



Safer Seward Highway Project
Seward Highway MP 98.5 to 118,
Bird Flats to Rabbit Creek
Project No.: Z566310000/0A31034

Environmental Assessment

*Appendix H: Geotechnical Data Review,
Seward Highway Milepost 98.5–118,
Anchorage, Alaska*

DRAFT

December 2025

Prepared for:

Alaska Department of Transportation and Public Facilities

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GEOTECHNICAL DATA REVIEW

Seward Highway Milepost 98.5-118

ANCHORAGE, ALASKA

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Submitted To: HDR, Inc.
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Attn: Edith McKee, PE

Subject: GEOTECHNICAL SERVICES, SEWARD HIGHWAY MP 98.5-118,
ANCHORAGE, ALASKA

Shannon & Wilson prepared this data review and participated in this project as a subconsultant to HDR, Inc. Our scope of services was specified in Task Order Number 28 with HDR dated September 5, 2023. Work was conducted in general accordance with our July 7th, 2023 proposal. This report presents the results of historical data review and research conducted by Shannon & Wilson, Inc (S&W). along Seward Highway between mileposts 98.5 and 118. This geotechnical report was prepared by the undersigned.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.



Nina Guizzetti,
Geotechnical Staff



Kyle Brennan, PE
Vice President

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1 INTRODUCTION

This report presents the results of data review by Shannon & Wilson, Inc. (S&W) to support the designs of proposed alignments of the Seward Highway MP 98.5 to 118 project, near Anchorage, Alaska. The purpose of this data review was to gather and review historical data, as well as recent data and projects conducted along the alignment. Much of this data was provided to S&W by HDR while other data was gathered from external, publicly available sources. This review is intended for use by the project design engineering staff, HDR, and their representatives. The information included herein is intended to provide a generalized baseline of information in support of developing an understanding of likely conditions that will be encountered along the project corridor. The conditions should be verified by site/project specific explorations to provide the basis of project design. Our work was conducted to focus on conditions that would likely impact rock slope and foundation design.

In addition to the data review described in this report, we have also conducted preliminary surface reconnaissance and data gap analysis focusing on the rock and foundation engineering facets of the project. Our preliminary surface reconnaissance is provided in our Surface Reconnaissance Report, and our data gap analysis is provided in our Data Gap Analysis Report. The findings from these efforts will ultimately inform recommendations for further explorations that will advance project design, which will also be provided under a separate cover.

2 SITE AND PROJECT DESCRIPTION

The project is located along Seward Highway from milepost 98.5 to 118, stretching from south Anchorage, Alaska to just south of Indian, Alaska. The site can be accessed by the highway, which includes pull outs in some areas, and some slopes along the highway can be accessed by foot. The site includes the highway, which runs along Turnagain Arm, as well as the Alaska Railroad (ARRC), and is at the base of natural slopes of Chugach State Park. The existing roadway maintains a relatively uniform grade through much of its alignment, with occasional, relatively low-angle hills. The terrain on the south side of the existing highway consists of the Turnagain Arm mudflats sloping down to the south. Terrain on the north side of the existing highway varies from relatively flat marsh land (e.g. Potter Marsh) to steeply sloped ground comprising the toe of the Chugach Mountains in the form of natural slopes or cut slopes developed for the highway.

We understand the purpose of this project is to examine existing data along the corridor and to conduct site visits to make surficial observations and gather data where possible to conduct a data gap analysis. These analyses will ultimately inform recommendations for further explorations that will advance project design along the highway. We understand that the project includes multiple design concepts for new alignments of Seward Highway, some including tunnels, new bridge structures, and numerous rock cuts. A vicinity map indicating the general project location is presented as Figure 1 and a detailed site plan showing features of interest is presented as Figure 2.

2.1 Climate

The climatic conditions of the project area is influenced by its location in south-central Alaska, where the Gulf of Alaska meets the Chugach Mountains. The average annual precipitation is about 20 inches, mostly falling as snow from October to April. The area is subject to climate extremes and large tide ranges. The average annual temperature is around 39 degrees Fahrenheit (NOAA no date). The design freezing index is about 2,500 degree days, while the design thawing index is about 4,000 degree days (Hartman, 1984). This area of Alaska is generally considered permafrost free.

2.2 Regional Geology

Turnagain Arm is a glacially scoured valley with steep mountain walls and dynamic, tidally influenced channels. The project lies along Turnagain Arm, a narrow waterway connected to the Cook Inlet. The area is constantly experiencing deposition and erosion from alluvial processes and influx/outflow of marine sediments. The geology of the area is dominated by earlier cycles of regional tectonic movement and instability, and later glacial, fluvioglacial, and tectonic activity.

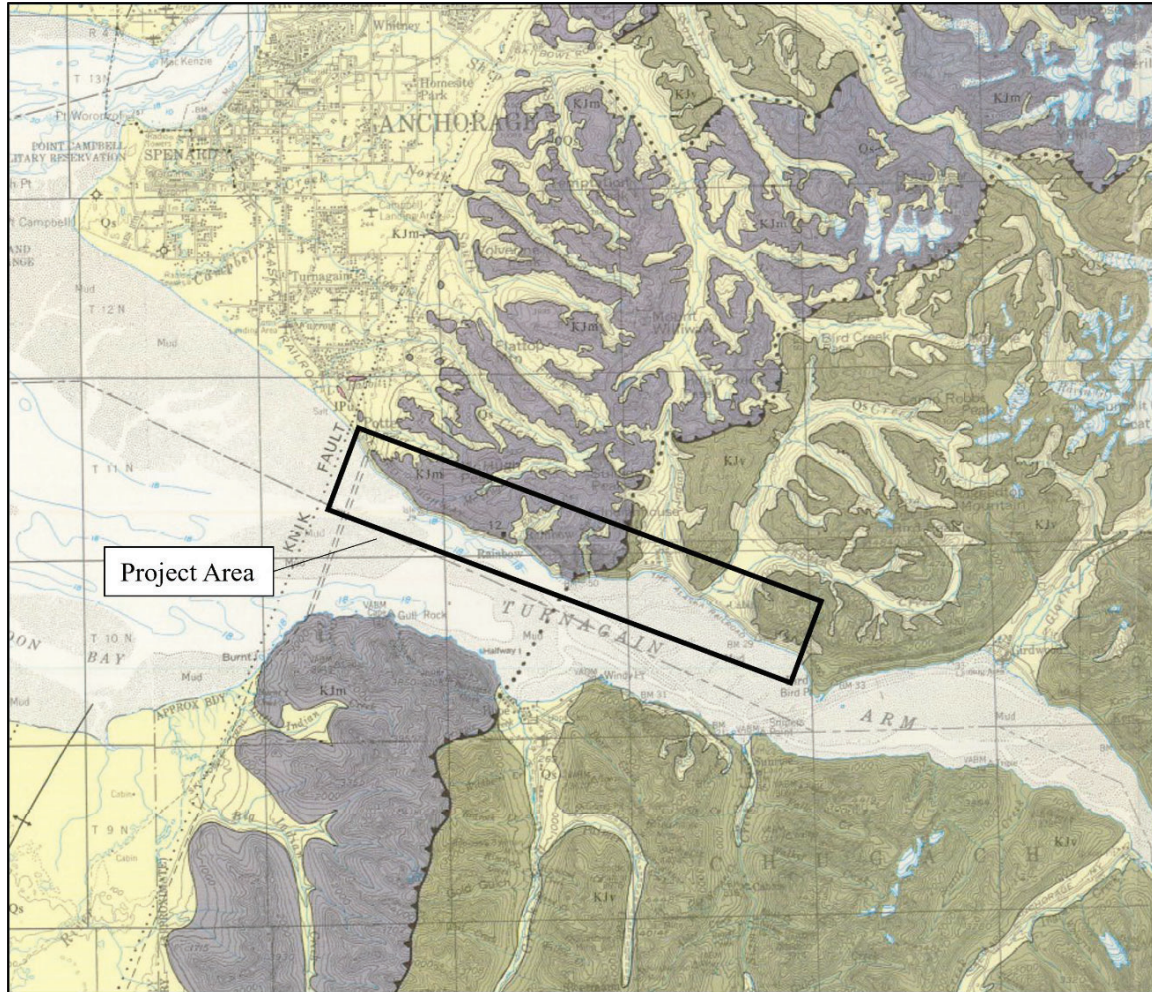
Southcentral Alaska, like much of the Pacific Coast of North America is composed of a series of microplates or terranes. These terranes are large crustal blocks that have their own internal structural and tend to retain their own unique stratigraphic history. Alaska is made up of a series of accretionary terranes and subterranes that have been folded, uplifted, buried, incised, and eroded. In addition, volcanism along the subduction zone has deposited its own material throughout the terrane strata.

The bedrock along the Turnagain Arm is dominated by a complex microplate known as the Chugach Terrane, which became part of Alaska approximately 65 million years ago during the Cretaceous Period due to tectonic processes. Generally, the rocks that comprise the Chugach Terrane consist of a mélangé and flysch series of graywackes, argillites, sandstones, siltstones, conglomerates, and shales.

Along Turnagain Arm, the Chugach terrane contains two major rock units; the *mélange* of the McHugh Complex and the flysch series designated the Valdez Group. The McHugh complex consists of large blocks (some as large as 25 miles long) and pieces of rock within a fine grained gray matrix. The *mélange* contains thick sequences of weakly metamorphosed greywacke, arkose, siltstone, and conglomeratic sandstone. The bedding is discontinuous and difficult to observe. Volcanic rocks within the McHugh Complex consist of greenstones with pillow structure and basalt, likely from seafloor spreading. The complex is cut by numerous brittle faults, from which quartz, calcite, chlorite, and prehnite has been observed as well as slickensides.

The contact between the McHugh Complex and the Valdez Group is along the Eagle River Thrust Fault, which is a low angle, complex fault zone. The McHugh Complex is in the hanging wall overlying the Valdez Group in the footwall. The fault strikes generally perpendicular to the Turnagain Arm and its contact is mapped just west of Indian Creek on the north side of Turnagain Arm and just west of the town of Hope, Alaska on the south side of Turnagain Arm. The Eagle River Thrust fault is at approximate milepost 106 of the Seward Highway. The project area is contained within the McHugh Complex and Valdez Group, as well as quaternary deposits in the region.

The Quaternary deposits atop the bedrock within the project area generally consist of overconsolidated till with interbedded and interfingering alluvial and marine sediments at the surface. The widespread complex of unconsolidated deposits result directly or indirectly from glaciation, from its subsequent stream activity, or from wave action. Unconsolidated deposits in the project area typically consist of glacial moraine, glaciofluvial and alluvial silts, sands and gravels, and localized fills. The thickness of these surficial deposits varies greatly and deposition as well as erosion occurs very quickly due to the topography and environment. Near major stream valleys, outwash and meltwater channel fills locally, bury, or are inset into glacial drift. Stream floodplains are underlain by granular alluvium and bounded by steep, glacially carved mountain walls. Various forms of colluvium, including rockfalls, slumps, and mudflows, are scattered along the walls of stream valleys.

Exhibit 2-1: Regional Geology along Seward Highway

Map Units: KJm – Metasedimentary Rocks with Volcanics; KJv - Metasedimentary Rocks; Qs – Surficial Deposits.
Taken from *Geologic Map of Cook Inlet Area, Alaska* (Magoon, Adkison, and Egbert, 1976).

2.3 Tectonics and Seismicity

The project area resides in one of the most seismically active areas in the United States and historically subjected to large (greater than 6.0 Magnitude) earthquakes. Alaska experiences approximately 22,000 earthquakes of any given magnitude per year, which accounts for 52 percent of the earthquakes in the United States (AEIC no date).

The tectonics and seismicity of southern Alaska are the result of ongoing north-northwest movement between two lithospheric plates; the Pacific Plate moves about 5 to 6 centimeters per year (cm/yr) northwestward relative to the North American Plate. The margin of convergence between the plates is the subduction zone and is marked on the surface by the Aleutian trench, about 175 miles southeast of Turnagain Arm. Active seismicity in southcentral Alaska occurs as both deep earthquakes associated with the subduction zone,

as well as shallow earthquakes associated with long linear transform faults and smaller fault-cored fold structures.

Cook Inlet is located within a forearc basin in the shallow crustal zone and above the megathrust and intraslab sources. Earthquakes from each source may cause significant ground shaking at the site.

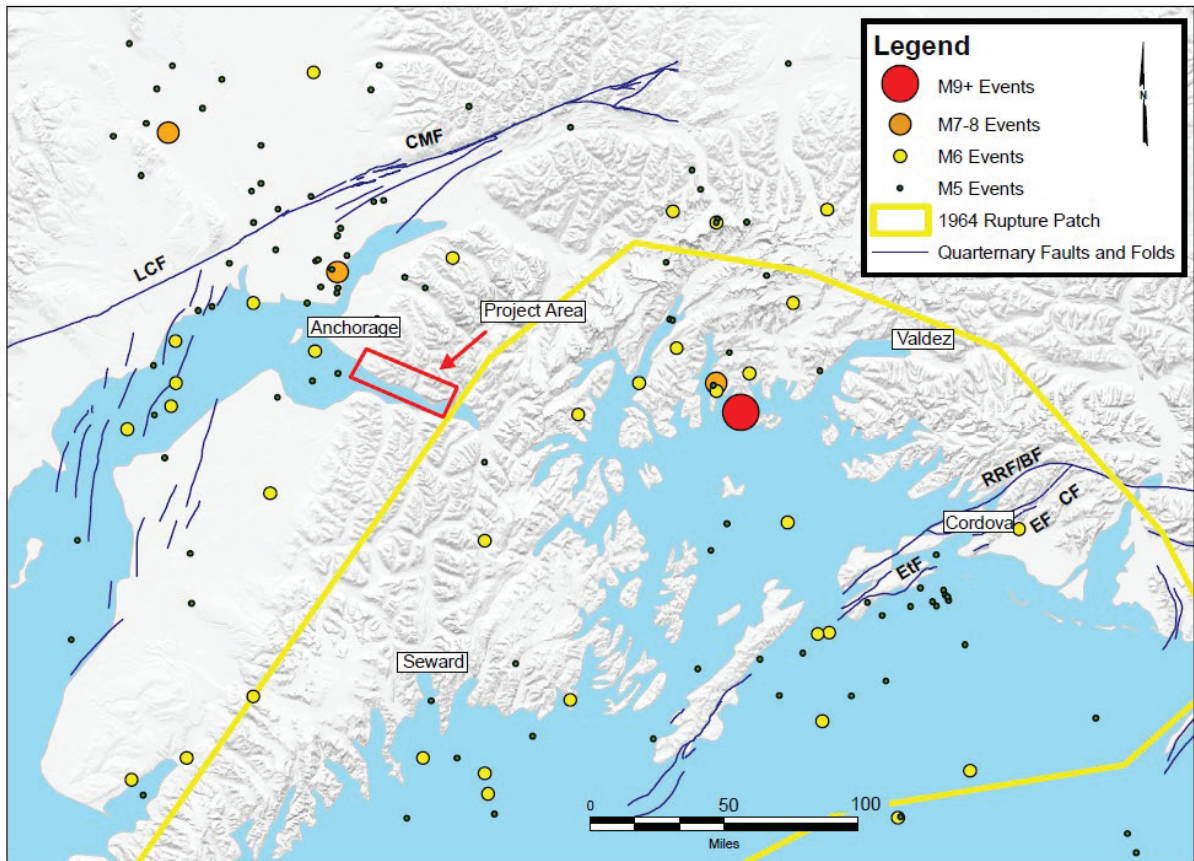
Megathrust or interplate earthquakes occur on the relatively shallow northwest dipping (<10 degrees) interface between the North American and Pacific Plates. Nearly the entire length of this interface has ruptured in historic times, producing several large interplate earthquakes, including the 1964 Prince William Sound Great Alaska (MW 9.2), 1957 Andreanof (MW 9.1), 1938 (MW 8.2 near the end of the Alaska Peninsula), and 1965 Rat Island (MW 8.7) great earthquakes (Yeats et. al., 1997).

Intraslab or Wadati-Benioff Zone earthquakes occur within the subducted Pacific Plate. These are typically located near the transition or within the steeper dipping part of the plate at or beyond (northwest of) the down-dip edge of the seismogenic plate interface. Consequently, these earthquakes occur at depths of 15 miles and greater.

Haeussler et al. (2000) identify several faults and potentially fault-cored folds in upper Cook Inlet basin. Holocene scarps and recorded historical seismicity have been observed on the largest of these structures, the Castle Mountain Fault. The fault trends east-northeast/west-southwest approximately parallel to the northwest shore of the Cook Inlet, and lies approximately 60 miles northwest of the project area. Evidence of Holocene (11,000 years before present [ybp]) displacement has been observed along a portion of the fault in the Susitna lowland north of Anchorage.

The fault displays evidence of both right-lateral strike-slip and reverse slip components. The north side is displaced upward relative to the south side along a steep, north-dipping fault plane. Slip during the Holocene Epoch on the Castle Mountain Fault has been predominately strike-slip with a component of dip-slip movement indicated by displacement of Holocene features and sediments. In the Susitna lowland, a Holocene sand ridge is displaced 23 feet in a right-lateral sense while near-surface sediments have been displaced vertically 7.5 feet.

Exhibit 2-2: Tectonics and Seismicity



Fault Key: LCF – Lake Clark Fault, CMF – Castle Mountain Fault, EtF – Etches Fault, RRF – Rude River Fault, BF – Bagley Fault, EF – Eyak Fault, CF – Cordova Fault. Map developed from GIS data provided by the State of Alaska, USGS, and Natural Earth.

3 DATA REVIEW

It is our understanding that there are currently three proposed alignments of the highway being considered. Alignments under consideration incorporate various combinations of retaining walls, tunnels, separated grades (between north and southbound lanes) and bridge crossings at major drainage crossings. It is our understanding that the design concepts are still being refined and that changes will likely still take place as the project advances.

S&W was provided access to existing data that has been gathered along Seward Highway, both inside and outside the extent of the project. We reviewed past projects and data that pertained to multiple different facets of highway design, focusing on sources that included information on rock structure/stabilization and existing bridge and drainage structures.

3.1 Rock Stabilization

The current alignment of Seward Highway between mileposts 98.5 and 118 contains numerous rock cuts of varying height and length. It is our understanding the potential future alignments of the new highway will require further rock cuts and rockfall mitigation efforts. The new alignment may also include tunnels. To better understand past work and existing data the following sources were reviewed:

- Alaska Department of Transportation and Public Facilities, 2010, Geotechnical Observations and Summary – Proposed Material Sites, Seward Highway MP 105-107, Central Region Materials
- Alaska Department of Transportation and Public Facilities, 2001, Geotechnical Report, Seward Highway MP 96-102, Safety, Roadway & Recreational Improvements, Central Region
- Alaska Department of Transportation and Public Facilities, 2016, Rock Fall Analysis Seward Highway MP 104-115, Central Region Materials

We reviewed a project from 2010 conducted by the Alaska Department of Transportation and Public Facilities (AKDOT&PF) that details the results of materials analyses from then considered material sites along Seward Highway between mileposts 105 to 107, specifically mileposts 104.8, 106.2, 106.9, 107.25, and 109. This report included rock structure, point cloud, and materials data pertaining to rock cuts and samples they gathered during their reconnaissance. This paper reported structural data in rock cuts that created wedge failures. A similar report also conducted by AKDOT&PF in 2001 contained rock structure, rock material, and soil properties data also of then proposed material sites, including what is now Bird Creek parking area. This report also mentions wedge type failures in outcrops they observed. Another report from AKDOT&PF published in 2016 detailed the evaluation of 53 unstable slopes along Seward Highway by the Central Region Materials Section (CRM), and the subsequent selection of 15 sites for possible rockfall mitigation. Some of these sites have implemented rockfall mitigation measures because of the 2016 report, while others have not been addressed. Contained within the report are detailed photographs of the hazardous slopes which include annotations of potential rockfall mitigation measures as well as each slope's Unstable Slope Management Program (USMP) ranking. In 2020, seven of those sites were targeted by AKDOT&PF (AKDOT&PF 2016) for rockfall mitigation projects. These sites have been scaled and mixtures of draped mesh, attenuation devices, rock bolts, and rock dowels have been used to stabilize the rock cuts.

While the general geology along Turnagain Arm is fairly uniform, the rock structure and discontinuities exposed in the rock cuts and natural rock outcroppings appear to be

irregular and variable. The 2016 report indicates that each site will require specific mapping and exploration efforts in order to assess the appropriate methods for rock slope stabilization and rockfall mitigation along the new alignment of the highway.

3.2 Bridge and Drainage Structures

There are two bridges along the existing Seward Highway within the project corridor at Indian Creek and Bird Creek. In addition to these structures there are numerous drainage structures crossing under the highway and railroad embankments consisting of culvert drains of various sizes. To better understand past work and existing data the following sources were reviewed:

- Alaska Department of Transportation and Public Facilities, 2018, Foundation Geology Report, Indian Creek Bridge Replacement, Seward Highway MP 99 to 105 Improvements, Statewide Geotechnical Services
- Alaska Department of Transportation and Public Facilities, 2020, Geotechnical Report, Anchorage Area Drainage Improvements FY2019 – McHugh Creek, Central Region Materials
- Alaska Department of Transportation and Public Facilities, 1996, Geotechnical Report, Potter Valley Road Capacity Improvements, Central Region

Bird Creek Bridge was built in 1923. Based on the Safer Seward Highway ArcGIS hub, created by HDR, there is no existing subsurface data near the bridge that would allow evaluation of foundation support conditions. In 2022, rehabilitation work was completed for Bird Creek Bridge (R&M Consultants 2022). It is our understanding that, based on data review, no specific geotechnical investigations have been conducted to support the design of Bird Creek Bridge.

Indian Creek Bridge is a newer bridge, replaced in 2021-2022. Numerous test holes were drilled to support the foundation design of the newly constructed bridge. These exploration efforts included standard geotechnical borings with SPT sampling as well as cone penetrometer testing. The test holes generally encountered approximately 0.2 to 0.5 feet of asphalt overlying fill ranging from depths of 6.5 to 13 feet below ground surface bgs. In general, the native soils encountered consisted of predominantly granular soils, mostly poorly graded sand or gravel with silt and silty sand. In some test holes, fine grained soils such as silt or silt with sand was observed and some boulders were observed. It was noted that one test hole encountered what was interpreted as weathered bedrock at 110 feet bgs. Further interpretations of bedrock depths were supported by two seismic lines that were

run roughly parallel to the highway, which found bedrock depths vary from 97 to 127 feet bgs (AKDOT&PF 2018).

A major drainage structure that crosses under the highway is the McHugh Creek Culvert, located at around milepost 111.7. In 2020, AKDOT&PF conducted geotechnical investigations including six test holes and 19 soil probes at the site in support of the new culvert (AKDOT&PF 2020). Currently, construction of the new culvert is underway.

We did not find additional subsurface information at other drainage structures along the existing highway during our review. According to the Safer Seward Highway ArcGIS Online Hub, it appears there are multiple creeks draining from Chugach State Park into Turnagain Arm, crossing Seward Highway and the Alaska Railroad. Whether drainage structures exist at these locations is uncertain and will require field reconnaissance to determine the specific conditions at each site.

4 CONCLUSIONS

Based on the above data review, we have developed a baseline understanding of the location, geologic setting, and features that currently exist within the project area. Rock structure mapping and explorations have been conducted near mileposts 104.8, 106.2, 106.9, 107.25, and 109. The only explorations suitable for evaluation of foundation conditions for new structures were conducted at Indian Creek Bridge. Subsurface explorations have also been performed at McHugh Creek, however, their depths were limited as they were intended to support design of the culvert crossing under the highway. Comparing this data with the new alignments being considered, it is clear there are numerous areas that will require additional explorations to support preliminary and final design. These areas include sites of bridge or culvert crossings (eg. Bird Creek and Rabbit Creek) and proposed rock cuts and tunnel sites (eg. Indian Point and Rainbow Point). In some cases, explorations in areas with existing data may be necessary to obtain new data that specifically pertains to foundation and/or rock engineering needed for this project. These explorations will likely include site reconnaissance, geotechnical borings in soil and rock, rock structure mapping, and photogrammetry.

5 CLOSURE AND LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives for evaluating the site as it relates to the geotechnical aspects discussed herein. The conclusions and interpretation contained in this report are based on site conditions as they were presented in the reviewed existing information. It is assumed that the available data are

representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the existing data.

If there is a substantial lapse of time between the submittal of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the conclusions considering the changed conditions and time lapse. Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely taking soil samples or advancing test holes. Please read the Important Information section at the back of this report to reduce your project risks.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact us.

6 REFERENCES

Alaska Earthquake Information Center (AEIC). No Date. <http://www.aeic.alaska.edu>

Alaska Department of Transportation and Public Facilities, 2010, Geotechnical Observations and Summary – Proposed Material Sites, Seward Highway MP 105-107, Central Region Materials

Alaska Department of Transportation and Public Facilities, 2001, Geotechnical Report, Seward Highway MP 96-102, Safety, Roadway & Recreational Improvements, Central Region

Alaska Department of Transportation and Public Facilities, 2016, Rock Fall Analysis Seward Highway MP 104-115, Central Region Materials

Alaska Department of Transportation and Public Facilities, 2018, Foundation Geology Report, Indian Creek Bridge Replacement, Seward Highway MP 99 to 105 Improvements, Statewide Geotechnical Services

- Alaska Department of Transportation and Public Facilities, 2020, Geotechnical Report, Anchorage Area Drainage Improvements FY2019 – McHugh Creek, Central Region Materials
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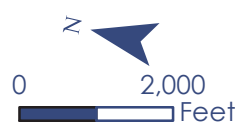
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LEGEND

- Proposed Tunnel Sites
- Milepost (every 1/2 mile)
- Existing Explorations - Foundations
- Existing DOT ROW
- Existing ARRC ROW

Notes:

1. Mileposts, existing DOT ROW, and ARRC ROW provided courtesy of Safer Seward Highway Hub, 2023.
2. Foundations explorations: Alaska Department of Transportation and Public Facilities, 2020, Geotechnical Report, Anchorage Area Drainage Improvements FY2019 – McHugh Creek, Central Region Materials.



Earthstar Geographics



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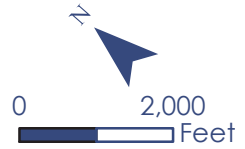
Earthstar Geographics

LEGEND

- Proposed Tunnel Sites
- Milepost (every 1/2 mile)
- Existing Explorations - Rock
- Existing Explorations - Foundations
- Existing DOT ROW
- Existing ARRC ROW

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2. Foundations explorations: Alaska Department of Transportation and Public Facilities, 2020, Geotechnical Report, Anchorage Area Drainage Improvements FY2019 – McHugh Creek, Central Region Materials.
3. Rock explorations at MP 109: Alaska Department of Transportation and Public Facilities, 2016, Rock Fall Analysis Seward Highway MP 104-115, Central Region Materials
4. Rock explorations at MPs 107.25, 106.9, and 106.2: Alaska Department of Transportation and Public Facilities, 2010, Geotechnical Observations and Summary – Proposed Material Sites, Seward Highway MP 105-107, Central Region Materials





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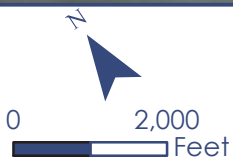
Earthstar Geographics

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3. Rock explorations at MP 109: Alaska Department of Transportation and Public Facilities, 2016, Rock Fall Analysis Seward Highway MP 104-115, Central Region Materials
4. Rock explorations at MPs 107.25, 106.9, 106.2, and 104.8: Alaska Department of Transportation and Public Facilities, 2010, Geotechnical Observations and Summary – Proposed Material Sites, Seward Highway MP 105-107, Central Region Materials





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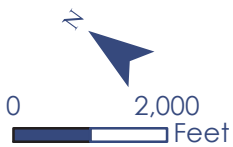
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LEGEND

- Proposed Tunnel Sites
- Milepost (every 1/2 mile)
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3. Rock explorations at Bird Creek parking area: Alaska Department of Transportation and Public Facilities, 2001, Geotechnical Report, Seward Highway MP 96-102, Safety, Roadway & Recreational Improvements, Central Region



Important Information

Important Information

About Your Geotechnical Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent

such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland