30.3	40.8	46.4
Largest Back of Queue (feet)	263	285	325
Intersection LOS	B	B	C
Worst Movement LOS	C	D	E

In off-peak hours, a roundabout will function even better than a traffic signal. For the purposes of this discussion, delay can be considered as a combination of *queue move up delay, stopped delay,* and *geometric delay*. In general, a modern roundabout will have higher *queue move up delay* and *geometric delay* than a traffic signal. However, the *stopped delay* will be significantly shorter for a roundabout than a traffic signal. In off-peak hours when there is rarely a queue, the *queue move up delay* and *stopped delay* are much shorter, so the roundabout will tend to function near the value for *geometric delay*. Conversely, the *stopped delay* for a traffic signal is present at all times.

For this roundabout, the left-turn *geometric delay* is approximately 11 seconds, through movement delays are approximately 3 seconds and right turn delays are approximately 5 seconds. During off-peak hours the average delay will be a function of these values. For this intersection, the delay at a traffic signal would not noticeably improve in off-peak hours.

Operational and maintenance costs are expected to be lower if a modern roundabout is constructed. If a signal is constructed at this intersection it can be expected to cost $12,000 - $15,000 per year for electricity and signal maintenance.

A modern roundabout may be a safer intersection. At this time, there are not statistically significant data to compare the safety of modern roundabouts to traffic signals in Anchorage. However, several national studies in the U.S. have found that roundabouts tend to reduce the number and severity of crashes at intersections of this type. Further data will be needed to judge roundabout safety in Alaska. Local drivers at this intersection may also more easily accept a modern roundabout because the intersection has operated as a 4-way stop for many years.

A traffic signal will require less ROW. See Figure 18-1 and Section 18.0 Right of Way. A modern roundabout will require up to 727 additional square feet and two more parcels will be impacted.

The queue at the Mears Middle School driveway in the AM peak hour should be considered in the design of the 100th Avenue/Victor Road intersection. At traffic signals, a queue extending into the intersection is common in Anchorage. Typically, the queue will not block the entire intersection and those drivers queued into an intersection when the signal changes tend to make an effort to clear the intersection as soon as possible. Such queues tend to block cross traffic, but most of the other maneuvers tend to remain in service.

Similar experience in Anchorage at modern roundabouts is not available for comparison. It is known that a modern roundabout does not have a defined stop bar, and traffic can legally enter at the yield line. Therefore, it is possible for a queue extending into a modern roundabout intersection to block the circulating lane and thereby cause gridlock. At this time there is not enough local experience to make a judgment about whether or not the problems associated with the short-duration queue at Mears Middle School in the AM peak hour should preempt the construction of a modern roundabout at the 100th Avenue/Victor Road intersection.

Finally, building a traffic signal will be less disruptive during the construction period. Disruptions to traffic will occur for detector loop construction, revising turn lanes, and associated tasks. Conversely, constructing a modern roundabout will require more extensive curb, drainage and grading revisions that will cause more delay while construction is underway.

7.3.4 100TH AVENUE INTERSECTION RECOMMENDATION

A traffic signal is recommended for the 100th Avenue/Victor Road intersection. A traffic signal will likely be more effective to handle the morning queuing problem at Mears Middle School in the AM peak hour. Anchorage drivers appear to be more open to a traffic signal especially where a queue extends into the intersection. The advantages of the traffic signal are superior in terms of the construction activities associated with this intersection.

7.4 Dimond Boulevard Intersection

The existing intersection is controlled by a semi-actuated, coordinated traffic signal. The intersection operates at a Level of Service (LOS) B along Dimond Boulevard, and a LOS D on the northbound approach in peak hours. Based on the modeling predictions, the intersection will continue to have an acceptable LOS in the design year. However, if the traffic on Dimond Boulevard continues to increase at a high compound growth rate, the LOS will begin to deteriorate in later years. Additional improvements on Victor Road may become necessary such as extending the raised median to the south across the Fred Meyer Store/Sea Parrot Circle intersection.

7.4.1 FUTURE STREET NETWORK

Future improvements may also be needed at the Dimond Boulevard intersection if the street network is changed significantly. The Municipality of Anchorage is evaluating a project to extend Northwood Drive to the Dimond Boulevard signal at Victor Road. If Northwood Drive is extended, the northbound lane configuration on Victor Road near Dimond Boulevard may need to be adjusted to match the new project. No change in the southbound lanes would be required. See *Traffic Analysis, Victor Road, 100th Avenue to Dimond Boulevard* for the analysis of the Dimond Boulevard intersection and the potential effects of the Northwood Drive Extension project.

7.4.2 SOUTHBOUND LANE DROP TRANSITION

Presently, two southbound lanes are located on Victor Road at the Dimond Boulevard intersection. The two southbound lanes are required to facilitate two left-turn lanes of westbound traffic on Dimond Boulevard turning south on Victor Road. The two left-turn lanes were constructed when Dimond Boulevard was reconstructed in the mid 1980's. At that time, the 1984 LRTP recommended that Victor Road be reconstructed as a 4-lane street, and to serve in the interim period, a taper was constructed in the vicinity of Sea Parrot Circle to transition traffic into the single existing southbound lane on Victor Road.

The outside left-turn lane has never been placed into service, but as traffic grows in the intersection the second left-turn lane will be needed to maintain acceptable intersection capacity. Two lanes of left-turning traffic require two southbound lanes for a distance necessary to allow merging into a single southbound lane. This situation is complicated by the presence of two local street intersections on the west side of Victor Road (Sea Parrot Circle and Canary Court) that will certainly have right-turning traffic in the peak hour. Right-turning traffic will slow the traffic in the right lane, and impede the necessary acceleration by drivers in that lane who wish to merge into the left lane and continue south on Victor Road. Therefore, if the right southbound lane on Victor Road is not of sufficient length, too few drivers will use the double left-turn lanes to maintain the capacity of the Dimond Boulevard intersection.

In the PER, this taper was shown between Station 117+50 and Station 119+50. Following review of the PER, the Municipal Traffic Engineer determined[e] a need to

[e] Traffic Department Memorandum, August 22, 2003. See Appendix G.

extend the two southbound lanes beyond Canary Court before tapering into a single southbound lane. The taper was revised to extended beyond Canary Court between Station 114~ and Station 116~. However, as mentioned in Section 5.8 Taper Length, several major utility impacts would likely occur. The department determined the high cost of relocating these utilities is unwarranted. A shorter taper deems satisfactory to the needs of this project. The taper is now proposed to be constructed in the nearly the same location.

7.4.3 DIMOND BOULEVARD INTERSECTION RECOMMENDATIONS

Retaining the existing intersection configuration is recommended. The southbound transition taper will be constructed north of Sea Parrott Circle. This lane will also be a right-only into Sea Parrott Circle.

Small revisions to the intersection configuration may be required prior to the design year, however, with the recommended improvements the intersection is expected to operate at LOS "C/D" at least until the mid-life year, 2015. If the intersection operations deteriorate beyond that point, it is likely that an eastbound right-turn lane will be needed to respond to high traffic growth on Dimond Boulevard. Improvements of this nature should be addressed through a larger project on Dimond Boulevard.

8.0 Signals and Illumination

The condition of the traffic signal facilities and lighting along Victor Road were evaluated during preliminary engineering. The signal and illumination condition reports can be found in the PER.

8.1 100th Avenue Signal

Presently, some of the underground portion of a traffic signal system has been constructed at the 100th Avenue intersection. Signal pole foundations are present on the southeast and southwest quadrant of the intersection. The existing poles currently only serve as illumination, however, the signal mast arm connection is in place on both poles. Since those poles were constructed, ADOT&PF has upgraded their requirements for such structures and pole replacement is likely to be required.

Some of the required conduit and junction boxes are present at the intersection. However, only some of the necessary detection loops are in place, and the condition of those loops is unknown. It is recommended that new detection loops for each approach be included in the project.

There are no existing traffic signals or pedestrian signals. There are no signal pole improvements on the north side of the intersection. In the northwest quadrant, an existing electrical transmission pole is in conflict with the proposed signal pole. Relocating the power pole to the north is probably necessary.

Much of the underground conduit along with the controller cabinet has been installed on previous projects. However, the controller cabinet does not currently have electrical

power connected to it. Also, the controller cabinet is in conflict with the proposed curb ramps and should be relocated as a portion of this project.

If a roundabout intersection is constructed, no traffic or pedestrian signals will be required.

8.2 Dimond Boulevard Signal

At the Dimond Boulevard intersection, all of the required traffic and pedestrian signals are in place. In 2003, Dimond Boulevard was repaved. New loop detectors were installed on Victor Road. However, new Emergency Vehicle Override (also known as Opticom) equipment was not installed. Since a fire station is on Southport Drive, the Opticom System should be installed with this project.

As a part of the design effort, the signal equipment at the Dimond Boulevard intersection will be reviewed with signal maintenance personnel to be sure all components are up to current design standards and in good working order.

8.3 Illumination

Illumination at the 100th Avenue intersection will not require any upgrades. The existing lighting meets current standards. If traffic signals are installed, the northeast corner pole will need to be replaced, but the light and mast can be reused on the new pole.

North of 100th Avenue, the lighting consists of a variety of fixture types, wattages and mounting heights. Four of the fixtures that provide illumination for Victor Road are on the side streets and one is mounted on a wood power pole. The only section of the road that meets current design and construction standards is the section north of station 119+50 (from the south entrance to Fred Meyers parking lot to Dimond Boulevard).

The section between 100th Avenue and station 119+50 will have new lights installed to bring it up to current practices. The fixtures at stationing 102+40 and 111+14 will be removed. The fixtures at stationing 100+60 (Olympic Drive) and 111+80 will need to be moved back away from the street. The fixture at stationing 105+90 may need to be moved back. All of the new and remaining existing fixtures should be connected to a single circuit, so that all lights turn on at the same time. Light placement will be finalized during the design effort. 250-watt fixtures are required for the preferred alternative.

At Dimond Boulevard, the intersection will not require any upgrades. The existing lighting meets current standards as long as none of the poles need to be relocated. If poles are moved, the lighting should be re-evaluated.

9.0 Discussion of Preferred Alternative

The 3-Lane with Short Taper and Eastside Pathway Alternative (3-Lane Alternative) refines the 3-Lane Alternative as described in the PER. In general, this alternative would convert the existing 2-lane street into a 3-lane street comprised of one lane in each direction with continuous two-way left turn (CTWLT) lane. A pathway would be

included on the east side of Victor Road. On the west side of Victor Road, a sidewalk would be installed between Sea Parrott Circle and Dimond Boulevard.

The 3-Lane with Short Taper and Eastside Pathway Alternative (3-Lane Alternative) has been selected as the preferred alternative. Associated improvements will include landscaping, relocation of impacted utilities, and auxiliary lanes and raised medians at key intersections. The 3-Lane Alternative is generally comprised of one 12-foot wide travel lane in each direction; a 14-foot wide continuous two-way left-turn (CTWLT) lane, curb & gutter, and detached 10-foot wide multi-use pathway along the east side of the road. Also, a 5-foot attached sidewalk is planned between Sea Parrott Circle and Dimond Boulevard. See Figures 9-1 and Figure 9-2.

In the vicinity of the 100th Avenue intersection, auxiliary lanes will be constructed at the north approach and a raised median will be constructed rather than a CTWLT lane. Near the Dimond Boulevard intersection, the section includes two southbound lanes, a raised median, two left-turn lanes, a through lane and a right lane. The transition between the section with two southbound lanes at the Dimond Boulevard intersection and the single southbound lane shown on Figure 9-2 will occur north of Sea Parrott Circle. See Section 7.4 and Figure C-1 for more information about the taper.

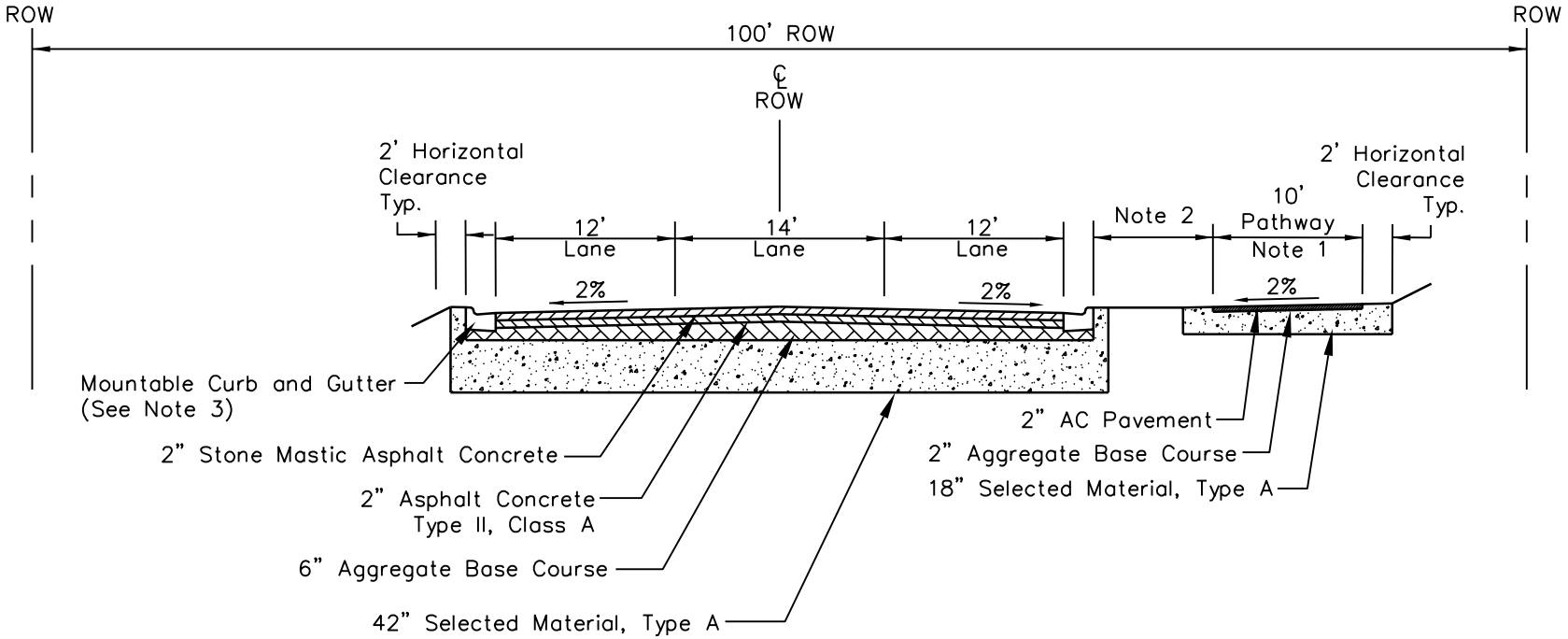
9.1 Horizontal Alignment

In an effort to identify methods to limit utility relocation costs an investigation of other potential alignments was completed. However, no alternative solutions were found. The horizontal alignment will remain the same as the existing roadway – centered on the existing ROW centerline. Shifting the horizontal alignment is not feasible due to ROW constraints, utilities in the area, environmental concerns near the sag vertical curve, and constraints at the 100th Avenue and Dimond Boulevard intersections.

9.2 Vertical Alignment

A new vertical alignment is needed for most of Victor Road. At the 100th Avenue intersection, a longer approach landing is needed on the north side. The sag vertical curve near Olympic Drive must be raised to meet modern design standards. A lower profile is needed north of the sag curve to improve the sight distance and so that the wider section can match adjacent properties without excessive ROW impacts. Between the Chevron Station and Dimond Boulevard, the existing profile is acceptable.

Drainage conditions, improving sight distance, and controlling earthwork costs are the primary considerations in designing the vertical alignment. Because the Olympic Drive intersection is being raised, a portion of Olympic Drive and Chelatna Circle must be reconstructed to meet the new vertical alignment. A detailed discussion of the vertical alignment issues can be found in the PER.



STA BOP TO 120+71

NOTES:

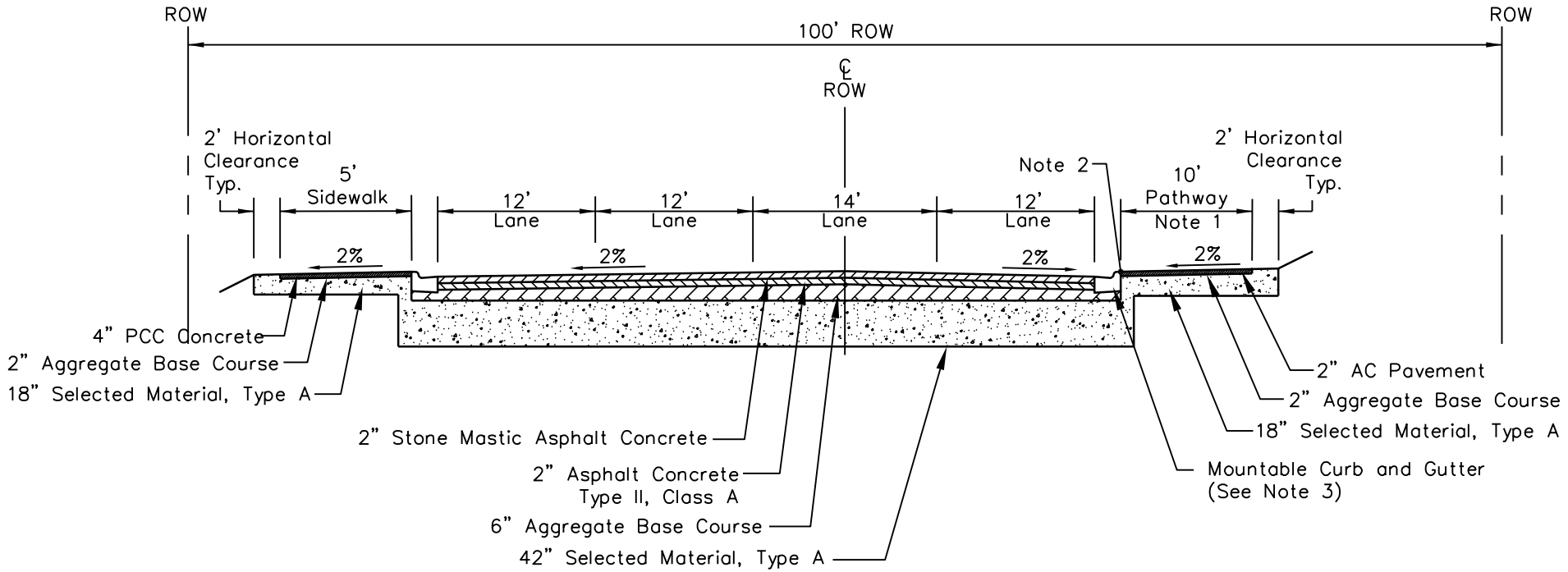
1. 10' PATHWAY IS COMPRISED OF 8' PAVED PATHWAY WITH 1' PAVED SHOULDERS ON EACH SIDE.
2. SEE PLAN VIEW FOR LOCATIONS OF PATHWAY RELATIVE TO CURB AND GUTTER. PATHWAY SEPARATION VARIES FROM ZERO (ATTACHED) TO 6.5'.
3. 2' CURB & GUTTER WIDTHS ARE COMPRISED OF 0.5' CURB AND 1.5' GUTTER.

VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

3-LANE ALTERNATIVE TYPICAL SECTION

DATE: OCT. 2007
DRAWN: CW/SAM
CHECKED: CW
FIGURE: 9-1

LOUNSBURY & ASSOCIATES
Surveyors • Engineers • Planners



STA 120+71 TO EOP

NOTES:
1. 10' PATHWAY IS COMPRISED OF 8' PAVED PATHWAY WITH 1' PAVED SHOULDERS ON EACH SIDE.
2. SEE PLAN VIEW FOR LOCATIONS OF PATHWAY RELATIVE TO CURB AND GUTTER. PATHWAY SEPARATION VARIES FROM ZERO (ATTACHED) TO 6.5'.
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VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMONE BOULEVARD

3-LANE ALTERNATIVE TYPICAL SECTION

DATE: OCT. 2007
DRAWN: CW/SAM
CHECKED: CW
FIGURE: 9-2

LOUNSBURY & ASSOCIATES
Surveyors • Engineers • Planners

9.3 Access Control

Access will be maintained at all current driveways. In some cases, multiple driveways may be reduced in number and substandard driveways may be moved to new locations. Driveways in some locations may become right-in/right-out-only configurations if raised medians are constructed. Access control issues will be considered during the design phase.

Maintaining access to the Lake View Terrace Subdivision is an important design aspect of this project. Among the many options discussed in the PER, reconstructing Olympic Drive in the present location to meet the higher proposed elevation of Victor Road is preferred. The driveway for Olympic Drive, Lot 2, Block 1, Lakeview Terrace Subdivision #1 must be relocated from the present location to the east side of the lot. Relocation is necessary because reasonable driveway access cannot be constructed at the current location from the proposed profile of Olympic Drive.

9.4 Required Structures

Four retaining walls were originally needed to complete this project. Two of the proposed retaining walls, located in the vicinity of the sag vertical curve, are necessary to meet the environmental commitments. The other two retaining walls are necessary to avoid additional ROW impacts.

However, this phase of the project has eliminated three of the retaining walls with revamping the 3-Lane Alternative. The only wall needed will be located in the southeast quadrant of the Victor/Minerva intersection. The wall will be constructed in cut sections, and will generally be visible from Victor Road. This walls are good candidates for cast-in-place concrete cantilever walls. The appearance of the walls should be coordinated with the landscaping.

No other structures are required to complete this project.

10.0 Safety Improvements

Safety will be improved on Victor Road by reconstructing the street in compliance with modern standards. The vertical alignment will be substantially improved. Increasing the roadway width and reconstructing the pathway on the east side of Victor Road will also enhance safety.

If a modern roundabout is constructed, safety may be benefited. Studies in the U.S. indicate that modern roundabouts are safer than other forms of intersection control. However, at present, the data in Alaska is not sufficient to judge the comparative safety of modern roundabouts in Alaska.

11.0 Pedestrian/Bicycle Facilities

The PER recommended a multi-use pathway on both sides of Victor Road. Since the PER, the Department has determined that upgrading the existing facilities meets the project goals. Having a pathway on the west side of Victor Road was not justifiable due to enormous utility and ROW Impacts.

ADOT&PF has reviewed the proposed alternatives and the Areawide Trails Plan and has adopted project-specific criteria for Victor Road. As discussed in the State of Alaska Design Criteria Waiver (Width and Placement of Pedestrian and Bicycle Facilities) in Appendix A, 10-foot wide multi-use pathway on the east side of Victor Road is a requirement for this project. The pathways will be separated from the curb where possible. In addition, a 5-foot attached sidewalk will be a requirement between Sea Parrot Circle and Dimond Boulevard.

All facilities will be designed in accordance with American with Disabilities Act Accessibility Guidelines (ADAAG). Because of the steep terrain in the sag vertical curve near Olympic Drive, the vertical alignment of the street represents the best possible running slope that can be developed for the proposed multi-use pathway. The existing running slope is approximately 8%. Following reconstruction, the running slope will be 5.75%-6.5% on either side of the vertical curve. No other reasonable alternatives are available due to the location of Olympic Drive to the east, and the steep topography on the west side of Victor Road. AASHTO guidelines call for running slopes of less than 5%, except *"where terrain dictates*.[f]" Where the terrain is too steep to maintain the 5% guideline, AASHTO suggests a grade of 5-6% may be constructed for up to 800 feet. On Victor Road, the length exceeding 5% will be approximately 500 feet. Therefore, the proposed multi-use path complies with AASHTO guidelines.

Similarly, ADAAG also include an exception for "*the unique characteristics of terrain.*[g]" The proposed multi-use pathway meets the exception requirements ADAAG 4.1.1(5) (a). In addition, because some of the pathway will be built along the proposed curb, the vertical alignment will be constructed as close as possible to accessibility requirements. The proposed multi-use pathway will comply with ADAAG, but those portions of the route that are too steep will not be accessible. Refer to Figure C-1 in Appendix C for plan and profile drawings.

[f] American Association of State Highway Transportation Officials (AASHTO). Guide for the Development of Bicycle Facilities. Washington D.C. 1999. p. 39.

[g] ADAAG 4.1.1(5) allows for some general exceptions in new construction. Paragraph (a) reads: "In new construction, a person or entity is not required to meet fully the requirements of these guidelines where that person or entity can demonstrate that it is structurally impracticable to do so. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features. If full compliance with the requirements of these guidelines is structurally impracticable, a person or entity shall comply with the requirements to the extent it is not structurally impracticable. Any portion of the building or facility which can be made accessible shall comply to the extent that it is not structurally impracticable."

12.0 Utility Relocation and Coordination

A detailed utility analysis is included in the *Utility Conflict Report*. Underground and overhead utilities including electrical transmission and distribution, telephone, cable television, water distribution, sewer collection, storm drain, and natural gas distribution are present within the Victor Road corridor. All utilities are expected to have some degree of conflict with the proposed improvements. Figure U-2 in Appendix C is reprinted from the *Utility Conflict Report*. The following utility impacts are expected to occur with the construction of the preferred alternative:

Table 12-1, Utility Impacts

Utility	Item	Quantity
Electric	Relocate Power Poles	3 ea
	Relocate Underground Electric	2800 lf
	Relocate/Adjust Pad-Mount Electrical Equipment	2 ea
	Adjust Electrical Vault	1 ea
Traffic	Relocate/Adjust Signal Control Box	2 ea
	Relocate/Adjust Signal Pole w/ mast arm	1 ea
Illumination	Reconstruct Electrolier	6 ea
Telephone	Relocate Overhead Telephone	400 lf
	Relocate Underground Telephone	2410 lf
	Relocate/Adjust Telephone Splice Cabinet	2 lf
	Relocate/Adjust Pedestal	4 ea
	Adjust Manhole	2 ea
Cable TV	Relocate Overhead Cable	400 lf
	Relocate Underground Cable	500 lf
Water	Adjust Water Valves & Key Boxes	23 ea
	Fire Hydrant Adjustment	2 ea
Sewer	Adjust Manholes	3 ea
	Reconstruct Manholes	4 ea
	Reconstruct 8-inch Sanitary Sewer	430 lf

13.0 Erosion and Sediment Control

Measures to control erosion will be recommended as the design progresses. Typical provisions included in present-day Municipal and State construction contracts are suitable to control erosion and sedimentation along Victor Road. Cut and fill slopes will be constructed at a maximum 2H:1V slope. The areas where vegetation is disturbed during construction will be stabilized to prevent erosion. The contractor shall provide a SWPPP incorporating the use of best management practices.

14.0 Drainage

A detailed hydrologic and hydraulic analysis is included in the PER, Appendix H, *"Hydrologic and Hydraulic Analysis."* The analysis describes drainage characteristics in the project area and discusses the proposed drainage system.

Victor Road has an abnormally small contributing drainage area because all the surrounding property drains away from the ROW. Because the contributing areas are so small, all new storm drain pipes on Victor Road will be the minimum 12-inch size. Outfall pipes and culverts will be larger to control icing.

On the west side of Victor Road, all drainage flows directly to Campbell Lake. At the north end, drainage on Victor Road flows into the Dimond Boulevard storm drain system. On the east side, the drainage is collected into storm drains that cross under Victor Road near Olympic Drive. Existing storm drain pipes that cross under Victor Road, but do not collect drainage from the project area, are outside the scope of the street reconstruction project. Work on those existing facilities will only be incorporated into this project if the work is necessary to protect the new Victor Road embankment, and are likely to reach the end of their useful life prior to the Victor Road design year (2025).

Water quality treatment will be required for the new storm drain system to be constructed on Victor Road. Because of the limited ROW available, in-manhole treatment systems are recommended. For maintenance reasons, the treatment manholes should be the same type and manufacture as similar units recently used on other Municipal projects.

One such manhole would be located at Station 107+10; 36' Left. This manhole would treat water prior to outfall into Campbell Lake. A unit such as a CDS PMSU30_30, or similar product would meet the project requirements. These units have a capacity of 3.0 cubic feet per second (CFS). A second manhole would be located at Station 125+52; 42' Right. This manhole would treat water prior to the entry into the Dimond Boulevard storm drain system. A unit such as a CDS PMSU20_25, or similar product would meet the project requirements. These units have a capacity of 1.6 CFS.

No other water quality treatment facilities are needed to treat drainage originating from the Victor Road drainage boundaries. However, should ADOT&PF elect to treat storm water that originates outside the project area and crosses Victor Road, those improvements could be incorporated into this project. As an example, the existing grease/grit separation chamber at the northeast quadrant of Olympic Drive could be modified in some manner if desired.

15.0 Soil Conditions

15.1 Geotechnical Investigation

Shannon & Wilson, Inc. prepared a geotechnical report for the Victor Road project. Subsurface explorations along Victor Road were completed by Shannon & Wilson in 1994. In 1985, Harding Lawson Associates completed a geotechnical evaluation for the storm drain that crosses Victor Road near Olympic Drive. In 2002, Shannon & Wilson reviewed the previous soils investigations and prepared recommendations for the proposed structural section and pavement design. Refer to the Geotechnical Report for the detailed information.

15.2 Pavement Design

The pavement will be designed based on the equivalent single axle loads (ESAL) and the design criteria established by ADOT&PF.

15.3 Recommendations

After analyzing the soils, Shannon & Wilson concluded the pavement failure along Victor Road is probably due to the frost-susceptible subgrade and high water table. They recommend the following:

- Excavate all frost susceptible soil to at least 4-feet below finish grade;
- Over-excavate compressible soils to top limit of native soils;
- Proof-roll all areas that receive fill;
- Install subdrains behind the east curb line;
- Place separation geotextile fabric between the bottom of the subgrade and original ground; and
- Construct the structural section as described below.

Selected material should be used to construct all embankments as discussed in the Geotechnical report. The following summarizes the proposed structural section:

Thickness	Material
2-inches	Asphalt Concrete Pavement, Type V
2-inches	Asphalt Concrete Pavement, Type II
6-inches	Aggregate Base Course
42-inches	Structural Fill (Selected Material, Type A)
	Non-woven Geotextile Fabric

16.0 Landscaping and Amenities

Land Design North has completed an analysis of existing conditions and prepared recommendations for landscaping and amenities. Their findings and recommendations for the project area are included in Appendix F.

17.0 Maintenance Considerations

Periodic maintenance will be required following construction. During winter months, snow will be removed on an as-needed basis. Snow removal requires both an on-street area large enough for temporary snow storage and a clear area large enough to load snow into trucks for off-site disposal.

Winter sand must be removed in the spring and periodic sweeping may continue during summer months. Design features will be included to trap excess sediments that are not removed by sweeping operations. Modern water quality regulations require regular inspection and cleaning of drainage facilities. Periodic maintenance will also be required for street lighting, traffic signals, and traffic signs & stripes.

18.0 Right-of-Way

Additional ROW and temporary construction permits will be necessary to construct the 3-Lane Alternative.

18.1 Existing Right-of-Way

The existing ROW width is 100-feet. The existing ROW is not sufficient to construct the preferred Alternative at several locations south of Olympic Drive. The existing ROW north of the Olympic Drive intersection is sufficient to construct all proposed improvements. A retaining wall will be employed to prevent ROW impacts at the southeast quadrant of the Victor Road/Minerva intersection. See Section 9.4 for more information.

18.2 Proposed Right-of-Way Acquisitions

Additional ROW is required at the 100th Avenue intersection for curb returns, pathway construction, utility relocations, and sight distance triangles. The parcels are identified as 1-4 on Figure 18-1. Along the east side of Victor Road additional ROW is required to improve drainage at the four parcels south of Olympic Drive. The acquisition would be limited to the existing utility easement. These parcels are identified as 5-8 on Figure 18-1.

Since the PER, Lot 1, Block 1, Lakeview Terrace Subdivision #1 has been acquired to reconstruct Olympic Drive. The total take was necessary because reasonable driveway access cannot be constructed from the proposed profile of Olympic Drive. The parcel is identified as 9 on Figure 18-1. Right-of-Way cost is based on MOA 2007 appraised value[13]. Table 18-1 identifies the anticipated ROW impacts.

Table 18-1, ROW Impacts

Parcel ID	Site Address	ROW Impact (sf)	Total Lot Area (sf)	Remaining Lot Area	**Building Valuation (Tax Assessment)	Remarks
*1	10000 Southport Dr	1270	15855	14585		Sight Distance Triangle/Pathway
*2	2222 W 100th Ave	990	63660	62670	N/A	Sight Distance Triangle/Pathway
3	9940 CHELATNA CIR	700	12049	11349	162500	Sight Distance Triangle/Pathway
4	9930 CHELATNA CIR	920	10988	10068	150300	Sight Distance Triangle/Pathway
5	9900 CHELATNA CIR	625	8750	8125	191800	Drainage Improvements
6	9830 CHELATNA CIR	620	8750	8130	193700	Drainage Improvements
7	9820 CHELATNA CIR	710	9800	9090	187200	Drainage Improvements
8	9800 CHELATNA CIR	590	9637	9047	130900	Drainage Improvements

* The Right-of-Way area would only be needed if a roundabout is constructed.

18.3 Temporary Construction Permits

Temporary Construction Permits (TCP) will be required to reconstruct all driveways along Victor Road. A TCP will also be required to construct the proposed retaining wall at Minerva Way. See Figure's 18-1 and 18-2 below. Table 18-2 identifies the anticipated TCPs required to construct the project.

NOTES:
PARCELS IDENTIFIED AS 1 & 2 WOULD ONLY BE NEEDED IF A ROUNDABOUT IS CONSTRUCTED.

LEGEND:
TCP AREAS
ROW ACQUISITION

MARITIME LOOP
100th AVE.
SOUTHPORT DRIVE
VICTOR ROAD
OLYMPIC DRIVE
CHELATNA CIRCLE
BEGINNING OF PROJECT
STA 98+82
100+00
105+00
MATCHLINE STA. 108+50
SOUTH ANCHORAGE SUBDIVISION
LOT 1
R/W
N

CAMPBELL LAKE HEIGHTS
ADDITION No. 9
CLOE-STAD SUBDIVISION
LOT 2
CANARY COURT
VICTOR ROAD
110+00
115+00
MATCHLINE STA. 108+50
MATCHLINE STA. 120+00
PROPOSED RETAINING WALL
MINERVA WAY
BLOCK 1
TRACT 1A-3
TRACT 1A-4A
TRACT 1A-4B
TRACT 1A
STONEGATE TOWNHOUSES SUBDIVISION
STONEGATE TOWNHOUSES ADDITION

SHEET NO.	TOTAL SHEETS
1	2
STATE	YEAR
ALASKA	2007

PROJECT DESIGNATION
STP-0001(232)/55027
ADDENDUM NO.
ATTACHMENT NO.
REVISIONS

NO.	DATE	DESCRIPTION

W. DIMOND BLVD.
SEA PARROT CIR.
CANARY CT.
MINERVA WAY
VICTOR ROAD
OLYMPIC DR.
CHELATNA CIR.
W 100TH AVE

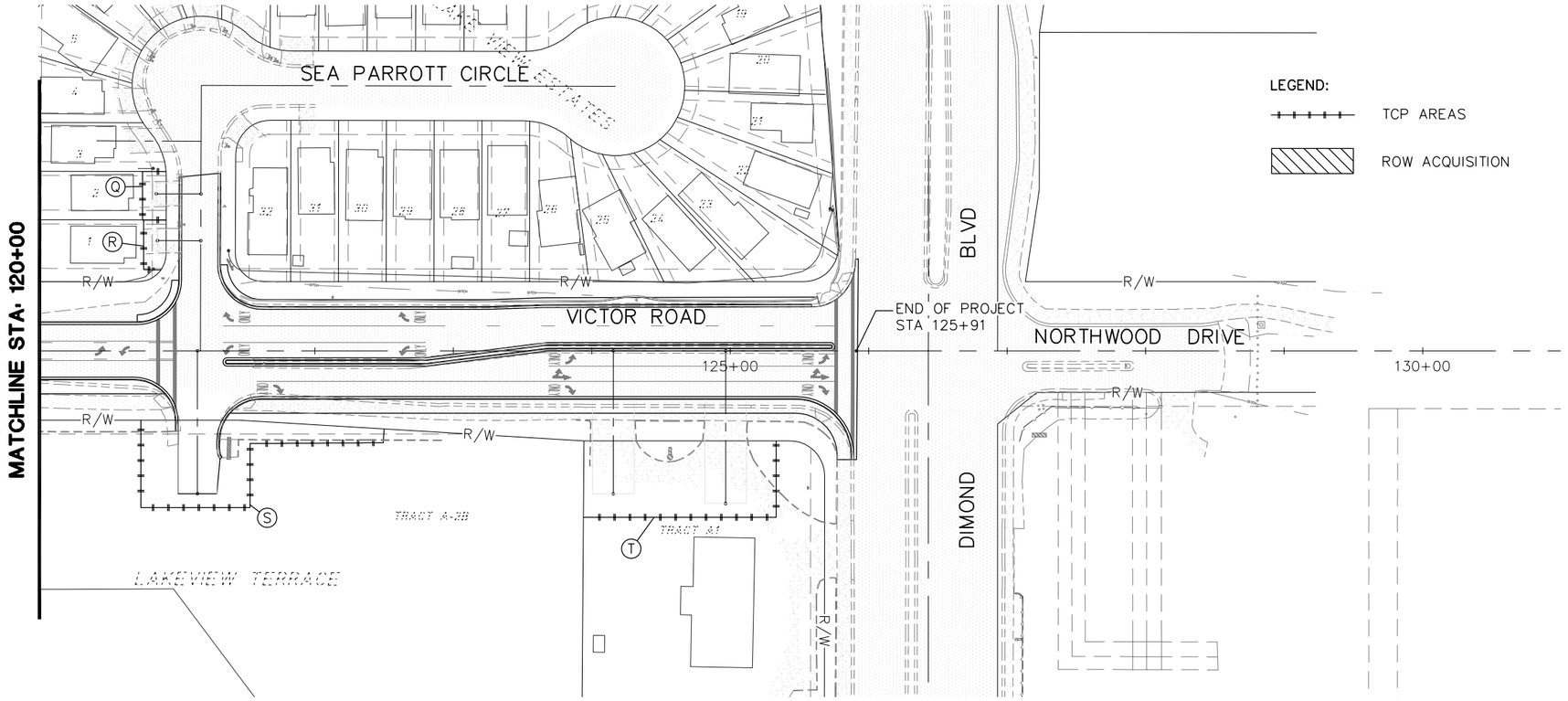
VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

Drawing Prepared by:
LOUNSBURY & ASSOCIATES, INC.

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

FIGURE 18-1
TCP AREAS &
PROPOSED ROW ACQUISITION
STA BOP TO STA 120+00

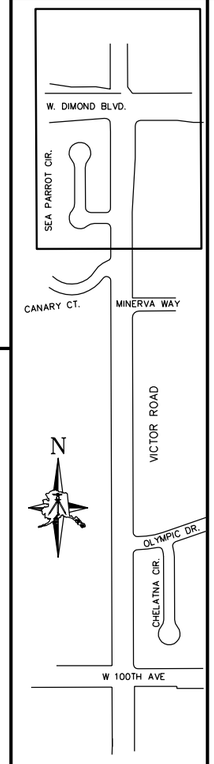
DESIGN STUDY REPORT
OCTOBER 2007



SHEET NO.	TOTAL SHEETS
2	2
STATE	YEAR
ALASKA	2007
PROJECT DESIGNATION	
STP-0001(232)/55027	
ADDENDUM NO.	
ATTACHMENT NO.	

REVISIONS

NO.	DATE	DESCRIPTION



VICTOR ROAD RECONSTRUCTION
100TH AVENUE TO DIMOND BOULEVARD

Drawing Prepared by:
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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
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FIGURE 18-2
TCP AREAS &
PROPOSED ROW ACQUISITION
STA 120+00 TO STA EOP

Table 18-2, TCP Areas Required

Parcel ID	Reason	Legal Description	Total Lot Area (sf)	TCP Req'd (sf)
A	Residence Driveway	Lakeview Terrace #1, Block 1 Lot 3	8,292	394
B	Residence Driveway	Lakeview Terrace #1, Block 1 Lot 2	8,418	440
C	Residence Driveway	Campbell Lake Tracts, Lot 3	51,293	12,451
D	Residence Driveway	Campbell Lake Tracts, Tract 6A	55,706	2,029
E	Residence Driveway	Campbell Lake Heights #9, Lot 7A	52,062	3,878
F	Residence Driveway	Campbell Lake Heights #9, Lot 6	53,190	2,585
G	Residence Driveway	Stonegate Townhouse, Block 1 Tract 1A-3, Kingsford Park	64,220	1,832
H	Residence Driveway	Stonegate Townhouse, Block 1 Tract 1A-4C, Kingsford Park	74,619	2,170
I	Residence Driveway	Campbell Lake Heights #9, Lot 5	58,930	1,940
J	Residence Driveway	Campbell Lake Heights #9, Lot 4	62,366	4,032
K	Residence Driveway	Campbell Lake Heights #9, Lot 3	62,366	4,962
L	Residence Driveway	Cloe-Strid, Lot 2	62,161	1,099
M	Retaining Wall Const.	Stonegate Townhouse, Block 1 Tract 1A-4B, Southwood	38,975	1,343
N	Parking Area Driveway	Stonegate Townhouse #2, Block 2 Tract 1A, Stonegate Villa	83,883	1,350
O	Residence Driveway	Campbell Lake Heights #10, Block 6 Lot 1	16,958	786
P	Residence Driveway	Campbell Lake Heights #10, Block 6 Lot 16	12,861	472
Q	Residence Driveway	Campbell Lake View Estates, Lot 2	3,850	600
R	Residence Driveway	Campbell Lake View Estates, Lot 1	4,858	570
S	Fred Meyer Driveways	Lakeview Terrace, Tract A2-B	510,032	12,665
T	Chevron Driveway	Lakeview Terrace, Tract A-1	32,252	7,676

19.0 Environmental Commitments and Coastal Zone Consistency Determination

The environmental review and checklist verified that the proposed action to construct the recommended alternative complies with *23 CFR 771 ENVIRONMENTAL IMPACT AND RELATED PROCEDURES, § 771.117 Categorical Exclusions*. The review determined that no significant impacts would result from constructing the project. FHWA concurrence was granted on August 14, 2002. The detailed environmental

analysis is included in the PER, Appendix E, "*Categorical Exclusion Checklist and Environmental Documentation*."

19.1 Environmental Commitments

The following environmental commitments have been made for this project:

- The project will not encroach on Stonegate Park.
- The project will not encroach on the class A wetlands other than those within the existing ROW as identified by the Corps of Engineers.
- The project will include permanent Best Management Practices (BMPs) for storm water discharges including an oil/water separator prior to outfall into Campbell Lake.
- The construction contract will require the Contractor to develop and implement a Storm Water Pollution Prevention Plan (SWPPP) to treat storm water, comply with the municipal noise ordinance, apply water and/or pallatives to control dust, and provide advanced public notice of road closures, detours, or delays.
- If archaeological resources are encountered during construction, work will be halted, and the State Historic and Preservation Office will be contacted. If contamination is encountered, work will be halted, and the State of Alaska Department of Environmental Conservation (ADEC) will be contacted.

19.2 Coastal Zone Consistency Determination

The environmental review determined that the south end of the project area crosses a drainage outfall into Campbell Lake. This project is within the Municipality of Anchorage coastal zone management area. A wetland analysis was completed and the US Army Corps of Engineers determined that the project qualifies for a nationwide permit.

Refer to the PER for the Coastal Zone Questionnaire and Corps or Engineers documentation.

19.3 Environmental Reevaluation

Based on additional information developed during the design study process, the amount of ROW required to construct the preferred alternative has been refined. See Section 18.0 Right of Way for more information. No other findings of the environmental analysis have changed since the CE approval.

Additional reevaluations will be completed in subsequent phases of the project as required.

20.0 Updated Cost Estimate

A detailed cost estimate is included in Appendix B.

The approximate total project cost for the 3-Lane Alternative with all associated improvements is estimated to be:

Construction	$ 4,412,836
Utility Relocation Cost	$ 1,217,950
TCP Cost	$ 19,000
Right-of-Way Cost	$ 100,000
Construction Engineering	$ 661,925
Contingencies @ 15%	$ 661,925
TOTAL	$ 7,080,000

REFERENCES

[1] Traffic Analysis: Victor Road, 100th Avenue to Dimond Boulevard. Municipality of Anchorage, Project Management & Engineering , September 2003.

[2] Hydrologic and Hydraulic Analysis: Victor Road, 100th Avenue to Dimond Boulevard. Municipality of Anchorage, Project Management & Engineering , April 2003.

[3] Preliminary Engineering Report: Victor Road, 100th Avenue to Dimond Boulevard. Municipality of Anchorage, Project Management & Engineering , June 2003.

[4] Utility Conflict Report: Victor Road, 100th Avenue to Dimond Boulevard. Alaska Department of Transportation and Public Facilities, September 2007.

[5] Anchorage Metropolitan Area Transportation Solutions, January 2003

[6] Official Streets and Highway Plan, Municipality of Anchorage Department of Community Planning and Development, December 1996.

[7] Alaska Highway Preconstruction Manual, Alaska Department of Transportation and Public Facilities, January 2005.

[8] American Association of State Highway Transportation Officials (AASHTO). A Policy on Geometric Design of Highways and Streets. Washington D.C.

[9] Guide for the Development of Bicycle Facilities, American Association of State Highway Transportation Officials, Washington D.C., 1999.

[10] Areawide Trails Plan, Municipality of Anchorage, Department of Community Planning and Development, April 1997.

[11] Design Criteria Manual, Municipality of Anchorage, Department of Public Works, March 1988.

[12] Anchorage School District: Profile of Performance 2002-2003, Mears Middle School Overview, www.asdk12.org/publications/reportcards/750reportcard.pdf

[13] Appraised Value: Municipality of Anchorage Property Appraisal 2007, http://munimaps.muni.org/website/anchorage/application/map.htm

APPENDICES