Geotechnical Report

Appendix F

Geotechnical Report

Quinhagak Street Reconstruction

MOA PM&E Project No. 21-13

January 2023

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Geotechnical Report
Quinhagak Street Reconstruction
(MOA PM&E Project No. 21-13)

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1. Introduction, Project Description, and Existing conditions

CRW Engineering Group, Inc. (CRW) is pleased to present this geotechnical investigation and design recommendations report to support the upgrades to Quinhagak Street in Anchorage, Alaska. A vicinity map is shown in Figure 1.

The project is being managed by the Municipality of Anchorage (MOA) Project Management & Engineering Department (PM&E) and has been assigned MOA PM&E project number 21-13. Improvements are expected to include a new roadway structural section, pavement, drainage improvements, curb and gutter, pedestrian facilities, and light poles.

The scope of geotechnical work included:

- Reviewing historical geotechnical investigations within and near the project area.
- Performing a geotechnical field investigation which included advancing boreholes along the project alignment and soil sampling.
- Installing piezometer wells for groundwater level monitoring.
- Overseeing index laboratory testing of recovered soil samples including moisture content, grain size distribution including hydrometer, and Atterberg Limits.
- Analyzing field observations and testing results.
- Preparing the geotechnical report to provide design recommendations for the project.

The project area is the length of Quinhagak Street in Anchorage, beginning south of E Dowling Road and extending to Askeland Drive (Figure 1). Properties along Quinhagak Street are primarily commercial or light industrial with a small residential subdivision south of E 64th Avenue.

The existing street is a two-lane roadway surface with curbs and gutters. There are currently no sidewalks along any length of the street. The street pavements show significant distresses including cracking, settling, heaving, and rolled curb and gutters.

2. Subsurface Investigation

CRW's geotechnical investigation consisted of drilling and sampling six boreholes (BH-01 through BH-06) on May 25, 2022, at the locations shown in Figure 2. Borehole locations were selected by CRW following the guidelines presented in the 2007 MOA PM&E Design Criteria Manual (DCM) Section 1.7 – Soil Investigation Standards and allowing traffic to pass through as much as possible during drilling operations. The soil boring locations were approved by PM&E prior to performing the field investigations.

Utility locates were submitted to the Alaska Digline and site walks were arranged with all entities known to have utilities in the project area. Several borehole locations were adjusted due to the presence of utilities.

2.1 Subsurface Drilling

Drilling services were provided by Discovery Drilling Inc. (Discovery) of Anchorage, Alaska, using a truck-mounted CME-75 drill rig equipped with a nominal 8-inch outer diameter (O.D.) hollow-stem auger. When drilling through the asphalt pavement, an approximately 12-inch diameter hole was cut in the pavement with a saw tooth bit prior to advancing the borehole.

Traffic control was performed in accordance with the requirements of the MOA approved traffic control plan.

A CRW engineer supervised the field investigation program, recovered soil samples, and managed field operations. Borings were advanced to a depth of 17 feet below ground surface (BGS) except BH-01 which terminated at 16 feet BGS due to refusal of the sampler.

2.2 Sample Collection

Soil samples were obtained by advancing an oversized split-spoon sampler into the soil beyond the bottom of the auger or by collecting cuttings from the auger. Samples were collected using a 3-inch O.D. split-spoon sampler as a modified Standard Penetration Test (SPT). The sampler was advanced 24 inches, counted in 6-inch intervals, except where refusal was encountered in sampling and used a 340-pound automatic hammer. The number of blows required to drive the sampler each 6-inch interval is reported on the borehole logs in Appendix A. The blow counts shown on the borehole logs are field values that have not been corrected for overburden, sampler size, hammer energy, rod length, or other factors.

Split-spoon samples were collected at approximately 2.5-foot intervals in the first 10 feet and every 5 feet thereafter. Recovered samples were visually classified in the field before being individually sealed in two polyurethane bags and transported to the soil's laboratory for additional testing. Field visual classifications were verified through laboratory testing. Soil characteristics, such as classification, consistency, moisture, and color were noted for each sample recovered. Classification was performed following the Unified Soil Classification System (USCS) according to ASTM D2487/D2488. Frost classifications of the soil were described according to the MOA DCM standards.

2.3 Borehole Completion and Piezometer Well Installation

All boreholes were backfilled with cuttings brought to the ground surface during drilling. In select borings (BH-01, BH-03, and BH-05), a 1-inch PVC piezometer well was installed for groundwater level monitoring. The PVC pipe was hand-slotted over various portions and was installed over the length of each boring.

After the piezometer was installed, the annular space around the PVC was backfilled with cuttings. A 7-inch flush mount cover was installed at the surface with the annulus filled with pea gravel. A cold patch asphalt was placed around the flush mount to match the existing pavement surface where required. If no piezometer well was installed, the boring was backfilled with cuttings and cold patch asphalt was placed at the surface to match the existing pavement where required.

2.4 Groundwater Monitoring

Groundwater levels were noted during drilling, and two weeks after completion of drilling. Groundwater levels are presented on the borehole logs, in Appendix A, and in this report in Table 4-1.

2.5 PID Field Testing

Soil samples were tested with a photo ionization detector (PID) to test for the presence of volatile organic compounds (VOC) after being placed into polyurethane bags during sampling. The PID was calibrated at the beginning of each field day with 100 parts per million (ppm) isobutylene calibration gas. The PID used was equipped with a 10.2-eV lamp. Screening was performed between 15 and 60 minutes after the sample was placed in the bag. Prior to screening, each sample was shaken or agitated for 15 seconds to assist volatilization. After vapor development, the PID sampling probe was inserted into the top of the bag and the highest measurement was recorded. Care was taken when inserting the sampling probe into the bag to avoid uptake of any moisture or soil particles. The field PID readings are presented on the borehole logs in Appendix A.

3. Laboratory Testing and Results

Soil laboratory tests to evaluate index properties of recovered samples were performed by Alaska Testlab (ATL) in their Anchorage facility. The laboratory testing programs consisted of soil index tests to determine water content, grain-size distribution including hydrometer, No. 200 Wash, Atterberg Limits, and Limited Mechanical Analysis (LMA) to determine percentages of gravel, sand, and fines content. LMA consists of washing a sample over the Number 200 mesh sieve. The coarse fraction of the remaining soil is then dried and sieved through the Number 4 sieve to determine the sand and gravel content. The LMA is a means to determine the percentage of coarse and fine soil in a sample without having to perform full gradations. Because LMAs are not full gradations, all classifications of clean granular soils are "poorly graded" even though the soil may, in fact, be well graded. Qualitative observations of grain sizes are included in the soil descriptions on the logs in Appendix A.

The laboratory tests were performed in accordance with the test methods of ASTM International as summarized in Table 3-1.

Table 3-1. Laboratory Analyses and Methods

Analysis	Method	Number of Samples
Water Content	ASTM D2216	48
Grain-size Distribution	ASTM D6913 ASTM D422	6
Limited Mechanical Analysis	ASTM D1140	15
Atterberg Limits	ASTM D4318	3

Results of the laboratory testing are presented on borehole logs in Appendix A and in full in Appendix B.

4. Site Conditions

4.1 Geology

The geology for the project area was determined from the Simplified Geologic Map of Central and East Anchorage, Alaska, as mapped by R.A. Combellick with the Alaska Division of Geologic and Geophysical Surveys (DGGS) in 1999, in addition to the 1972 map by Schmoll and Dobrovolny (Combellick, 1999; Schmoll and Dobrovolny, 1972). The geology of the project area consists primarily of 50 feet or more of glacioestuarine or eolian silt and fine sand, with Holocene alluvium to the south, underlain by undifferentiated glacial drift.

Geologic conditions in the boreholes agreed with the general geology though variations between borings was noted.

4.2 Historical Geotechnical Investigations

CRW consulted the online MOA Soil Boring App to evaluate historical borings in the project area. Fourteen historic boreholes were located in the project limits. Historical boreholes generally matched information obtained in our field investigation. This included a 2 to 5-foot layer of granular fill, followed by a section of silty sand and clayey silt. Historical borehole logs can be found in Appendix C.

4.3 Pavement Thickness and General Soil Lithology

The pavement thickness, where encountered, ranged from 1.5 to 3.0 inches based on measurements of recovered samples.

The subsurface conditions observed within the existing road prism generally consisted of 5 to 6 feet of granular fill composed of poorly graded gravel with sand and silt or poorly graded sand with gravel and silt, decreasing in thickness from north to south. At BH-06, granular fill was 2.5 feet thick. The granular fill was underlain by up to 4 feet of silty sand or sand with silt, decreasing in thickness from north to south, and was not observed in BH-06.

Beneath the granular fill layer, 6 to 10 feet of silty lean clay was observed increasing in thickness from north to south. Beneath the silty lean clay, 3 to 5 feet of silty sand was generally present increasing in thickness from north to south. Cobbles were noted in the granular fill ranging from 4 to 5 inches in size and were present from 5 to 10 percent by volume.

The moisture content ranged between 4 to 8 percent in the granular fill, 18 to 20 percent in the of silty sand/ sand with silt, 10 to 40 percent in the silty lean clay, and 20 to 25 percent in the silty sand.

The fines content ranged between 2 and 10 percent in the granular fill, and its frost susceptibility was estimated to be non-frost susceptible (NFS) to frost class F-2. The silty sand/sand with silt had fines content from 20 to 50 percent and the silty lean clay had fines content of 90 to 100 percent and were estimated to be frost class F-4.

A layer of peat was encountered in BH-03 from approximately 1.0 to 2.5 feet BGS. The moisture content was 164 percent. BH-03 was located just off the road surface in the gravel lot to the west of the roadway (Figure 2). Peat was not encountered in any other borings.

Fat clay was encountered in BH-05 from 5 to 15 feet BGS, with a moisture content of 30 to 40 percent, an estimated fines content of 100 percent, and Atterberg limits with a liquid limit of 54 percent, plastic limit of 25, and plasticity index of 29 percent. Fat clay was not encountered in any other borings.

The observed subsurface conditions generally agreed with the historic geotechnical investigation findings. Detailed subsurface conditions are presented on the borehole logs in Appendix A. It should be noted that subsurface conditions outside the existing road prism could vary from the borehole logs.

4.4 Groundwater Conditions

Groundwater, if observed, was recorded on the borehole logs. Only the most recent measurement taken after drilling is displayed on the borehole logs in Appendix A. Table 4-1 provides a summary of the groundwater levels at the time of drilling and all subsequent measurements. All depths are relative to the existing roadway surface. Screen intervals consist of the depth of the piezometer that was slotted prior to installation.

Table 4-1. Summary of Groundwater Levels

Borehole	Screened Interval if Completed as Piezometer (Feet BGS)	Groundwater Levels At Time of Drilling on 5/25/2022 (Feet BGS)	Groundwater Levels on 6/9/2022 (Feet BGS)	Groundwater Levels on 8/17/2022 (Feet BGS)
BH-01	4.0 – 16.0	5.0	5.55	4.35
BH-02	No Piezometer Installed	3.5	N/A	N/A
BH-03	2.75 – 16.75	3.0	3.65	2.33
BH-04	No Piezometer Installed	Not Observed	N/A	N/A
BH-05	9.6 – 14.6	1.0	3.05	1.98
BH-06	No Piezometer Installed	10.0	N/A	N/A

4.5 PID Field Testing Results

Standard practice in the MOA is to consider soil samples with PID readings of 20 parts per million (ppm) or higher potentially contaminated. No samples screened during this investigation exceeded this limit, and no visual or olfactory evidence of contamination was observed.

4.6 Contaminated Site Review

Soil samples were tested using a PID during the field investigation per MOA requirements with results previously discussed in this report and values provided on the borehole logs. In addition, CRW consulted the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program (CSP) on-line database for nearby recorded contaminated sites. A review of the CSP database revealed no sites within 500 feet of the project area.

5. Geotechnical Engineering Recommendations

CRW has developed the following recommendations based on our understanding of the project scope and considering the data obtained during our geotechnical investigation.

5.1 Site Preparation

All existing pavements, fill, curbs and gutters, trees, stumps, and other deleterious material should be cleared from the roadway reconstruction limits. Exposed subgrade at the bottoms of excavations should be scarified a minimum of 6 inches, moisture conditioned, and compacted to 95 percent of the maximum Proctor density as determined from ASTM D1557. If the subgrade cannot be moisture conditioned, we recommend the contractor over excavate the subgrade a minimum of 1 foot and replace with non-frost susceptible (NFS) material.

5.2 Excavations

All excavations should follow proper local, state, and federal requirements including those in 29 Code of Federal Regulations (CFR) Part 1926 Occupational Safety and Health Standards Subpart P – Excavations (Occupational Safety and Health Administration [OSHA], 2020).

The contractor is responsible for trench stability, worker safety, and regulatory compliance as he will be present on a daily basis and can adjust efforts to obtain the needed stability. Surface runoff entering the excavation could present challenges and should be accounted for during construction. We anticipate excavations will use benching/sloping or shoring/shielding as OSHA requires this due to the depth of the excavation. If trench shoring, like cantilever or braced excavations, is utilized, additional recommendations for lateral earth pressures can be provided.

Utility or roadway excavations above the water table may stand relatively steeply initially but fail suddenly without warning. As the in-situ soils dry, they will tend to ravel and slough to their natural angle of repose, which we estimate to be between 1.5 to 1.8H:1V (horizontal to vertical). Below the water table, or if surface water is allowed to enter the trench, in-situ soils may slough, soften, squeeze, slump over time or due to disturbance, to slopes of 2 to 2.5H:1V or flatter if not benched/sloped or shored/shielded.

Additionally, the sequencing of excavation for the utility line and the excavation for the roadway should be considered by the designers and the contractor. Should the roadway construction occur prior to utility installation, poor performance of the roadway may occur due to dissimilar material in the utility trench compared to the roadway structural section as well as damage and repair to any insulation and/or geotextile.

5.3 Dewatering and Radius of Influence

Based on our observations during drilling and measurements of groundwater in piezometers after drilling, shallow groundwater is present in the project area. Excavations are anticipated to be 5 to 8 feet BGS and groundwater levels were measured between 1.0 to 5.6 feet BGS. Groundwater is likely to be encountered during excavation activities. Groundwater conditions will vary with environmental variations and seasonal

conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as existing curbs, gutters, and other roadside features.

We recommend that the contractor determine the actual groundwater levels at the time of construction to evaluate groundwater impacts on the construction procedures, if necessary. We recommend the ground around any excavation be contoured to direct surface water away from the excavation and to minimize surface water or runoff from entering the excavation.

Based on the observed groundwater and anticipated excavation depths, dewatering will likely be required. Dewatering methods include open pumping, wellpoints, deep wells, ejector wells, cutoff methods, or some combination. Considering the lithology encountered and anticipated depths, we do not recommend open pumping, ejector wells, or cutoff methods due to the anticipated groundwater drainage potential based on estimated hydraulic conductivity (discussed later, also see Powers et al., 2007 and Powrie, 2014). We recommend wellpoints be considered for construction dewatering. Depending on spacing and size, wellpoints may be either 1.5- or 2-inch diameter.

We recommend construction dewatering be the responsibility of the contractor including submitting a dewatering plan for approval as part of the submittal process. The dewatering plan should show anticipated wellpoint/well layout including spacing, diameters, well screens, filters, location of pumps, and discharge point(s).

Permits from the Alaska Department of Natural Resources and potentially other local and state agencies will be necessary for construction dewatering.

For preliminary planning, we have estimated pumping rates for the storm drain excavation based on an assumed dewatering effective trench width of 6 feet and drawdown of up to 5 feet. We estimate the hydraulic conductivity from empirical and literature values, based on the encountered soils, ranging from 0.02 to 10 feet per day (FT/day) with higher flows in the silty sands and lower flows in the silt with sand. We note there is tremendous uncertainty in conductivity estimates using empirical/literature values as they are affected by soil type, excavation/dewatering methods, and seasonal groundwater fluctuations and will vary during construction.

We estimate an initial required pumping rate of 0.1 to 3 gallons per minute per linear foot (GPM/FT) which decreases to steady-state pumping rates of 0.1 to 2 GPM/FT during dewatering efforts. We estimate the radius of influence of the cone of depression from dewatering to vary from 3 to 60 FT (measured from the center of the trench). These estimates do not consider the effect of “tailwater” from water flowing into the excavation due to the high permeability of bedding material.

Dewatering activities should consider the potential for settlement if buildings and other infrastructure are within the radius of influence. When the water table is lowered, compressible soils can consolidate, due to an increase of the effective weight of overlying soils. Consolidation has the potential to impact development adjacent to the project area. While construction and dewatering are anticipated to be of short duration and impacts minimal, considerations should be made as to whether monitoring of settlement is required. CRW’s geotechnical engineer will work closely with the designers to evaluate the magnitude of settlement and tolerable settlement values will be determined considering input from MOA, CRW designers, and stakeholders during detailed design.

If dewatering is anticipated to produce unacceptable settlements, the designers should perform pre- and post-condition surveys of nearby building finish floors/foundations and other infrastructure to evaluate if dewatering activities resulted in damage. In addition, survey points should be placed at and around buildings and other infrastructure to verify settlement due to dewatering. If settlement is observed during monitoring the contractor should reevaluate the dewatering technique to reduce the potential for continued settlement.

5.4 Frost Depth and Permafrost

Typical design frost depths are estimated between 8 and 11 feet BGS in Anchorage and are common for relatively dry granular soils. It should be noted that seasonal fluctuations of snow cover, temperatures, infiltration/evaporation, groundwater table, and other climatic effects will have an impact on the design frost depth therefore any calculated value should only be considered a reasonable estimate of the design value as deeper frost penetrations are possible. In addition, the presence of groundwater within the upper 11 feet will also affect the frost depth in addition to the potential for ice lensing and heaving.

We have modeled design frost depths based on the modified Berggren equation using the commercially available Microsoft DOS program BERG2 as discussed in the next section of this report.

Permafrost was not encountered in the boreholes and is not expected at the project site.

5.5 Recommended Road Structural Section

CRW has developed a recommended road structural section based on the current MOA DCM as outlined in Chapter 1 Streets, Section 1.10 Road Structural Fill Design. The DCM recommends two methods for frost considerations in the structural section design: the Complete Protection Method and the Limited Subgrade Frost Penetration Method.

The structural section design uses the latter method, which seeks to reduce the freezing impacts to a specified percentage of the structural section into the subgrade.

The Complete Protection Method involves the removal of all frost susceptible subgrade soils beneath the roadway to the calculated frost penetration depth. These soils are replaced with non-frost susceptible fill. This method may be used regardless of the frost susceptibility of the subgrade soils. Rigid board insulation may also be used in the subbase of the structural section to reduce the required depth of classified fill and backfill. The Complete Protection Method would require excavation and replacement of frost susceptible soils down to depths of 8 to 10 feet, excluding insulation, which is not economical and therefore is not recommended.

The Limited Subgrade Frost Penetration Method attempts to restrict roadway surface movements to levels that will not adversely affect road surface life or quality. The method permits frost penetration into a frost susceptible subgrade equal to a maximum of 10 percent of the structural section design thickness.

The frost depth was analyzed using the commercially available Microsoft DOS computer program BERG2 written by Braley and Connor (Braley and Connor, 1989) as approved in the DCM. The analysis calculates the estimated total frost penetration depth for a given soil lithology. For our analysis, we used the program default climate parameters for Anchorage and assumed conservative surface freeze/thaw n-factors based

on local practice and published values. Soil layers were assigned in the program with estimated dry unit weights of the soil and average or anticipated water contents. Soil thermal parameters were calculated from the equations built into the BERG2 program (see Braley and Connor for further discussion).

5.5.1 Recommended Structural Section – Limited Subgrade Frost Protection Method

The project area contains frost susceptible subgrade with a F-3 and F-4 frost classification within 8 feet of the ground surface. Based on this, we recommend an insulated structural section using the Limited Subgrade Frost Penetration for the entire project alignment. We have developed a recommended structural section based on the BERG2 analysis and have evaluated 2 inches of insulation. The insulation for the structural section in this analysis assumed a minimum R-value of R-4.5 per inch. Our recommended structural sections are presented in Table 5-1. A typical insulated section is presented in Figure 3.

Table 5-1. Recommended Structural Section (Insulated)

Minimum Thickness (inches)	Layer	Material	Compaction (percent)
2	Wearing Course	Asphalt Pavement (Class E)	-
2	Leveling Course	MOA Leveling Course	95
16	Base Course	MOA Type II-A	95
2	Insulation	XPS or EPS (60 psi R-4.5)	-
24	Subbase Course	MOA Type II	95
N/A	Separation Geotextile	MOA Class 2, Type A	-
N/A	Subgrade	Existing soils	95 (top 6 inches)
46	**Total Thickness**	-	-

See Appendix D for BERG2 analysis and detailed results. Note that the recommended structural section considers only minimum thicknesses.

5.6 Compaction Requirements

Pavement structural section fill material should be placed in loose lift thickness, no more than 12 inches, and compacted to the percentage as outlined in Table 5-1 based on the material's Modified Proctor maximum dry density in accordance with ASTM D1557. Compaction verification of the backfill by a qualified inspector is also recommended.

5.7 Rigid Insulation

We recommend that rigid board insulation for the road structural section have a minimum compressive strength of 60 pounds per square inch (psi) and a maximum water absorption of 0.3 percent by volume in accordance with the current version of Municipality of Anchorage Standard Specifications (MASS). We recommend the insulation have a minimum R-value of R-4.5 per inch. We recommend a minimum of 12 inches of loose fill be placed over the insulation to protect from wheel loads during construction. We also

recommend a minimum of 18 inches of fill over the insulation for design to prevent frost formation in the form of differential icing.

Board insulation should be extended a minimum of 4 feet beyond the back of curbs when no sidewalk is present. Extending the insulation 4 feet will reduce the risk of the curb heaving up or "curb rolling." The potential for curb rolling decreases as the distance the insulation extends beyond the back of curb increases. The 4-foot layout has protected the curb well on past projects especially where the curbs need to be protected due to the flat longitudinal roadway grades like those on this project.

The insulation should extend 1 foot minimum beyond the back of any sidewalk but will not perform as well as the curb. To increase the performance of any sidewalk, the owner could consider extending the insulation 4 feet as well. Additionally, insulation below separated sidewalks that are separated by 4 feet or more could be reduced in thickness to save cost but will not perform as well.

Transitions between insulated and uninsulated sections should involve the extension of insulation beyond the roadway section 8 to 12 feet with the thickness reduced in these areas to minimize the possibility of differential heave. The insulation can be tapered from 2 inches thick to 1 inch thick in the transition zone. The subgrade in transitions should be graded (tapered) at a 10H:1V (horizontal to vertical) slope if construction distances permit. We recommend the transitions not be steeper than 5H:1V.

5.8 Geotextiles

We recommend that a geotextile be used at the base of the structural section along the entire project alignment. The use of a geotextile reduces the effects of thaw weakening, prevents fines migration, and increases lateral drainage at the base of the structural section. If soil layers at the base of the excavation are loose or soft, the geotextile will provide additional stabilization.

We recommend using a non-woven geotextile meeting MASS similar to Class 2, Type A. The geotextile should be placed on top of the excavated subgrade soils prior to placement of classified fill. The geotextile should be extended up the sides of excavations.

Typical installation involves placing the geotextile transverse to the centerline in order to avoid large overlaps. Fabric joints should be overlapped according to manufactures recommendations. Fabric joints may require sewing depending on subgrade conditions and should follow the manufacturer's requirements.

5.9 Subdrains

Incorporation of subdrains into the design of the structural section is recommended to help mitigate against the effects of high ground water levels. High groundwater levels, or groundwater that reaches the pavement structural section, can collect in the structural section and impact the overall road performance. Subdrains will mitigate against water infiltration in the structural section and improve overall road performance. The depth of subdrain installation should be below the roadway structural section for optimal performance.

Edge drains should be placed at the outer edges of the structural section as shown in Figure 3 and consist of a geotextile wrapped perforated pipe with a minimum O.D. of 10 inches. Construction should be per

MASS. Roadway subgrade should be sloped with a minimum of 2 percent towards subdrains to assist with drainage. Termination of the subdrains should be to the drainage system manholes or suitable outfalls. Subdrains should be hydraulically sized and consider potential icing issues.

Should edge drains not be feasible, an alternate would be a perforated drain placed in a shallow trench near the center of the structural section. As such, an alternate drainage option is a perforated center subdrain as shown in Figure 4 consisting of a geotextile-wrapped perforated pipe with a minimum O.D. of 18 inches. The use of a center subdrain may result in poorer structural section performance over time compared to the used of edge drains. The center subdrain should be constructed per MASS. Roadway subgrade should be sloped with a minimum of 2 percent towards the subdrain to assist with drainage. Termination of the subdrain should be to the drainage system manholes or suitable outfalls. Subdrains should be hydraulic sized and consider potential icing issues.

5.10 Reuse of Material

Existing fill and native material that meets the classification for MOA Type II and Type II-A fill can be reused as classified fill in the roadway structural section. It is anticipated that the majority of existing fill and native material along the project alignment contain frost susceptible material and will not meet MOA Type II and Type II-A classification.

Existing fill and native material that meets the classification for bedding material can be reused around utility pipes. Existing fill and native materials can be reused in utility trenches as backfill over the bedding but below the pavement structural section.

The amount and quality of reuse of material will vary depending on factors including lateral extent of deposits, transitional lithology, degree of saturation and moisture control during construction, and mixing of excavated materials. Higher fines content soils were encountered near the ground surface which could make granular soils difficult to compact if mixed and water content increases. We recommend native material excavated for reuse be visually inspected for fines content and if the material becomes wet will require storage to be dried for reuse. This effort may be less efficient and cost more than complete removal and replacement with imported materials.

5.11 Utility Recommendations

All utilities should be bedded, backfilled, and compacted per MASS. The satisfactory performance of piped utilities is highly dependent upon the quality of soil below and along the sides of the pipe.

MOA standard is to adequately bury water, sanitary sewer, and storm sewer utilities to protect from freezing. If inadequate burial depths cannot be achieved as design proceeds, alternate methods such as insulation, active freeze protection like heat trace, or some combination is recommended. Recommendations on insulation for utility protection can be provided on request.

5.12 Light Pole Foundations

We understand streetlights are planned along the project corridor and anticipate the design to follow MASS. We anticipate driven steel piles for the light pole foundations.

We recommended driven piles be installed such that the minimum embedment is achieved without damage to the piles. We recommend the light pole foundations be installed to a minimum of 25 feet BGS due to the presence of fine-grained soils starting around 10 feet BGS.

Additional recommendations for lateral or axial pile foundation considerations can be provided as needed.

6. Limitations and Closure

The information submitted in this report is based on our interpretation of data from a field geotechnical investigation performed for this project. The conclusions contained in this report are based on site conditions as they were observed on the drilling dates indicated. It is presumed that the borings in this investigation are representative of the subsurface conditions throughout the site. Effort was made to obtain information representative of existing conditions at the site. If, however, subsurface conditions are found to differ, we should be notified immediately to review these recommendations in light of additional information.

If there is 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, we recommend 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 collecting discrete samples or advancing borings. The client and contractor should be aware of this risk and account for contingency accordingly.

Samples will be retained by CRW for six months following the date on which the final report is issued. Other arrangements may be made at the client's request.

This report was prepared by CRW for use on this project only and may not be used in any manner that would constitute a detriment to CRW. CRW is not responsible for conclusions, opinions, or recommendations made by others based on data presented in this report.

7. References

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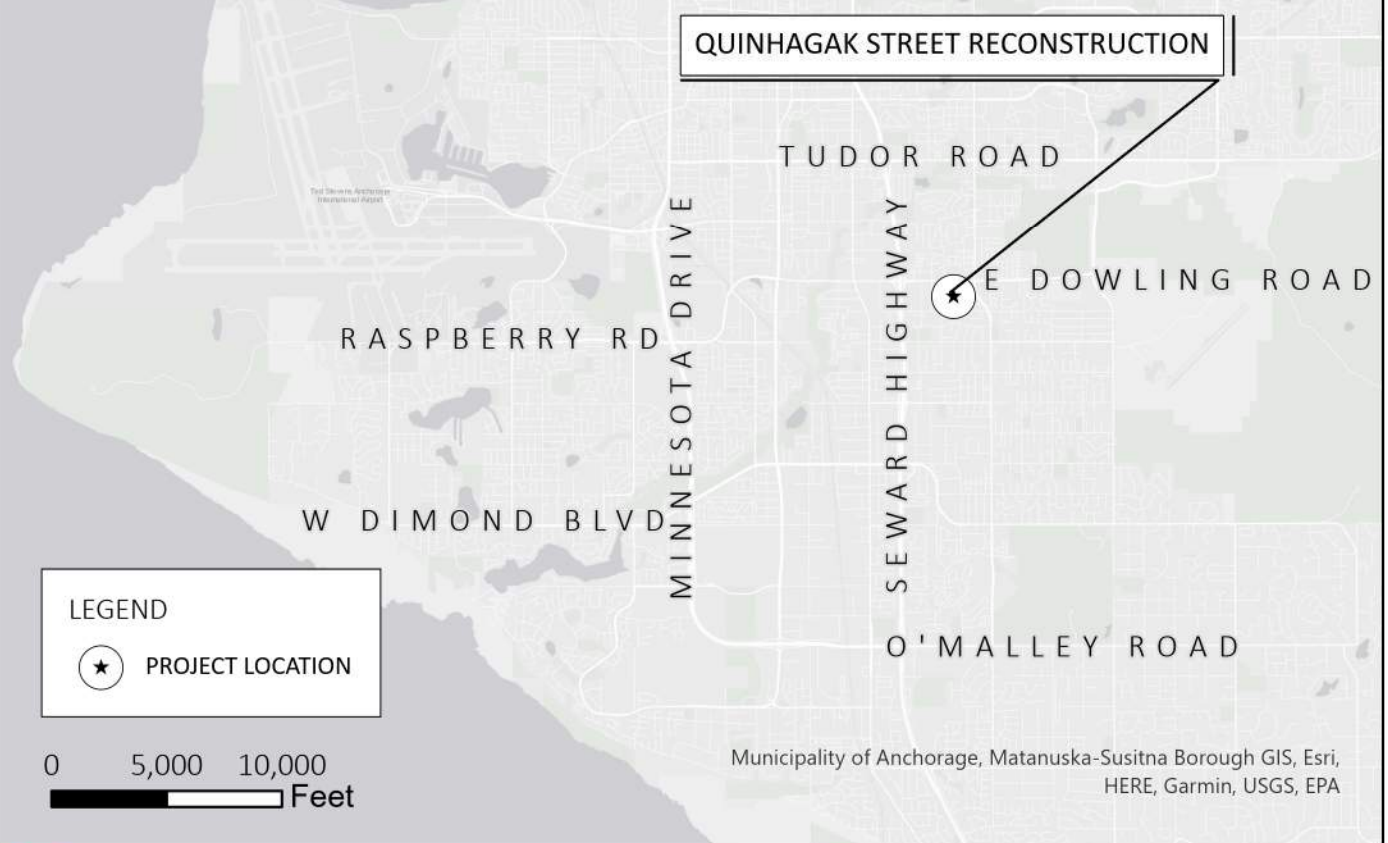
Figures



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QUINHAGAK STREET RECONSTRUCTION
GEOTECHNICAL INVESTIGATION
VICINITY MAP
ANCHORAGE, ALASKA

Project:	10155.00
Drawn By:	AFS
Scale:	Graphical Scale
Date:	Jan 2023
Figure:	1

File Path: J:\JobsData\10155.00 Quinhagak Street Reconstruction\00 CADD 2019\04 GIS\00 Project Database\Quinhagak_Geotech_Figures.aprx

LEGEND

- Borehole
- Borehole completed as piezometer
- Historical soil data point (MOA Database)

E DOWLING ROAD

BH-01

BH-02

BH-03

BH-04

BH-05

BH-06

PETERSBURG STREET

QUINHAGAK STREET

E 63RD AVE

E 64TH AVE

ASKELAND DRIVE

N

0 50 100 200 300 400 Feet

Microsoft

File Path: J:\JobsData\10155.00 Quinhagak Street Reconstruction\00 CADD 2019\04 GIS\00 Project Database\Quinhagak_Geotech_Figures.aprx

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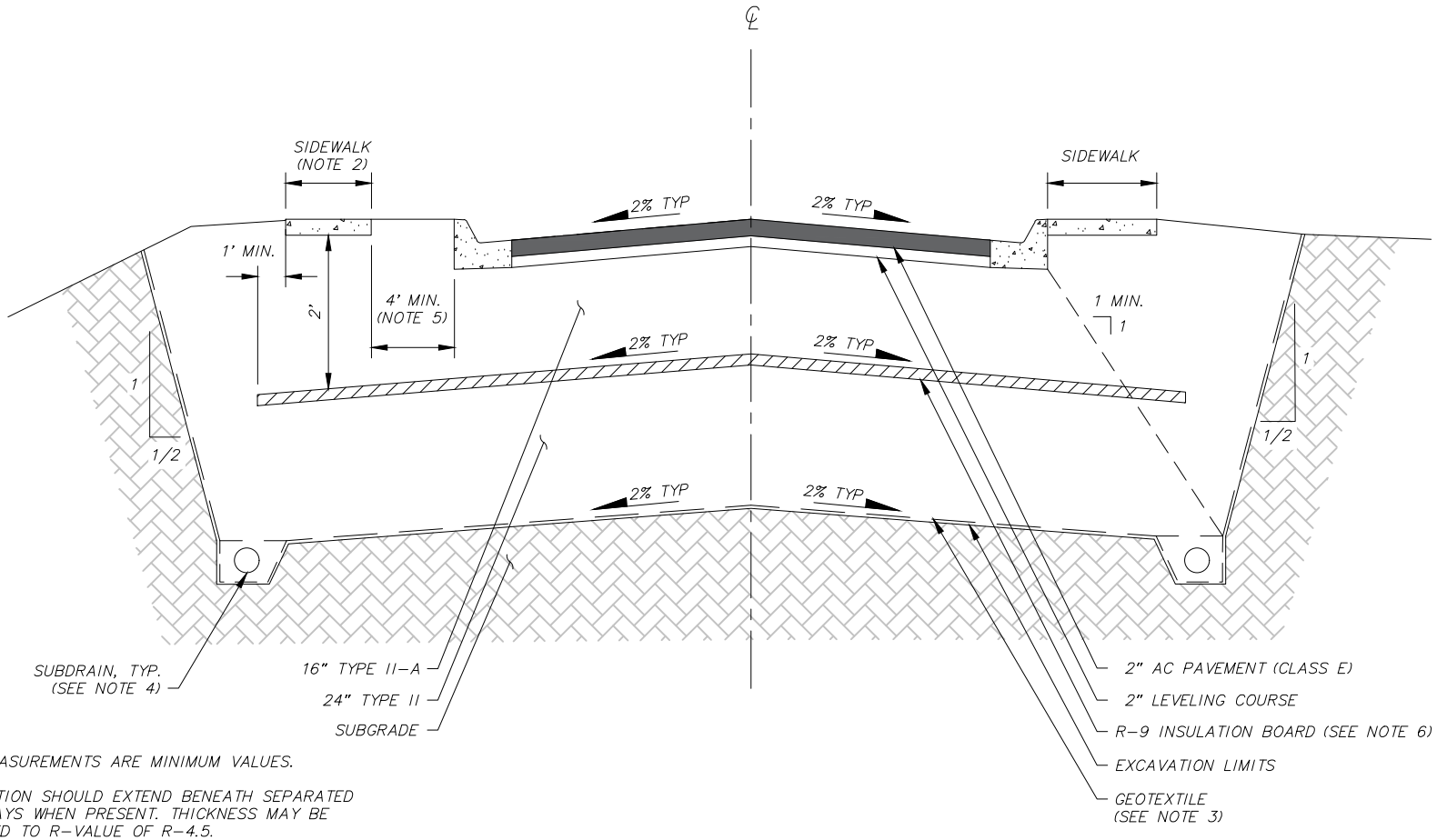
QUINHAGAK STREET RECONSTRUCTION
GEOTECHNICAL REPORT
BOREHOLE LOCATIONS
ANCHORAGE, ALASKA

Project:	10155.00
Drawn By:	AFS
Scale:	Graphical
Date:	Jan 2023
Figure:	2



NOTES:

1. ALL MEASUREMENTS ARE MINIMUM VALUES.
2. INSULATION SHOULD EXTEND BENEATH SEPARATED PATHWAYS WHEN PRESENT. THICKNESS MAY BE REDUCED TO R-VALUE OF R-4.5.
3. GEOTEXTILE SHALL MEET MOA MASS SECTION 20.25 CLASS 2, TYPE A, NON-WOVEN FABRIC WHEN SPECIFIED.
4. INSTALL SUBDRAINS PER MASS DETAIL #55-3.
5. EXTEND INSULATION A MINIMUM OF 4 FEET BEYOND THE BACK OF CURB WHEN NO SIDEWALKS ARE PRESENT.
6. INSULATION MIN. 60 PSI, ABSORPTION 0.30% MAX. BY VOLUME PER MASS SECTION 20.26.

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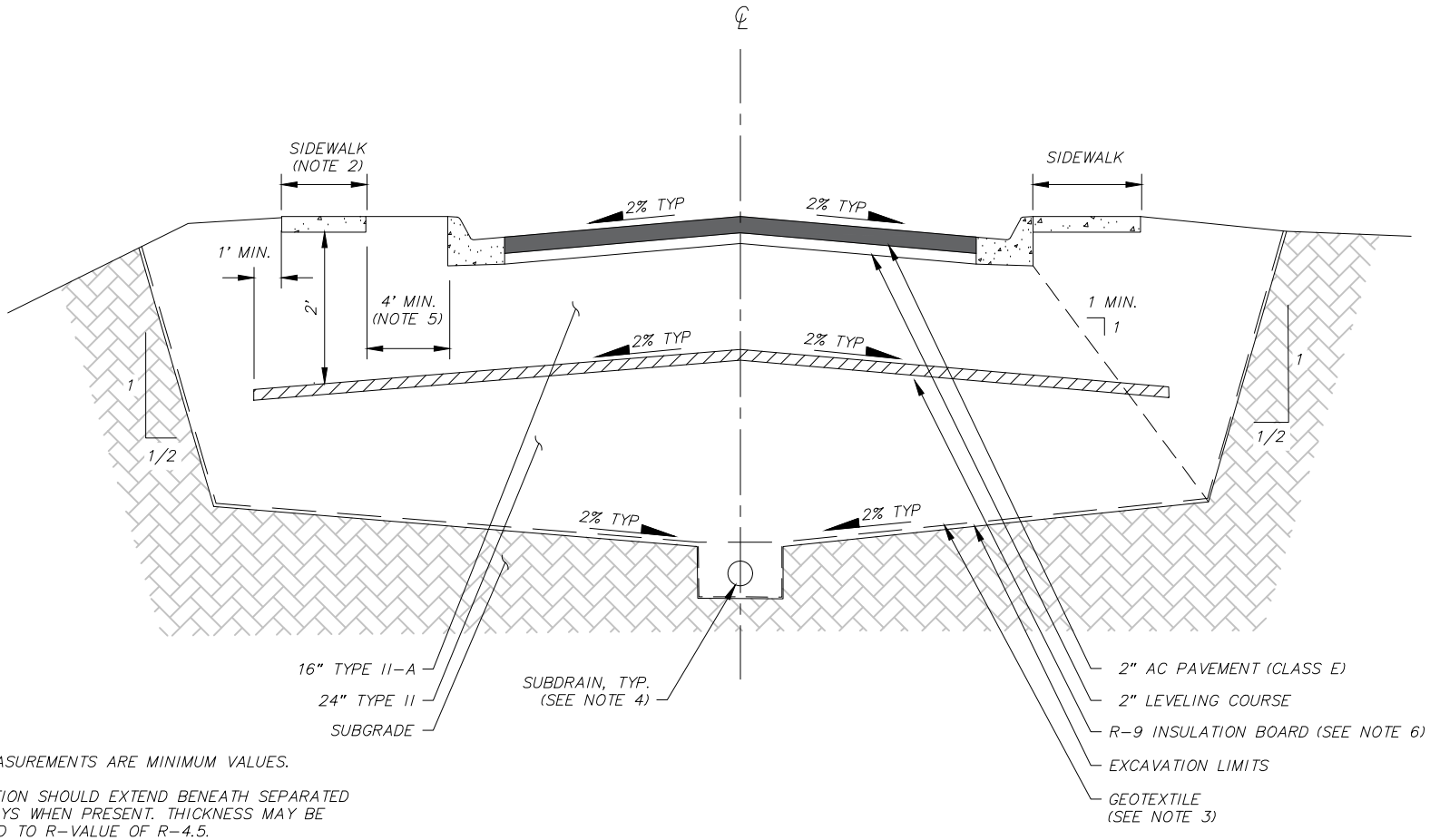
QUINHAGAK STREET RECONSTRUCTION
MOA PM&E PROJECT NUMBER 21-13
TYPICAL INSULATED SECTION WITH EDGE SUBDRAINS

Project:	10155.00
Drawn By:	CRW
Scale:	NTS
Date:	JAN 2023
Figure:	3



NOTES:

1. ALL MEASUREMENTS ARE MINIMUM VALUES.
2. INSULATION SHOULD EXTEND BENEATH SEPARATED PATHWAYS WHEN PRESENT. THICKNESS MAY BE REDUCED TO R-VALUE OF R-4.5.
3. GEOTEXTILE SHALL MEET MOA MASS SECTION 20.25 CLASS 2, TYPE A, NON-WOVEN FABRIC WHEN SPECIFIED.
4. INSTALL SUBDRAINS PER MASS DETAIL #55-3.
5. EXTEND INSULATION A MINIMUM OF 4 FEET BEYOND THE BACK OF CURB WHEN NO SIDEWALKS ARE PRESENT.
6. INSULATION MIN. 60 PSI, ABSORPTION 0.30% MAX. BY VOLUME PER MASS SECTION 20.26.

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QUINHAGAK STREET RECONSTRUCTION
MOA PM&E PROJECT NUMBER 21-13

TYPICAL INSULATED SECTION WITH CENTER SUBDRAIN

Project:	10155.00
Drawn By:	CRW
Scale:	NTS
Date:	JAN 2023
Figure:	4

Appendix A

Borehole Logs

Included in this section:

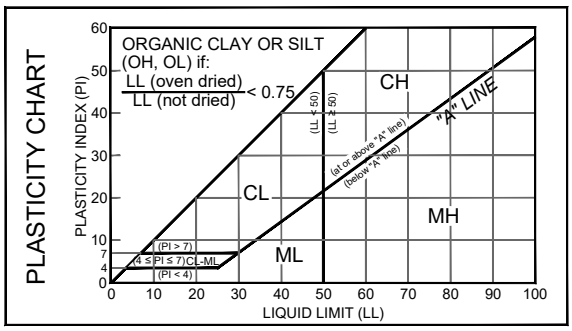
1) Borehole Log Legend
2) Borehole Logs (BH-01 through BH-06)

UNIFIED SOIL CLASSIFICATION (ASTM D 2487)

GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
GW	WELL-GRADED GRAVEL	if soil contains ≥ 15% sand, add "with sand"
GP	POORLY GRADED GRAVEL	
GM	SILTY GRAVEL	
GC	CLAYEY GRAVEL	
SW	WELL-GRADED SAND	if soil contains ≥ 15% gravel, add "with gravel"
SP	POORLY GRADED SAND	
SM	SILTY SAND	
SC	CLAYEY SAND	
CL	LEAN CLAY	if soil contains coarse-grained soil from 15% to 29%, add "with sand" or "with gravel" for whichever type is prominent, or for ≥ 30%, add "sandy" or "gravelly"
ML	SILT	
OL	ORGANIC CLAY OR SILT	
CH	FAT CLAY	
MH	ELASTIC SILT	
OH	ORGANIC CLAY OR SILT	
PT	PEAT	

Gravels or sands with 5% to 12 % fines require dual symbols (GW-GM, GW-GC, GP-GM, GP-GC, SW-SM, SW-SC, SP-SM, SP-SC) and add "with clay or "with silt" to group name. If fines classify as CL-ML for GM or SM, use dual symbol GC-GM or SC-SM.

Optional Abbreviations: Lower case "s" after USCS group symbol denotes either "sandy or "with sand" and "g" denotes either "gravelly" or "with gravel."



COMPONENT DEFINITIONS BY GRADATION

COMPONENT	SIZE RANGE
BOULDERS	ABOVE 12 IN.
COBBLES	3 IN. TO 12 IN.
GRAVEL	3 IN. TO NO. 4 (4.76 mm)
COARSE GRAVEL	3 IN. TO 3/4 IN.
FINE GRAVEL	3/4 IN. TO NO. 4 (4.76 mm)
SAND	NO. 4 (4.76 mm) TO NO. 200 (0.074 mm)
COARSE SAND	NO. 4 (4.76 mm) TO NO. 10 (2.0 mm)
MEDIUM SAND	NO 10 (2.0 mm) TO NO. 40 (0.42 mm)
FINE SAND	NO. 40 (0.42 mm) TO NO. 200 (0.074 mm)
SILT AND CLAY	SMALLER THAN NO. 200 (0.074 mm)
SILT	0.074 mm TO 0.005 mm
CLAY	LESS THAN 0.005 mm

OTHER SYMBOLS

SYMBOL	NAMES & LEGEND	
BLDR	COBBLES AND BOULDERS	overlay
FILL	GRANULAR FILL	man-made or placed
WD	WOODY DEBRIS	
RAP	RECLAIMED ASPHALT PAVEMENT	

RELATIVE DENSITY / CONSISTENCY ESTIMATE USING STANDARD PENETRATION TEST (SPT) VALUES (FROM TERZAGHI & PECK 1996)

COHESIONLESS SOILS[a]		COHESIVE SOILS[b]		
RELATIVE DENSITY	N_{60} (BLOWS/FOOT)[c]	CONSISTENCY	N_{60} (BLOWS/FOOT)[c]	UNCONFINED COMPRESSIVE STRENGTH (TSF)[d]
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.50
MED DENSE	10 - 30	MEDIUM	4 - 8	0.50 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

(a) Soils consisting of gravel, sand and silt, either separately or in combination possessing no characteristics of plasticity, and exhibiting drained behavior.
(b) Soils possessing the characteristics of plasticity, and exhibiting undrained behavior.
(c) Refer to ASTM D 1586-99 for a definition of N.
(d) Undrained shear strength, s_u = 1/2 unconfined compression strength, U_c. Note that Torvane measures s_u and Pocket Penetrometer measures U_c.

CRITERIA FOR DESCRIBING MOISTURE CONDITION (ASTM D 2488)

DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL IS BELOW WATER TABLE

SAMPLER ABBREVIATIONS

SS	SPT Sampler (2 in. OD, 140 lb hammer)	C	Core (Rock)
SSO	Oversize Spit Spoon (2.5 in. OD, 140 lb typ.)	TW	Thin Wall (Shelby Tube)
HD	Heavy Duty Split Spoon (3 in. OD, 300/340 lb typ.)	MS	Modified Shelby
BD	Bulk Drive (4 in. OD, 300/340 lb hammer typ.)	GP	Geoprobe
CA	Continuous Core (Soil in Hollow-Stem Auger)	AR	Air Rotary Cuttings
G	Grab Sample from surface / testpit	AG	Auger Cuttings

DESCRIPTIVE TERMINOLOGY FOR PERCENTAGES (ASTM D 2488)

DESCRIPTIVE TERMS	RANGE OF PROPORTION
TRACE	0 - 5%
FEW	5 - 10%
LITTLE	10 - 25%
SOME	30 - 45%
MOSTLY	50 - 100%

LABORATORY TEST ABBREVIATIONS

AL	Atterberg Limit	PI	Plastic Index	TS	Thaw Consolidation
Consol	Consolidation	PID	Photoionization Detector	TV	Torvane
LMA	Limited Mechanical Analysis	Proc	Proctor	TXCD	Consolidated Drained Triaxial
MA	Sieve and Hydrometer Analysis	PP	Pocket Penetrometer	TXCU	Consolidated Undrained Triaxial
MC	Moisture Content	P200	Percent Fines (Silt & Clay)	TXUU	Unconsolidated Undrained Triaxial
NP	Non-plastic	SA	Sieve Analysis	VS	Vane Shear
OLI	Organic Loss on Ignition	SpG	Specific Gravity	Ω	Soil Resistivity

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LEGEND: SOIL CLASSIFICATION AND ABBREVIATIONS

FILE NAME: M:\Engineering References\Tech Geotechnical\CRW Geotechnical Report Template\Borehole Log Legend\Geotech Borehole Legends.dwg

FROZEN SOIL CLASSIFICATION (ASTM D 4083)

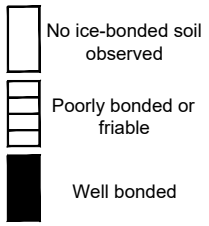
1. DESCRIBE SOIL INDEPENDENT OF FROZEN STATE	CLASSIFY SOIL BY THE UNIFIED SOIL CLASSIFICATION SYSTEM				
	MAJOR GROUP		SUBGROUP		
	DESCRIPTION	DESIGNATION	DESCRIPTION		DESIGNATION
2. MODIFY SOIL DESCRIPTION BY DESCRIPTION OF FROZEN SOIL	Segregated ice not visible by eye	N	Poorly bonded of friable		N_f
			Well bonded	No excess ice	Nbn
				Excess ice	Nbe
	Segregated ice visible by eye (ice less than 25 mm thick)	V	Individual ice crystals or inclusions		V_x
			Ice coatings on particles		V_c
			Random or irregularly oriented ice formations		V_r
			Stratified or distinctly oriented ice formations		V_s
			Uniformly distributed ice		V_u
3. MODIFY SOIL DESCRIPTION BY DESCRIPTION OF SUBSTANTIAL ICE STRATA	Ice greater than 25 mm thick	ICE	Ice with soil inclusions		ICE+soil type
			Ice without soil inclusions		ICE

FROST DESIGN SOIL CLASSIFICATION[1]

FROST GROUP[2]	GENERAL SOIL TYPE	% FINER THAN 0.02 mm BY WEIGHT	TYPICAL USCS SOIL CLASS
NFS[3]	(a) Gravels Crushed stone Crushed rock	0 - 1.5	GW, GP
	(b) Sands	0 - 3	SW, SP
PFS[4] [MOA NFS] [FAA NFS]	(a) Gravels Crushed stone Crushed rock	1.5 - 3	GW, GP
[MOA F-2] [FAA FG-2]	(b) Sands	3 - 10	SW, SP
S1 [MOA F-1] [FAA FG-1]	Gravelly soils	3 - 6	GW, GP, GW-GM, GP-GM, GW-GC, GP-GC
S1 [MOA F-2] [FAA FG-2]	Sandy soils	3 - 6	SW, SP, SW-SM, SP-SM, SW-SC, SP-SC
F1[5] [MOA F-1] [FAA FG-1]	Gravelly soils	6 - 10	GM, GC, GM-GC, GW-GM, GP-GM, GW-GC, GP-GC
F2[5] [MOA F-2] [FAA FG-2]	(a) Gravelly soils	10 - 20	GW, GP, GW-GM, GP-GM, GW-GC, GP-GC
	(b) Sands	6 - 15	SM, SW-SM, SP-SM, SC, SW-SC, SP-SC, SM-SC
F3[5] [MOA F-3] [FAA FG-3]	(a) Gravelly soils	Over 20	GM, GC, GM-GC
	(b) Sands, except very fine silty sands	Over 15	SM, SC, SM-SC
	(c) Clays, PI>12	--	CL, CH
F4[5] [MOA F-4] [FAA FG-4]	(a) Silts	--	ML, MH, ML-CL
	(b) Very fine silty sands	Over 15	SM, SC, SM-SC
	(c) Clays, PI≤12	--	CL, ML-CL
	(d) Varved clays or other fine-grained banded sediments	--	CL or CH layered with ML, MH, ML-CL, SM, SC, or SM-SC

(1) From the U.S. Army Corps of Engineers (USACE), EM 1110-3-138, "Pavement Criteria for Seasonal Frost Conditions", April 1984
(2) USACE frost groups directly correspond to frost groups in Municipality of Anchorage (MOA) Design Criteria Manual (DCM). Federal Aviation Administration (FAA) frost groups come from Table 2-2 in Section 2.5.4 of Advisory Circular (AC) 150/5320-6G, Airport Pavement Design and Evaluation (June, 2021).
(3) Non-frost susceptible
(4) Possibly frost susceptible, requires lab test for void ratio to determine frost design classification.
(5) Consistent with MOA Definition.

ICE BONDING SYMBOLS



DEFINITIONS

Candled Ice is ice which has rotted or otherwise formed into long columnar crystals, very loosely bonded together.

Clear Ice is transparent and contains only a moderate number of air bubbles.

Cloudy Ice is translucent, but essentially sound and non-pervious.

Friable denotes a condition in which material is easily broken up under light to moderate pressure.

Granular Ice is composed of coarse, more or less equidimensional, ice crystals weakly bonded together.

Ice Coatings on particles are discernible layers of ice found on or below the larger soil particles in a frozen soil mass. They are sometimes associated with hoarfrost crystals, which have grown into voids produced by the freezing action.

Ice Crystal is a very small individual ice particle visible in the face of a soil mass. Crystals may be present alone or in a combination with other ice formations.

Ice Lenses are lenticular ice formations in soil occurring essentially parallel to each other, generally normal to the direction of heat loss and commonly in repeated layers.

Ice Segregation is the growth of ice as distinct lenses, layers, veins and masses in soils, commonly but not always oriented normal to direction of heat loss.

Massive Ice is a large mass of ice, typically nearly pure and relatively homogeneous.

Poorly-Bonded signifies that the soil particles are weakly held together by the ice and that the frozen soil consequently has poor resistance to chipping or breaking.

Porous Ice contains numerous void, usually interconnected and usually resulting from melting at air bubbles or along crystal interfaces from presence of salt or other materials in the water, or from the freezing of saturated snow. Though porous, the mass retains its structural unity.

Thaw-Stable frozen soils do not, on thawing, show loss of strength below normal, long-time thawed values nor produce detrimental settlement.

Thaw-Unstable frozen soils show on thawing, significant loss of strength below normal, long-time thawed values and/or significant settlement, as a direct result of the melting of the excess ice in the soil.

Well-Bonded signifies that the soil particles are strongly held together by the ice and that the frozen soil possesses relatively high resistance to chipping or breaking.

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LEGEND: FROZEN SOIL CLASSIFICATION

FILE NAME: M:\Engineering_References\Tech_Geotechnical\CRW Geotechnical Report Template\Borehole Log Legend\Geotech Borehole Legends.dwg

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Anchorage, Alaska 99503
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BOREHOLE BH-01

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING 5.00 ft
LOGGED BY DSN **CHECKED BY** AFS/SMH
AT END OF DRILLING 5.35 ft
NOTES
AFTER DRILLING 4.35 ft

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS	▲ FIELD N VALUE ▲ 10 20 30 40 / PL MC LL 10 20 30 40
0	AC		ASPHALT CONCRETE, (AC)								
			POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) 44% gravel, 45% sand, 11% fines Brown/gray, moist. Subangular to subrounded gravel up to 3 inches. Frost class F2 (hydrometer).	SS S1	88	8-11-14-13 (25)			0.9	MA	
	SP-SM		38% gravel, 56% sand, 6% fines Frost class F2 (estimated).	SS S2	63	7-9-6-5 (15)			1.2	LMA	
5											
	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND, (GP-GM) 51% gravel, 42% sand, 7% fines Brown, wet. Subangular gravel up to 2 inches. Frost class F1 (estimated).	SS S3A	75	4-7-7-5 (14)			1.5	SA	
	ML		SILT WITH GRAVEL, (ML) 20% gravel, 0% sand, 80% fines Gray, moist. Subangular gravel up to 1 inch. Frost class F4 (estimated).	SS S3B					1.9		
	SM		SILTY SAND, (SM) 7% gravel, 63% sand, 30% fines Gray, wet. Fine sand. Frost class F3 (estimated).	SS S4	88	1-5-7-6 (12)			1	LMA	
10				SS S5A					1.8		
	ML		SILT, (ML) 0% gravel, 5% sand, 95% fines Gray, wet.	SS S5B	75	1-6-6-8 (12)			0.9		
15											
	ML		GRAVELLY SILT, (ML) 30% gravel, 0% sand, 70% fines Gray, wet. Subrounded gravel up to 1.5 inches.	SS S6	100	17-50/5"			1		>>▲

Bottom of borehole at 16.0 feet.

Notes:
Completed as piezometer, 1" Sch40 PVC, glued slip connections, hand-slotted screen 4-16 ft BGS. Backfilled with cuttings. Steel flushmount monument with 1/2" bolts. Cold patched.

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BOREHOLE BH-02

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING 3.50 ft
LOGGED BY AFS **CHECKED BY** AFS/SMH
AT END OF DRILLING
NOTES
AFTER DRILLING

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS
0	AC		ASPHALT CONCRETE, (AC)							
	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND, (GP-GM) 48% gravel, 40% sand, 12% fines. Brown, moist to wet. Subangular to rounded gravel up to 2.5 inches with cobbles up to 4-5 inches (5% by volume). Frost class F1 (hydrometer).	SS S1	92	11-17-14-9 (31)			2.2	MA
	GP-GM		(GP-GM) 52% gravel, 38% sand, 10% fines. Frost class F1 (estimated).	SS S2	63	3-6-4-5 (10)			2.4	LMA
5	GP		POORLY GRADED GRAVEL WITH SAND, (GP) 65% gravel, 30% sand, 5% fines. Brown, moist to wet. Angular to subrounded gravel up to 2.5 inches. Frost class NFS (estimated).	SS S3	63	5-9-8-7 (17)			2.7	
	SMg		SILTY SAND WITH GRAVEL, (SMg) 28% gravel, 57% sand, 15% fines. Dark gray to brown, moist to wet. Medium to coarse sand, subangular to subrounded gravel up to 1.5 inches. Frost class F2 (estimated).	SS S4	17	4-4-4-4 (8)			2.7	SA
10	ML		SILT WITH SAND, (ML) 12% gravel, 18% sand, 70% fines. Gray, wet. Subrounded gravel up to 1.5 inches.	SS S5A SS S5B	88	1-2-2-2 (4)			2.5 1.4	LMA
15	SP-SM		POORLY GRADED SAND WITH SILT, (SP-SM) 0% gravel, 92% sand, 8% fines. Gray, wet. Fine sand.	SS S6A	100	7-14-11-7 (25)			1.3	LMA
	ML		SILT WITH SAND, (ML) 10% gravel, 10% sand, 80% fines. Gray, moist. Fine sand, subrounded gravel up to 1.5 inches.	SS S6B					0.4	

Bottom of borehole at 17.0 feet.

Notes:
Backfilled with cuttings and topped with cold patch asphalt.

▲ FIELD N VALUE ▲
10 20 30 40
PL MC LL
10 20 30 40

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BOREHOLE BH-03

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING 3.00 ft
LOGGED BY AFS **CHECKED BY** AFS/SMH
AT END OF DRILLING 3.65 ft
NOTES
AFTER DRILLING 2.33 ft

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS	▲ FIELD N VALUE ▲ 10 20 30 40 / PL MC LL 10 20 30 40
0	GP-GM / ML / PT		POORLY GRADED GRAVEL WITH SILT AND SAND, (GP-GM) 70% gravel, 20% sand, 10% fines Brown, moist. Rounded gravel up to 3.0 inches, one broken cobble 3.5 inches. Frost class F1 (estimated).	SS S1A SS S1B	75	4-2-2-2 (4)			2.9 3.1		164
			ORGANIC SOIL, (ML) Dark brown, moist. Silt with organics. Frost class F4 (estimated).								
	SP-SM		PEAT, (PT) Dark brown, moist.								
			POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) 37% gravel, 53% sand, 10% fines Dark brown, moist. Subrounded to rounded gravel up to 1 inch. Frost class F2 (estimated).	SS S2A SS S2B SS S2C	75	3-4-5-5 (9)			3.2 2.6 2	LMA	
	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND, (GP-GM) 70% gravel, 20% sand, 10% fines Brown, moist to wet. Subrounded to rounded gravel up to 2.5 inches. Frost class F1 (estimated).								
5	SP		POORLY GRADED SAND, (SP) 10% gravel, 86% sand, 4% fines Gray, wet. Medium sand, subrounded gravel up to 1.25 inches. Frost class F2 (estimated).	SS S3	88	3-4-5-5 (9)			4.9	LMA	
	SM		SILTY SAND, (SM) 0% gravel, 61% sand, 39% fines Gray, wet. Fine sand. Frost class F4 (estimated).	SS S4	63	2-6-7-6 (13)			3.2	LMA	
10	CL-ML		SILTY CLAY, (CL-ML) 0% gravel, 5% sand, 95% fines Gray, moist to wet, soft to medium, low to medium plasticity. Interbedded silt and clay below 15 ft BGS. VS (Humboldt) = 1045 psf.	SS S5A SS S5B	88	1-1-3-3 (4)	4167		3.7 3.5	LMA	
15			0% gravel, 10% sand, 90% fines VS (Humboldt) = 1421 psf/42 psf residual.	SS S6A	88	1-1-3-8 (4)	4167		2.2		68
	MLs		SANDY SILT, (MLs) 0% gravel, 46% sand, 54% fines Gray, moist. Fine sand, one rounded piece of gravel 1.25 inches.	SS S6B					3.1	LMA	

Bottom of borehole at 17.0 feet.

Notes:
Completed as piezometer, 1" Sch40 PVC, glued slip connections, hand-slotted screen 2.75-16.75 ft BGS. Backfilled with cuttings. Steel flushmount monument with 1/2" bolts.

CRW Engineering Group, Inc.
3940 Arctic Blvd Ste. 300
Anchorage, Alaska 99503
Telephone: (907) 562-3252

BOREHOLE BH-04

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING
LOGGED BY AFS **CHECKED BY** AFS/SMH
AT END OF DRILLING
NOTES
AFTER DRILLING

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS	▲ FIELD N VALUE ▲ 10 20 30 40 / PL MC LL 10 20 30 40
0	AC		ASPHALT CONCRETE, (AC)								
	GP		POORLY GRADED GRAVEL WITH SAND, (GP) 76% gravel, 22% sand, 2% fines Brown, moist. Cobbles up to 4 inches and likely larger (5-10% by volume). Frost class F1 (hydrometer). Split spoon sample considered most representative of grain size distribution and is presented here. Grab sample also analyzed, see lab report for results.	SS S1	75	7-12-11-9 (23)			9.7	MA LMA	▲ ○
				SS S2	0	7-6-4-7 (10)					▲
5	SM		SILTY SAND, (SM) 4% gravel, 55% sand, 41% fines Gray, moist. Angular gravel up to 1 inch. Trace organic laminae in top of sample. Frost class F4 (estimated). VS (Humboldt) = 2047 psf.	SS S3	54	2-1-3-4 (4)			3.5	LMA	▲ ⊙
	CL		LEAN CLAY, (CL) 0% gravel, 5% sand, 95% fines Gray, moist, stiff to medium. Frost class F4 (estimated). VS (Humboldt) = 2340 psf.	SS S4	75	2-2-3-4 (5)	6000		7.9	AL	▲ ⊖
10			VS (Humboldt) = 2507 psf.	SS S5	100	1-2-4-6 (6)	6467		0.8		▲ ⊙
15	MLs		SANDY SILT, (MLs) 0% gravel, 45% sand, 55% fines Gray, moist. Fine sand	SS S6	50	3-4-6-6 (10)			1.6		▲ ⊙

Bottom of borehole at 17.0 feet.

Notes:
Backfilled with cuttings and topped with cold patch asphalt.

CRW Engineering Group, Inc.
3940 Arctic Blvd Ste. 300
Anchorage, Alaska 99503
Telephone: (907) 562-3252

BOREHOLE BH-05

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING 1.00 ft
LOGGED BY AFS **CHECKED BY** AFS/SMH
AT END OF DRILLING 3.05 ft
NOTES
AFTER DRILLING 1.98 ft

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS	▲ FIELD N VALUE ▲ 10 20 30 40 / PL MC LL 10 20 30 40
0	OL		SANDY ORGANIC SOIL, (OL)						0.6		
	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND, (GP-GM) 50% gravel, 40% sand, 10% fines Gray to brown, moist to wet, subrounded to rounded gravel up to 1.25 inches. Frost class F1 (estimated).	SS S1A / SS S1B	63	1-2-2-2 (4)			0.3	LMA	
	SMg		SILTY SAND WITH GRAVEL, (SMg) 15% gravel, 42% sand, 43% fines Gray to red, moist. Rounded gravel up to 0.75 inches. Frost class F4 (estimated).	SS S2	67	2-3-3-5 (6)	8133		0.4		
5	ML		SILT, (ML) 10% gravel, 0% sand, 90% fines Gray, moist, stiff, nonplastic. Rounded gravel up to 1.25 inches. Frost class F4 (estimated). VS (Humboldt) = 2256 psf.								
	CH		FAT CLAY, (CH) 0% gravel, 0% sand, 100% fines Gray, moist, stiff. Frost class F3 (estimated). VS (Humboldt) = 2005 psf.	SS S3	58	1-2-3-4 (5)	7033		0.3		
			VS (Humboldt) = 2381 psf.	SS S4	75	2-2-2-3 (4)	5376		0.2		
10			VS (Humboldt) = 1421 psf.	SS S5	100	2-2-1-1 (3)	3733		0.3	AL	
15									0.3		
	SM		SILTY SAND, (SM) 0% gravel, 64% sand, 36% fines Gray, moist to wet. Fine sand.	SS S6A / SS S6B	67	3-7-9-13 (16)			0.2	LMA	

Bottom of borehole at 17.0 feet.

Notes:
Completed as piezometer, 1" Sch40 PVC, glued slip connections, hand-slotted screen 9.6-14.6 ft BGS. Backfilled with cuttings. Steel flushmount monument with 1/2" bolts.

CRW Engineering Group, Inc.
3940 Arctic Blvd Ste. 300
Anchorage, Alaska 99503
Telephone: (907) 562-3252

BOREHOLE BH-06

CLIENT Municipality of Anchorage
PROJECT NAME Quinhagak Street Reconstruction
PROJECT NUMBER 10155.00
PROJECT LOCATION Quinhagak Street, Anchorage, Alaska
DATE STARTED 5/25/22 **COMPLETED** 5/25/22
GROUND ELEVATION
DRILLING CONTRACTOR Discovery Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow-Stem Auger, autohammer
AT TIME OF DRILLING 10.00 ft
LOGGED BY AFS **CHECKED BY** AFS/SMH
AT END OF DRILLING
NOTES
AFTER DRILLING

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	FIELD BLOW COUNTS (N VALUE)	POCKET PEN. (psf)	ICE BOND	PID (ppm)	OTHER TESTS	▲ FIELD N VALUE ▲ 10 20 30 40 / PL MC LL 10 20 30 40
0	AC		ASPHALT CONCRETE, (AC)								
	GP		POORLY GRADED GRAVEL WITH SAND, (GP) 63% gravel, 32% sand, 5% fines Brown, moist. Subrounded to rounded gravel up to 3 inches, cobbles up to 4.5 inches (10-15% volume). Frost class F1 (estimated).	SS S1	75	6-10-6-4 (16)			0.3	SA	▲ ○
			LEAN CLAY, (CL) 0% gravel, 5% sand, 95% fines Gray, moist, soft. Layers of sand up to 0.125 inches thick observed below 7.5 ft BGS. Frost class F4 (estimated). VS (Humboldt) = 2465 psf.	SS S2	75	2-3-3-3 (6)	7167		0		▲ ○
5	CL		VS (Humboldt) = 794 psf.	SS S3	67	1-1-1-1 (2)	1233		0.1	AL	▲ ○
			VS (Humboldt) = 752 psf.	SS S4A	100	1-1-2-5 (3)			0.1		▲ ○
				SS S4B					0		○
10	SM	▽	SILTY SAND, (SM) 0% gravel, 50% sand, 50% fines Gray, moist to wet. Fine sand. Frost class F4 (estimated). 0% gravel, 72% sand, 28% fines	SS S5	88	6-6-7-6 (13)			0	LMA	▲ ○
15	ML		SILT WITH SAND, (ML) 0% gravel, 17% sand, 83% fines Gray, moist.	SS S6	63	2-4-9-9 (13)			0.1	LMA	○ ▲

Bottom of borehole at 17.0 feet.

Notes:
Backfilled with cuttings and topped with cold patch asphalt.

Appendix B

Laboratory Results

Included in this section:

1) Laboratory Results from Alaska Testlab

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1312
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1312-S01	22-1312-S02	22-1312-S03	22-1312-S04
Client Sample ID	BH-01 Sa1	BH-01 Sa2	BH-01 Sa3A	BH-01 Sa3B
Date Sampled				

Particle Size Distribution

Method:
ASTM D 422

Description:
Analysis of Particle Size Distribution in Soils. Sieving for Particles >75µm, Hydrometer

Drying By:

Washed:
Sample Washed

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	100	
1in	96	
¾in	82	
½in	74	
3/8in	68	
No.4	56	
No.10	41	
No.20	33	
No.40	24	
No.60	17	
No.100	14	
No.200	11	
Finer No.200 (75µm)	15.0	

Other Test Results

Description	Method	Results				Limits
Dispersion device	ASTM D 422	Dispersant by hand				
Dispersion time (min)						
Shape						
Hardness						
Water Content (%)	ASTM D2216	4	4	10	10	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487	SP-SM		GP-GM		
Group Name		Poorly graded sand with silt and gravel		Poorly graded gravel with silt and sand		
Atterberg Limits Estimated		Yes		Yes		
Gravel (%)		44		51		
Sand (%)		45		42		
Fines (%)		11		7		
Tested By	ASTM D2487	John Platt		Frank Walters		
Percent Gravel	LMA (Internal Method)		38			
Percent Sand			56			
Percent Fines (Silt/Clay)			6			
Group Symbol			SP-SM			
Group Name			Poorly graded sand with silt and gravel			
Tested By			Frank Walters			

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
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info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1312
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1312-S01	22-1312-S02	22-1312-S03	22-1312-S04
Client Sample ID	BH-01 Sa1	BH-01 Sa2	BH-01 Sa3A	BH-01 Sa3B
Date Sampled				

Other Test Results

Description	Method	Results	Limits
Method	ASTM D6913	A	
Preparation Method		Oven Dry	
Composite Sieving?		Yes	
Separating Sieve(s)		No. 4	
Cu	ASTM D2487	35.20	
Cc		4.36	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

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4040 B Street, Suite 102
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Material Test Report

Report No: ASM:22-1312
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1312-S05	22-1312-S06	22-1312-S07	22-1312-S08
Client Sample ID	BH-01 Sa4	BH-01 Sa5A	BH-01 Sa5B	BH-01 Sa6
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	22	20	23	8	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)	7				
Percent Sand		63				
Percent Fines (Silt/Clay)		30				
Group Symbol		SM				
Group Name		Silty sand				
Tested By		Frank Walters				

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1312-S01
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1312-S01
Client Sample ID	BH-01 Sa1
Specification	Sieve SOILS

Other Test Results

Description	Method	Result	Limits
	ASTM D 422		
Dispersion device		Dispersant by hand	
Dispersion time (min)			
Shape			
Hardness			
Water Content (%)	ASTM D2216	4	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	SP-SM	
Group Name		Poorly graded sand with silt and gravel	
Atterberg Limits Estimated		Yes	
Gravel (%)		44	
Sand (%)		45	
Fines (%)		11	
Tested By	ASTM D2487	John Platt	
Date Tested		6/9/2022	

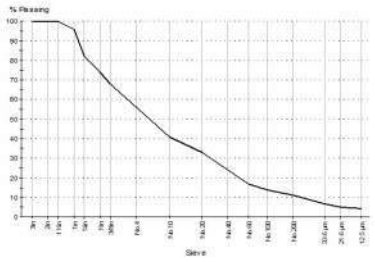
Particle Size Distribution

Method: ASTM D 422

Date Tested: 6/9/2022
Tested By: John Platt

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	100	
1in	96	
¾in	82	
½in	74	
3/8in	68	
No.4	56	
No.10	41	
No.20	33	
No.40	24	
No.60	17	
No.100	14	
No.200	11	
Finer No.200 (75µm)	15.0	
33.6 µm	6.6	
21.6 µm	5.0	
12.5 µm	4.4	

Chart



Comments

Soil Classification of Fines (-#200) in Sieve Analyses Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1312-S03
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID 22-1312-S03
Client Sample ID BH-01 Sa3A

Other Test Results

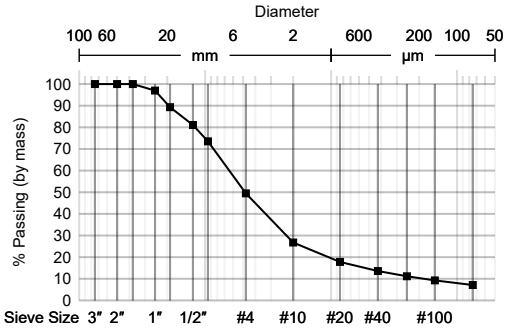
Description	Method	Result	Limits
Water Content (%)	ASTM D2216	10	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	GP-GM	
Group Name		Poorly graded gravel with silt and sand	
Atterberg Limits Estimated		Yes	
Gravel (%)		51	
Sand (%)		42	
Fines (%)		7	
	ASTM D2487		
Tested By		Frank Walters	
Date Tested		6/3/2022	
Method	ASTM D6913	A	
Preparation Method		Oven Dry	
Composite Sieving?		Yes	
Separating Sieve(s)		No. 4	
Cu	ASTM D2487	35.20	
Cc		4.36	
Date Tested		6/3/2022	

Particle Size Distribution

Method: ASTM D6913
Drying By: Oven
Date Tested: 6/3/2022
Tested By: Frank Walters

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	100	
1in	97	
¾in	89	
½in	81	
3/8in	74	
No.4	49.5	
No.10	27	
No.20	18	
No.40	14	
No.60	11	
No.100	9	
No.200	7	

Chart



Comments

Sample Size Does Not Meet ASTM Requirements
Soil Classification of Fines (-#200) in Sieve Analyses Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
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Material Test Report

Report No: ASM:22-1313
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1313-S01	22-1313-S02	22-1313-S03	22-1313-S04
Client Sample ID	BH-02 Sa1	BH-02 Sa2	BH-02 Sa3	BH-02 Sa4
Date Sampled				

Particle Size Distribution

Method:
ASTM D 422

Description:
Analysis of Particle Size Distribution in Soils. Sieving for Particles >75µm, Hydrometer

Drying By:

Washed:
Sample Washed

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	98	
1in	94	
¾in	88	
½in	76	
3/8in	69	
No.4	52	
No.10	36	
No.20	28	
No.40	20	
No.60	17	
No.100	14	
No.200	12	
Finer No.200 (75µm)	15.6	

Other Test Results

Description	Method	Results				Limits
Dispersion device	ASTM D 422	Dispersant by hand				
Dispersion time (min)						
Shape						
Hardness						
Water Content (%)	ASTM D2216	3	5	6	9	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487	GP-GM			SM	
Group Name		Poorly graded gravel with silt and sand			Silty sand with gravel	
Atterberg Limits Estimated		Yes			Yes	
Gravel (%)		48			28	
Sand (%)		40			57	
Fines (%)		12			15	
Tested By	ASTM D2487	Quinton Goodman			Frank Walters	
Percent Gravel	LMA (Internal Method)		52			
Percent Sand			38			
Percent Fines (Silt/Clay)			10			
Group Symbol			GP-GM			
Group Name			Poorly graded gravel with silt and sand			
Tested By			Frank Walters			

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
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info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1313
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1313-S01	22-1313-S02	22-1313-S03	22-1313-S04
Client Sample ID	BH-02 Sa1	BH-02 Sa2	BH-02 Sa3	BH-02 Sa4
Date Sampled				

Other Test Results

Description	Method	Results	Limits
Method	ASTM D6913	A	
Preparation Method		Oven Dry	
Composite Sieving?		Yes	
Separating Sieve(s)		No. 4	
Cu	ASTM D2487		
Cc			

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1313
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1313-S05	22-1313-S06	22-1313-S07	22-1313-S08
Client Sample ID	BH-02 Sa5A	BH-02 Sa5B	BH-02 Sa6A	BH-02 Sa6B
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	11	9	25	22	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)		12	0		
Percent Sand			18	92		
Percent Fines (Silt/Clay)			70	8		
Group Symbol			ML	SP-SM		
Group Name			Sandy silt	Poorly graded sand with silt		
Tested By			Frank Walters	Frank Walters		

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1313-S01
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1313-S01
Client Sample ID	BH-02 Sa1
Specification	Sieve SOILS

Other Test Results

Description	Method	Result	Limits
	ASTM D 422		
Dispersion device	Dispersant by hand		
Dispersion time (min)			
Shape			
Hardness			
Water Content (%)	ASTM D2216	3	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	GP-GM	
Group Name	Poorly graded gravel with silt and sand		
Atterberg Limits Estimated		Yes	
Gravel (%)		48	
Sand (%)		40	
Fines (%)		12	
	ASTM D2487		
Tested By		Quinton Goodman	
Date Tested		6/9/2022	

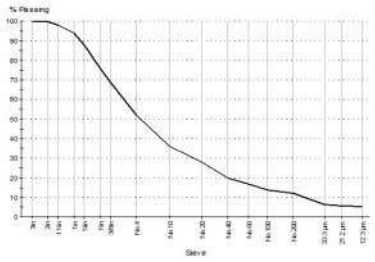
Particle Size Distribution

Method: ASTM D 422

Date Tested: 6/9/2022
Tested By: Quinton Goodman

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	98	
1in	94	
¾in	88	
½in	76	
3/8in	69	
No.4	52	
No.10	36	
No.20	28	
No.40	20	
No.60	17	
No.100	14	
No.200	12	
Finer No.200 (75µm)	15.6	
33.3 µm	6.3	
21.2 µm	5.8	
12.3 µm	5.3	

Chart



Comments

Soil Classification of Fines (-#200) in Sieve Analyses Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1313-S04
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID 22-1313-S04
Client Sample ID BH-02 Sa4

Other Test Results

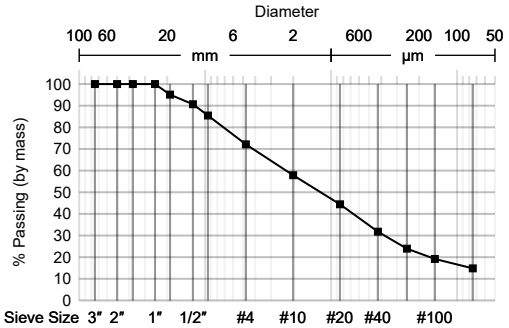
Description	Method	Result	Limits
Water Content (%)	ASTM D2216	9	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	SM	
Group Name		Silty sand with gravel	
Atterberg Limits Estimated		Yes	
Gravel (%)		28	
Sand (%)		57	
Fines (%)		15	
	ASTM D2487		
Tested By		Frank Walters	
Date Tested		6/3/2022	
Method	ASTM D6913	A	
Preparation Method		Oven Dry	
Composite Sieving?		Yes	
Separating Sieve(s)		No. 4	
Cu	ASTM D2487		
Cc			
Date Tested		6/3/2022	

Particle Size Distribution

Method: ASTM D6913
Drying By: Oven
Date Tested: 6/3/2022
Tested By: Frank Walters

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	100	
1in	100	
¾in	95	
½in	91	
3/8in	85	
No.4	72.1	
No.10	58	
No.20	44	
No.40	32	
No.60	24	
No.100	19	
No.200	15	

Chart



Comments

Sample Size Does Not Meet ASTM Requirements
Soil Classification of Fines (-#200) in Sieve Analyses Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1314
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1314-S01	22-1314-S02	22-1314-S03	22-1314-S04
Client Sample ID	BH-03 Sa1A	BH-03 Sa1B	BH-03 Sa2A	BH-03 Sa2B
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	37	164	14	12	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)				37	
Percent Sand					53	
Percent Fines (Silt/Clay)					10	
Group Symbol					SP-SM	
Group Name					Poorly graded sand with silt and gravel	
Tested By					Frank Walters	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1314
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1314-S05	22-1314-S06	22-1314-S07	22-1314-S08
Client Sample ID	BH-03 Sa2C	BH-03 Sa3	BH-03 Sa4	BH-03 Sa5A
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	11	18	22	26	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Cindy Zickefoose	
Percent Gravel	LMA (Internal Method)		10	0		
Percent Sand			86	61		
Percent Fines (Silt/Clay)			4	39		
Group Symbol			SP	SM		
Group Name			Poorly graded sand	Silty sand		
Tested By			Frank Walters	Frank Walters		

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1314
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1314-S09	22-1314-S10	22-1314-S11
Client Sample ID	BH-03 Sa5B	BH-03 Sa6A	BH-03 Sa6B
Date Sampled			

Other Test Results

Description	Method	Results			Limits
Water Content (%)	ASTM D2216	32	68	20	
Date Tested		5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)			0	
Percent Sand				46	
Percent Fines (Silt/Clay)				54	
Group Symbol				ML	
Group Name				Sandy silt	
Tested By				Frank Walters	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

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4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1315
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1315-S01	22-1315-S02	22-1315-S03
Client Sample ID	BH-04 Sa1S	BH-04 Sa1G	BH-04 Sa3
Date Sampled			

Particle Size Distribution

Method:
ASTM D 422

Description:
Analysis of Particle Size Distribution in Soils. Sieving for Particles >75µm, Hydrometer

Drying By:

Washed:
Sample Washed

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	90	
1in	81	
¾in	78	
½in	69	
3/8in	64	
No.4	51	
No.10	35	
No.20	26	
No.40	18	
No.60	13	
No.100	10	
No.200	8.5	
Finer No.200 (75µm)	12.5	

Other Test Results

Description	Method	Results			Limits
Dispersion device	ASTM D 422	Dispersant by hand			
Dispersion time (min)					
Shape					
Hardness					
Water Content (%)	ASTM D2216	5	3	20	
Date Tested		5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487	GP-GM			
Group Name		Poorly graded gravel with silt and sand			
Atterberg Limits Estimated		Yes			
Gravel (%)		49			
Sand (%)		42			
Fines (%)		9			
Tested By	ASTM D2487	Nathan Wilson			
Percent Gravel	LMA (Internal Method)		76	4	
Percent Sand			22	55	
Percent Fines (Silt/Clay)			2	41	
Group Symbol			GP	SM	
Group Name			Poorly graded gravel with sand	Silty sand	
Tested By			Frank Walters	Frank Walters	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1315
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1315-S04	22-1315-S05	22-1315-S06
Client Sample ID	BH-04 Sa4	BH-04 Sa5	BH-04 Sa6
Date Sampled			

Other Test Results

Description	Method	Results			Limits
Water Content (%)	ASTM D2216	30	29	20	
Date Tested		5/28/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487	CL			
Group Name		Lean clay			
Material Proportions Estimated		Yes			
Gravel (%)		0			
Sand (%)		0			
Fines (%)		100			
Tested By	ASTM D2487	Cindy Zickefoose			
Liquid Limit	ASTM D4318	43			
Plastic Limit		23			
Plasticity Index		20			
Preparation Method		Wet			
Oversize Removed By		Hand during mixing on glass plate			
Liquid Limit Apparatus		Mechanical			
Grooving Tool		Plastic			
Rolling		Hand			
Tested By		Cindy Zickefoose			
Date Tested		6/7/2022			

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1315-S01
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1315-S01
Client Sample ID	BH-04 Sa1S
Specification	Sieve SOILS

Other Test Results

Description	Method	Result	Limits
	ASTM D 422		
Dispersion device	Dispersant by hand		
Dispersion time (min)			
Shape			
Hardness			
Water Content (%)	ASTM D2216	5	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	GP-GM	
Group Name	Poorly graded gravel with silt and sand		
Atterberg Limits Estimated		Yes	
Gravel (%)		49	
Sand (%)		42	
Fines (%)		9	
	ASTM D2487		
Tested By		Nathan Wilson	
Date Tested		6/9/2022	

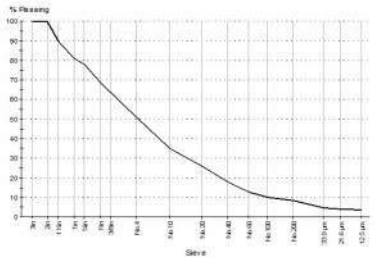
Particle Size Distribution

Method: ASTM D 422

Date Tested: 6/9/2022
Tested By: Nathan Wilson

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	90	
1in	81	
¾in	78	
½in	69	
3/8in	64	
No.4	51	
No.10	35	
No.20	26	
No.40	18	
No.60	13	
No.100	10	
No.200	8.5	
Finer No.200 (75µm)	12.5	
33.9 µm	4.7	
21.6 µm	4.2	
12.5 µm	3.7	

Chart



Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1326
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1326-S01	22-1326-S02	22-1326-S03	22-1326-S04
Client Sample ID	BH-05 Sa1A	BH-05 Sa1B	BH-05 Sa2	BH-05 Sa3
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	11	22	28	28	
Date Tested		5/26/2022	5/26/2022	5/28/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)		15			
Percent Sand			42			
Percent Fines (Silt/Clay)			43			
Group Symbol			SM			
Group Name			Silty sand with gravel			
Tested By			Frank Walters			

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
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info@alaskatestlab.com

Material Test Report

Report No: ASM:22-1326
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1326-S05	22-1326-S06	22-1326-S07	22-1326-S08
Client Sample ID	BH-05 Sa4	BH-05 Sa5	BH-05 Sa6A	BH-05 Sa6B
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	37	43	26	20	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487		CH			
Group Name			Fat clay			
Material Proportions Estimated			Yes			
Gravel (%)			0			
Sand (%)			0			
Fines (%)			100			
Tested By	ASTM D2487		Cindy Zickefoose			
Liquid Limit	ASTM D4318		54			
Plastic Limit			25			
Plasticity Index			29			
Preparation Method			Wet			
Oversize Removed By			Hand during mixing on glass plate			
Liquid Limit Apparatus			Mechanical			
Grooving Tool			Plastic			
Rolling			Hand			
Tested By			Cindy Zickefoose			
Date Tested			6/7/2022			
Percent Gravel	LMA (Internal Method)				0	
Percent Sand					64	
Percent Fines (Silt/Clay)					36	
Group Symbol					SM	
Group Name					Silty sand	
Tested By					Frank Walters	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
Anchorage, AK 99503
Phone: 907-205-1987
Fax: 907-782-4409
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Material Test Report

Report No: ASM:22-1327
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1327-S01	22-1327-S02	22-1327-S03	22-1327-S04
Client Sample ID	BH-06 Sa1	BH-06 Sa2	BH-06 Sa3	BH-06 Sa4A
Date Sampled				

Other Test Results

Description	Method	Results				Limits
Water Content (%)	ASTM D2216	4	27	42	20	
Date Tested		5/26/2022	5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	Karen Jackson	
Group Code	ASTM D2487	GW-GM		CL		
Group Name		Well-graded gravel with silt and sand		Lean clay		
Atterberg Limits Estimated		Yes				
Material Proportions Estimated				Yes		
Gravel (%)		63		0		
Sand (%)		32		0		
Fines (%)		5		100		
Tested By	ASTM D2487	Frank Walters		Cindy Zickefoose		
Method	ASTM D6913	A				
Preparation Method		Oven Dry				
Composite Sieving?		Yes				
Separating Sieve(s)		No. 4				
Cu	ASTM D2487	49.51				
Cc		1.47				
Liquid Limit	ASTM D4318			46		
Plastic Limit				23		
Plasticity Index				23		
Preparation Method				Wet		
Oversize Removed By				Hand during mixing on glass plate		
Liquid Limit Apparatus				Mechanical		
Grooving Tool				Plastic		
Rolling				Hand		
Tested By				Cindy Zickefoose		
Date Tested				6/7/2022		

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
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Material Test Report

Report No: ASM:22-1327
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID	22-1327-S05	22-1327-S06	22-1327-S07
Client Sample ID	BH-06 Sa4B	BH-06 Sa5	BH-06 Sa6
Date Sampled			

Other Test Results

Description	Method	Results			Limits
Water Content (%)	ASTM D2216	22	23	18	
Date Tested		5/26/2022	5/26/2022	5/26/2022	
Tested By		Karen Jackson	Karen Jackson	Karen Jackson	
Percent Gravel	LMA (Internal Method)		0	0	
Percent Sand			72	17	
Percent Fines (Silt/Clay)			28	83	
Group Symbol			SM	ML	
Group Name			Silty sand	Silt with sand	
Tested By			Frank Walters	Frank Walters	

Comments

Soil Classification of Fines (-#200) in LMAs Assumed Unless Verified by Additional Testing

Alaska Testlab - Anchorage
4040 B Street, Suite 102
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Phone: 907-205-1987
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info@alaskatestlab.com

Material Test Report

Report No: MAT:22-1327-S01
Issue No: 1

Client: CRW Engineering Group, LLC
3940 Arctic Blvd., Ste. 300
Anchorage, AK, 99503

Project Code: 220546

CC: CRW
Maria Kampsen

Project: Quinhagak St

10155.00

Reviewed By: Maria E Kampsen
Title: Senior Engineer
Date: 6/10/2022

Sample Details

Sample ID 22-1327-S01
Client Sample ID BH-06 Sa1

Other Test Results

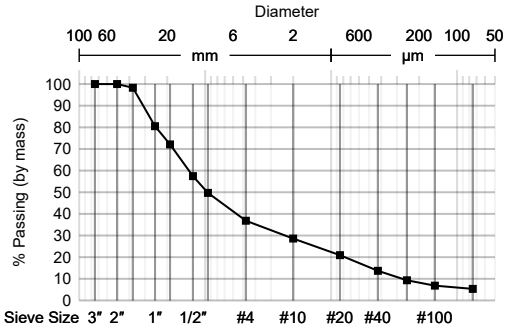
Description	Method	Result	Limits
Water Content (%)	ASTM D2216	4	
Date Tested		5/26/2022	
Tested By		Karen Jackson	
Group Code	ASTM D2487	GW-GM	
Group Name		Well-graded gravel with silt and sand	
Atterberg Limits Estimated		Yes	
Gravel (%)		63	
Sand (%)		32	
Fines (%)		5	
	ASTM D2487		
Tested By		Frank Walters	
Date Tested		6/6/2022	
Method	ASTM D6913	A	
Preparation Method		Oven Dry	
Composite Sieving?		Yes	
Separating Sieve(s)		No. 4	
Cu	ASTM D2487	49.51	
Cc		1.47	
Date Tested		6/6/2022	

Particle Size Distribution

Method: ASTM D6913
Drying By: Oven
Date Tested: 6/6/2022
Tested By: Frank Walters

Sieve Size	% Passing	Limits
3in	100	
2in	100	
1½in	98	
1in	81	
¾in	72	
½in	57	
3/8in	50	
No.4	36.8	
No.10	29	
No.20	21	
No.40	14	
No.60	9	
No.100	7	
No.200	5	

Chart



Comments

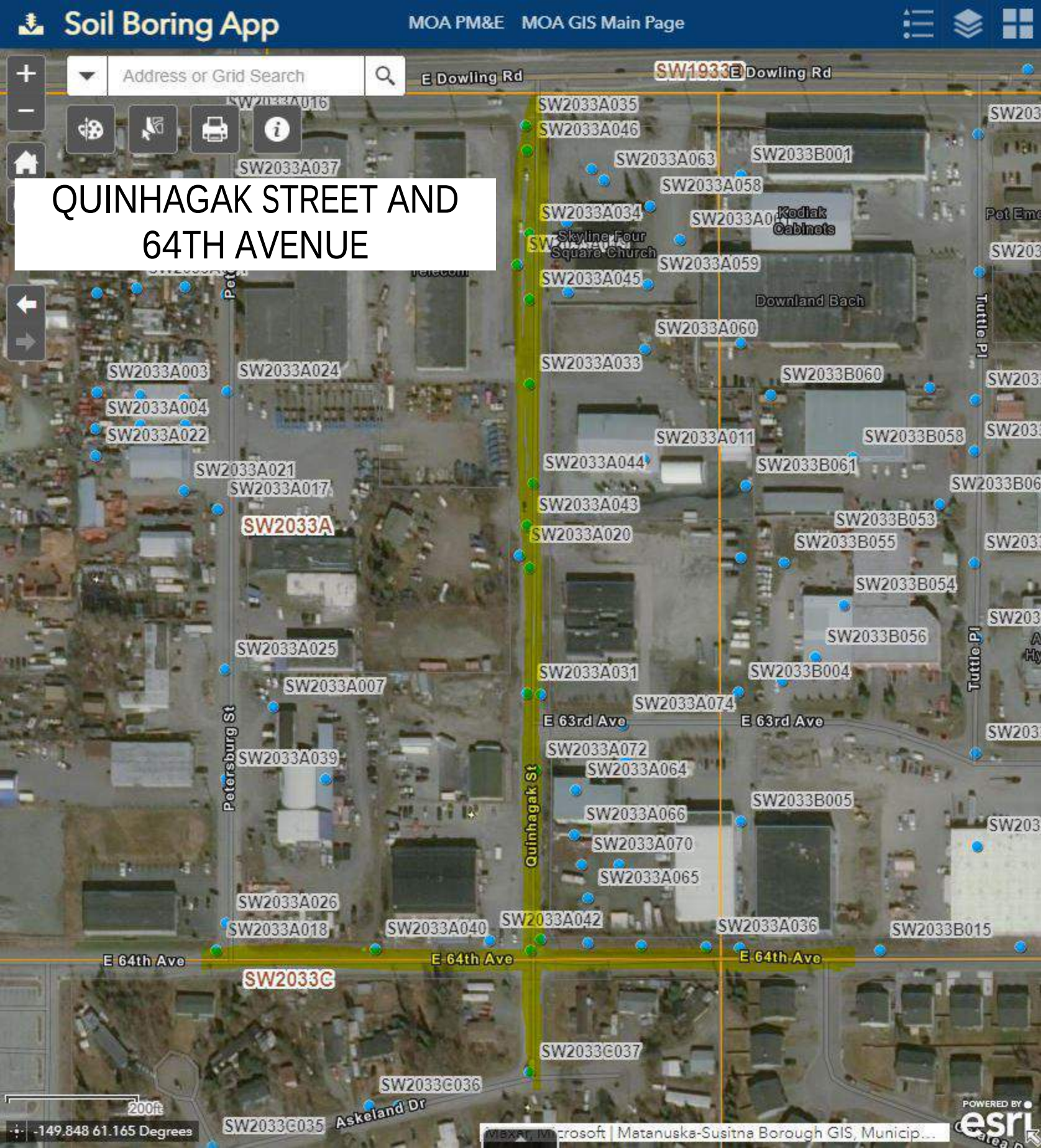
Sample Size Does Not Meet ASTM Requirements
Soil Classification of Fines (-#200) in Sieve Analyses Assumed Unless Verified by Additional Testing
No Plasticity Index Test Performed

Appendix C

Historical Borehole and Test Pit Logs

Included in this section:

1) Historical borehole/test pit logs for Quinhagak Street with map
2) Historical borehole/test pit logs for 64th Avenue with map


Soil Boring App
MOA PM&E
MOA GIS Main Page
Address or Grid Search
QUINHAGAK STREET AND 64TH AVENUE
E Dowling Rd
SW2033A035
SW2033A046
SW2033A063
SW2033B001
SW2033A058
SW2033A034
Kodiak Cabinets
Skyline Four Square Church
SW2033A059
SW2033A045
Downland Bach
SW2033A060
SW2033A033
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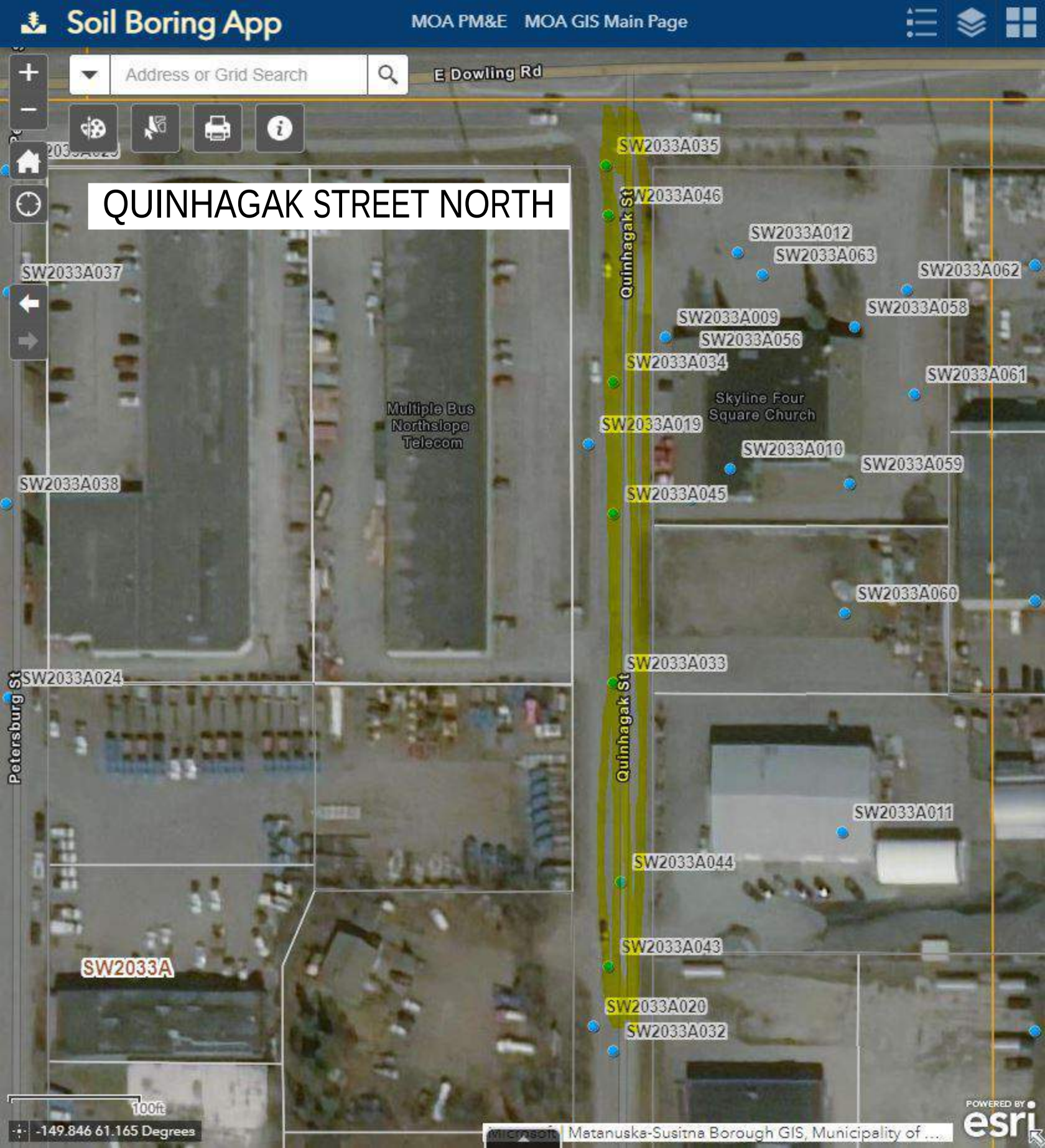
E 63rd Ave
SW2033A072
SW2033A039
SW2033A064
Petersburg St
Quinhagak St
Tuttle Pl
SW2033B005
SW2033A066
SW2033A070
SW2033A065
SW2033A026
SW2033A018
SW2033A040
SW2033A042
SW2033A036
SW2033B015
E 64th Ave
SW2033C
SW2033C037
SW2033C036
SW2033C035
Askeland Dr
200ft
-149.848 61.165 Degrees
Maxar, Microsoft | Matanuska-Susitna Borough GIS, Municip...
POWERED BY esri


Soil Boring App
MOA PM&E
MOA GIS Main Page
Address or Grid Search
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SW2033A012
SW2033A063
SW2033A062
SW2033A037
SW2033A058
SW2033A009
SW2033A056
SW2033A034
SW2033A061
Skyline Four Square Church
Multiple Bus Northslope Telecom
SW2033A019
SW2033A010
SW2033A059
SW2033A038
SW2033A045
SW2033A060
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Petersburg St
Quinhagak St
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SW2033A044
SW2033A043
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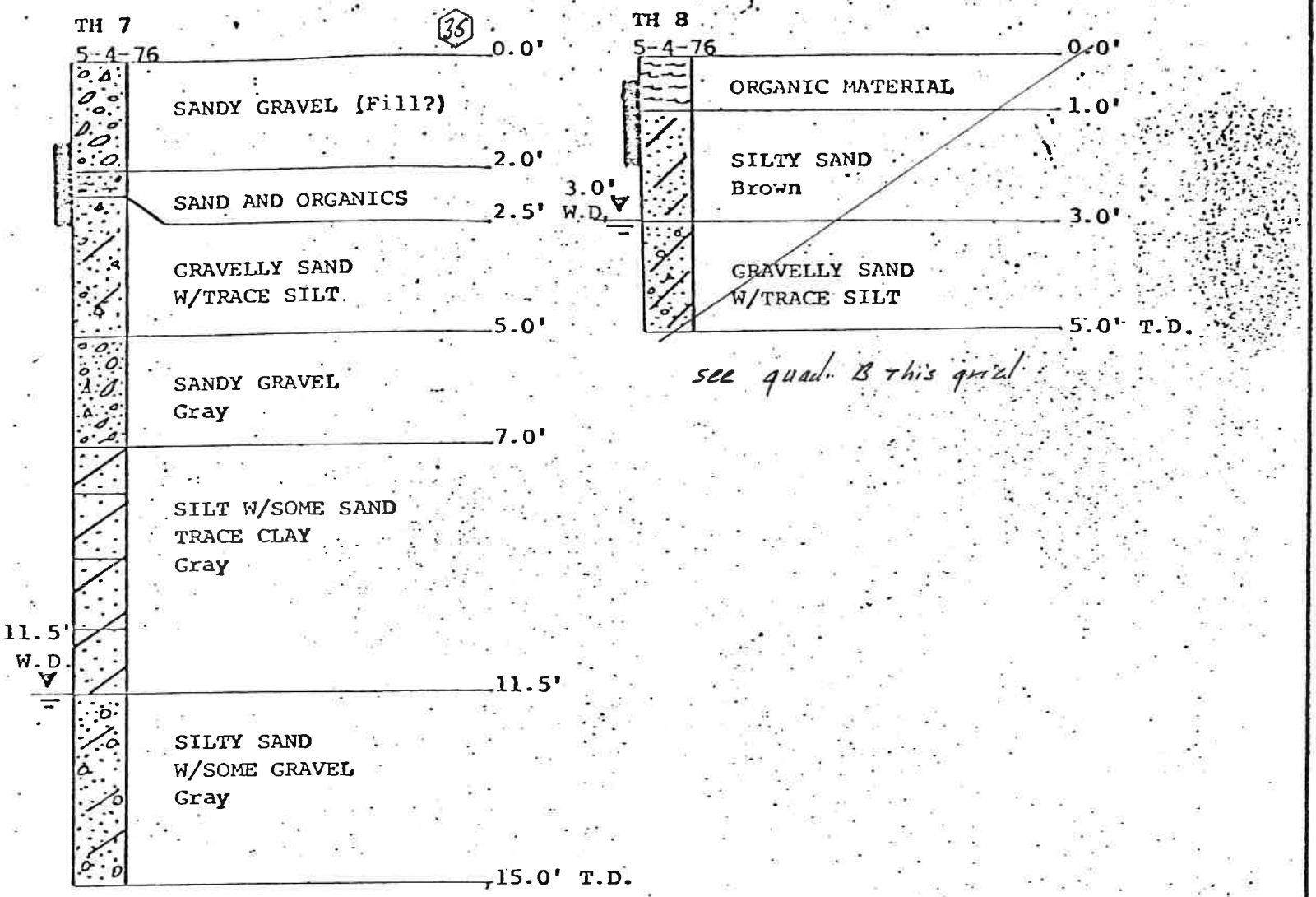
-149.846 61.165 Degrees
Matanuska-Susitna Borough GIS, Municipality of ...
POWERED BY esri



WN: PLA	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
KD: WJL			GRID: 2033
ATE: 5-6-76			PROJ.NO. 651133
CALE: 1"=3'			DWG.NO. 3.06

LOG OF TEST BORING

Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 truck 110
Project No
Project Name
Location Quinhagak St. 70'S. of Dowling
Method Used 6" Solid & Hollow Auger
Field Party Corrinder, Sattler D Geologist Barnwell
Weather Sunny, clear

R & M CONSULTANTS, INC.

Hole No. 10
Sheet 1 of 1 (46)
Total Depth 10 ft.

GROUND WATER TABLE			
W.D = While Drilling			A B = After Boring
Depth in Ft.			
Time	None		
Date			

Location Diagram:

San. No.	Sampling: Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F
1	1				0				D	—	45
					1						
					2						
					3				M	—	—
2	2				4						
					5				W	—	43
					6						
					7						
					8						
					9				W	—	42
					10						
					1						
					2						
					3						
					4						
					5						
					6						
					7						
					8						
					9						
					0						

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.

Vegetation: None.

Collar Elevation

Reference

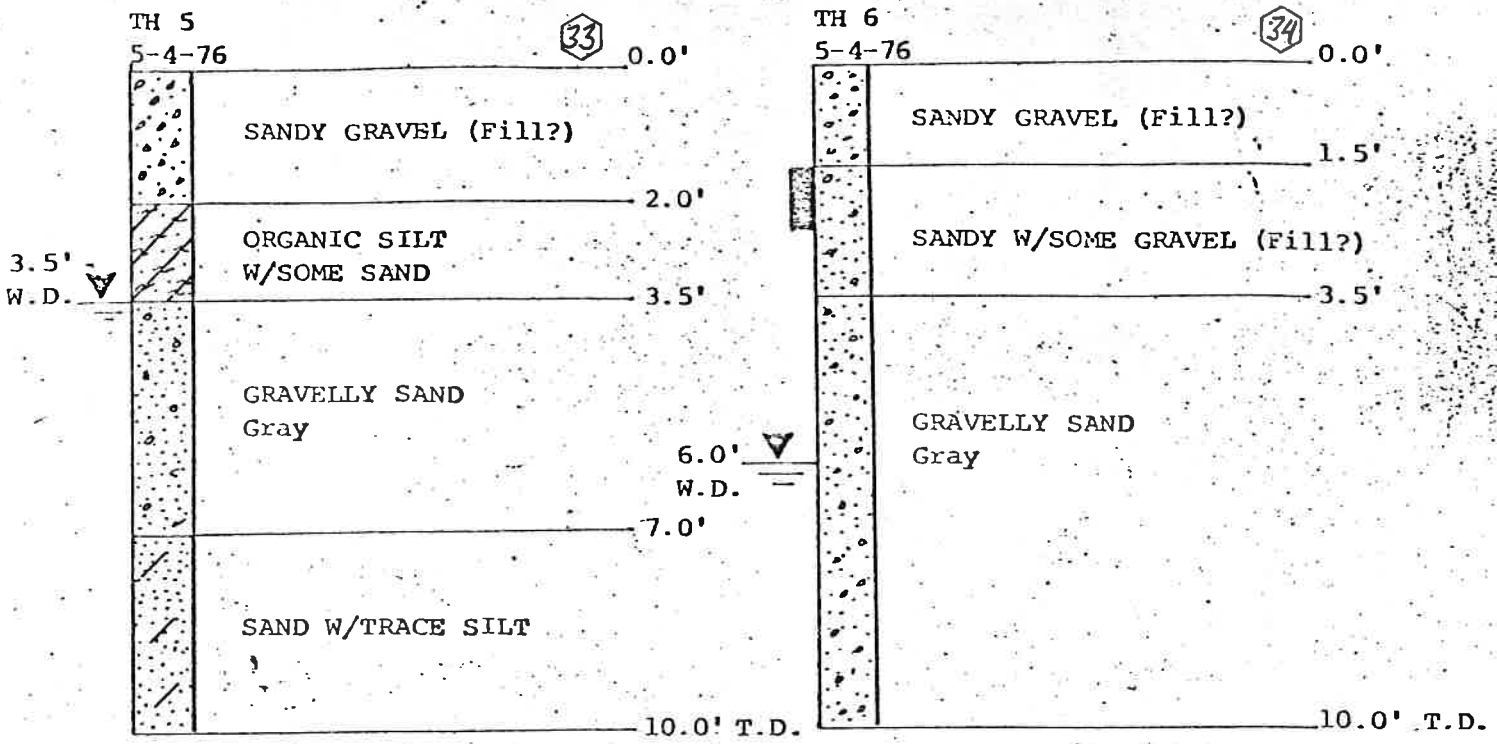
Smpl. 1
0'-5.0'
1 pb - ss

SW Brown, fairly clean well graded sands, gravelly sands.

Smpl. 2
5.0-10.0
1 pb - cb

SP-SC Brown - grey clayey, silty gravelly sands.

Clay content highest 8.5-10.0' good gray color.



DWN: PLA	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 5-6-76			PROJ.NO. 651133
SCALE: 1"=3'			DWG.NO. B-05

Test Hole #9 Table A WO #A18638
Logged By: O.M. Hatch
Date: Sept. 28, 1978

(19)

Depth in Feet

From	To	Soil Description
0.0'	3.0'	F-2, brown Silty Gravelly Sand, SM, damp, medium density, particles to 6".
3.0'	8.0'	F-4, brown to grey Sandy Silt, ML with Silty Sand, SM, layering, damp to saturated, stiff, particles to 2", Group E.
8.0'	14.0'	F-2, grey Silty Sand, SM, with clayey silt lenses, saturated, medium density, Group B.
14.0'	16.5'	F-1/F-3, grey very Silty Sandy Gravel, GM, damp, medium to high density, damp, particles to 2", Group C.

Bottom of Test Hole: 16.5'

Frost Line: None Observed

Free Water Level: While Drilling 5.0'

Sample	Depth	Blows/6"	M%	Type of Sample	Dry Strength	Group	Unified	Temp °F
1	5.0'- 7.0'	12/12/17/22	18.6	SP	H	E	SM/ML	51
2	10.0'-12.0'	16/17/18/19	20.1	SP	N-L	B	CL/ML	50
3	15.0'-16.5'	23/56/54	9.4	SP	L	C	GM	

Remarks:
1. Type of Sample, G=Grab, SP = Standard Penetration, U = Undisturbed.
2. Dry Strength, N=None, L=Low, M=Medium, H=High.
3. Group refers to similar material, this study only.
4. General Information, see Sheet 1.
5. Frost and Textural Classification, see Sheet 2.
6. Unified Classification, see Sheet 3.

LOG OF TEST BORING

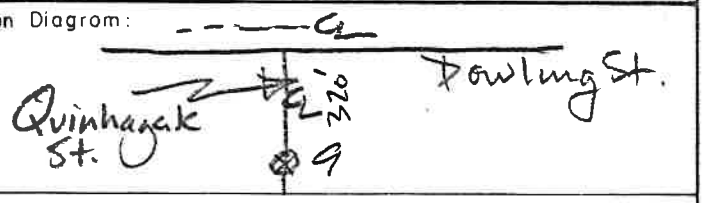
Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 Truck 110
Project No
Project Name
Locotian Quinhagak St. 320' South of ℄ on Dowling
Method Used 6" Solid Flite Auger
Field Party Grinder, Sattler Gealagist Burnwell
Weather Sunny

R & M CONSULTANTS, INC.

Hole No. 9
Sheet 1 of 1 (45)
Total Depth 10'

GROUND WATER TABLE			
W.D = While Drilling		A.B. = After Boring	
Depth in Ft.	None		
Time			
Date			

Location Diagram:



Sampling: Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T. °F
H 1				0				D		45
				1						
				2						
				3						
				4						
H 2				5				W		40
				6						
				7						
				8						
				9						
				0						
				1						
				2						
				3						
				4						
				5						
				6						
				7						
				8						
				9						
				0						

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving rates, depths circulation lost, rates on drilling ease, bits used, etc.

Vegetation: None

Collar Elevation

Reference

Smpl. 1
0-0' - 5.0'
1pb-cb

GM

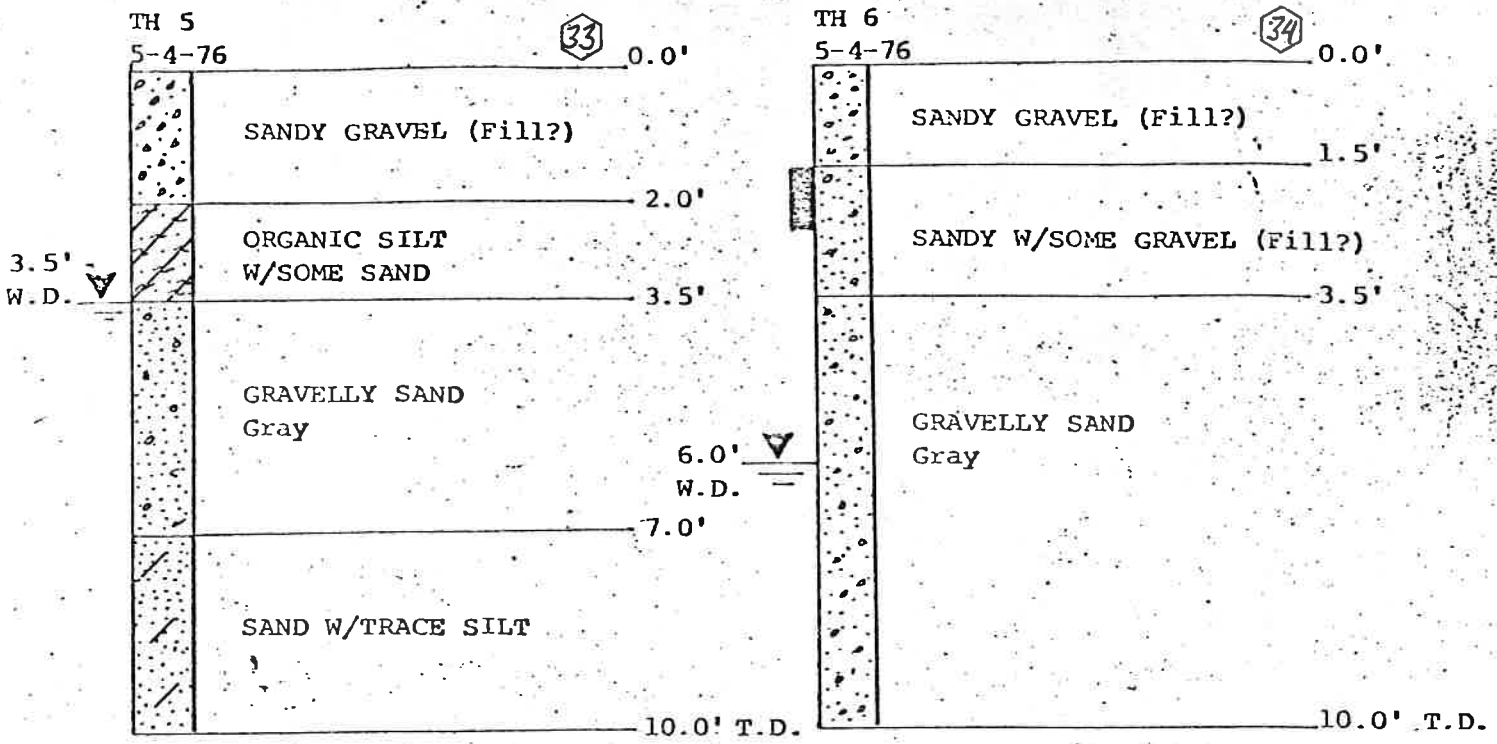
Brown poorly graded sandy gravel w/ some silt & subangular pebbles.

Smpl. 2
5.0 - 10.0
1pb-cb

Brown to grey silty clayey gravel. Clay content increases btwn. 7.5-10.0 ft.

GM-GC

END



DWN: PLA	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 5-6-76			PROJ.NO. 651133
SCALE: 1"=3'			DWG.NO. B-05

LOG OF TEST BORING

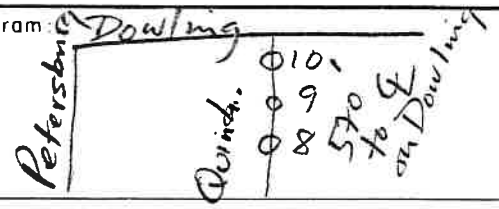
Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 Truck 110
Project No
Project Name
Location Quinhagak St.
Method Used 6" Solid Flite Auger
Field Party Grinder, Sattler
Weather Sunny clear
Geologist Bannwell

R & M CONSULTANTS, INC.

Hole No. 8
Sheet 1 of 1 (44)
Total Depth 10'

GROUND WATER TABLE			
W.D = While Drilling		A B.= After Boring	
Depth in Ft.			
Time	none		
Date			

Location Diagram: Dowling



Sampling: Met. / Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F
H1				0				D	-	45
2				5				W	-	45
				10			END			

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.

Vegetation: None

Collar Elevation

Reference

Smpl. 1
0+0' - 5.0'
pb - cb

Brown-grey silty clay w/ trace gravel.

CL

Smpl. 2
5.0 - 10.0'
pb - cb

Brown grey silty clay w/ some gravel, trace organics btwn. 5.0 - 7.5 ft.

CL

END

LOG OF TEST BORING

R & M CONSULTANTS, INC.

Date Begun 6-25-81
Date Completed 6-25-81
Rig No CME 55 Truck 110
Project No
Project Name
Location Quinhagak St.
Method Used 6" Solid Flite Auger
Field Party Grinds, Sattler
Geologist Bannwell
Weather Sunny

Hole No. 7
Sheet 1 of 1 (43)
Total Depth 10'

GROUND WATER TABLE			
W.D = While Drilling		A.B. = After Boring	
Depth in Ft.			
Time	None		
Date			

Location Diagram: N, Quinhagak St., Dowling, 7

Sampling: Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F
1				0				M	—	40
2				5				VM	—	—
				10						

DESCRIPTION: Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling eose, bits used, etc.

Vegetation: Grasses, horsetail

Collar Elevation

Reference

Smpl. 1
0-0' - 5.0'
1pb-cb

OL Grey-brown clay w/ some silt and organics. clumps of peat, wood.

Smpl. 2
5.0 - 10.0'
1pb - cb

CL-CH Grey clay w/ trace amounts of fine size gravel.

END

Test Hole #8 Table A WO #A18638
Logged By: O.M. Hatch
Date: Sept. 29, 1978

Depth in Feet

From	To	Soil Description
0.0'	3.0'	Brown Peat, Pt, damp, soft.
3.0'	13.0'	NFS/F-4, grey Gravelly Sand, SP, with Sandy Silt, ML, layering, saturated, particles to 2".
13.0'	16.5'	F-4, grey Clayey Silt, CL/ML, damp, stiff, PL+, Group D.

Bottom of Test Hole: 16.5'

Frost Line: None Observed

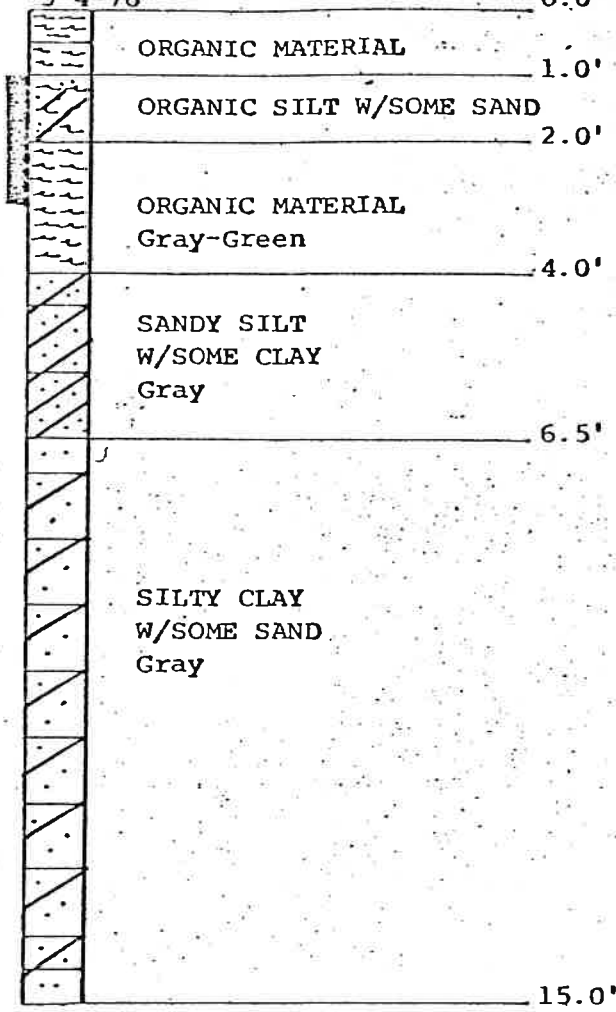
Free Water Level: While Drilling 4.0'
After 3 Days 2.0'

Sample	Depth	Blows/6"	M%	Type of Sample	Dry Strength	Group	Unified	Temp °F
1	5.0'- 6.5'	5/9/16	17.2	SP	L	-	SP/ML	42
2	10.0'-11.5'	28/31/11	15.0	SP	N	-	SP/ML	42
3	15.0'-16.5'	5/7/6	41.0	SP	M	D	CL/ML	42

Remarks:
1. Type of Sample, G=Grab, SP = Standard Penetration, U = Undisturbed.
2. Dry Strength, N=None, L=Low, M=Medium, H=High.
3. Group refers to similar material, this study only.
4. General Information, see Sheet 1.
5. Frost and Textural Classification, see Sheet 2.
6. Unified Classification, see Sheet 3.

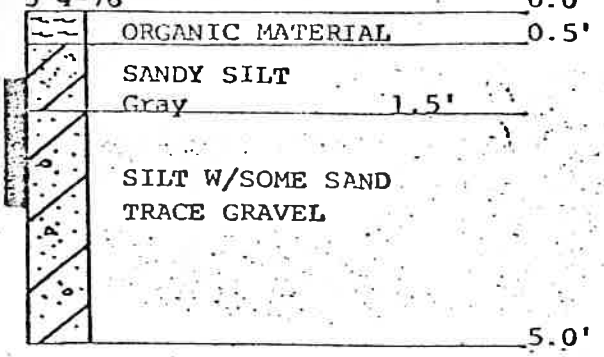
TH 3 (31)

5-4-76

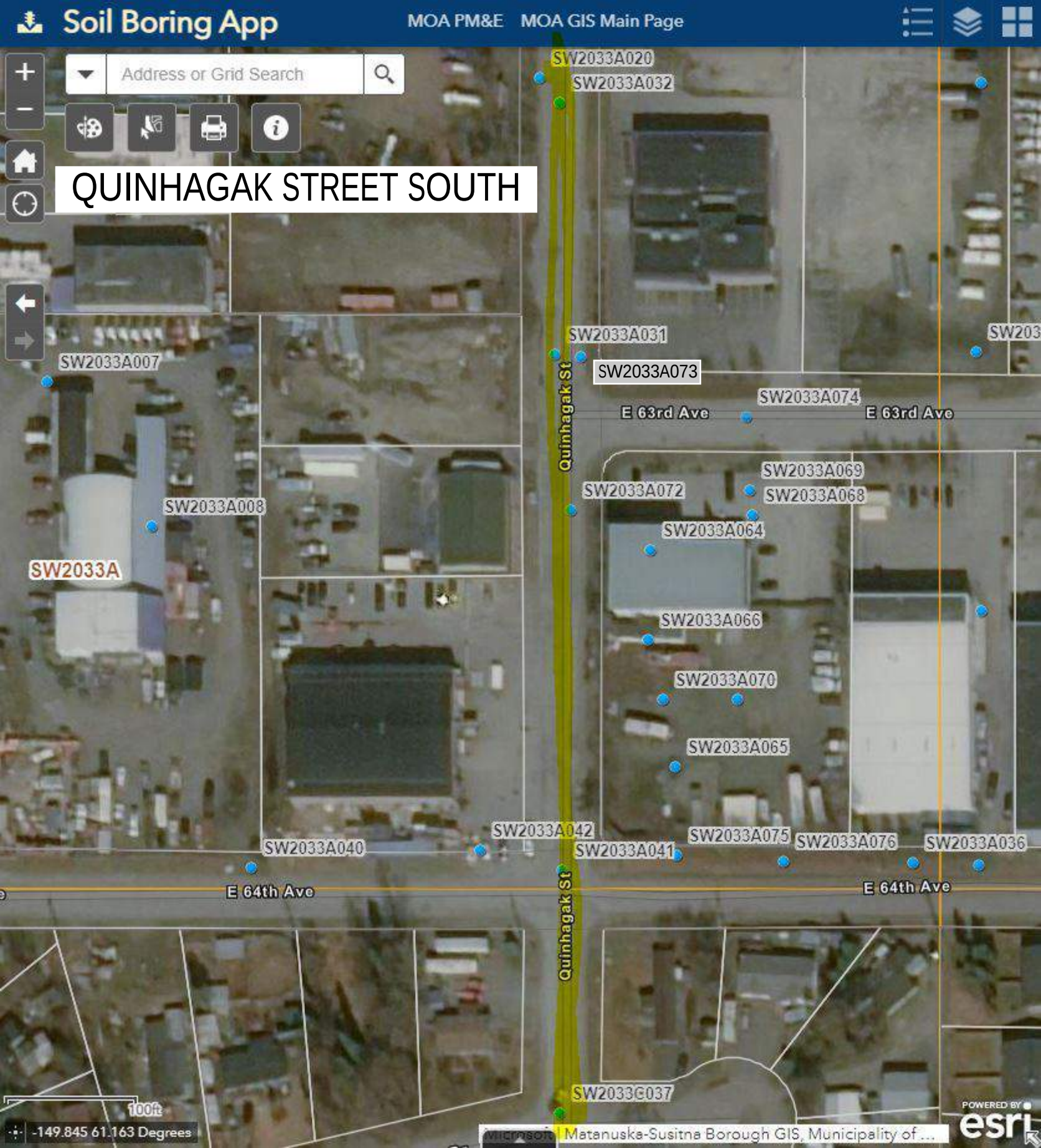


TH 4 (32)

5-4-76

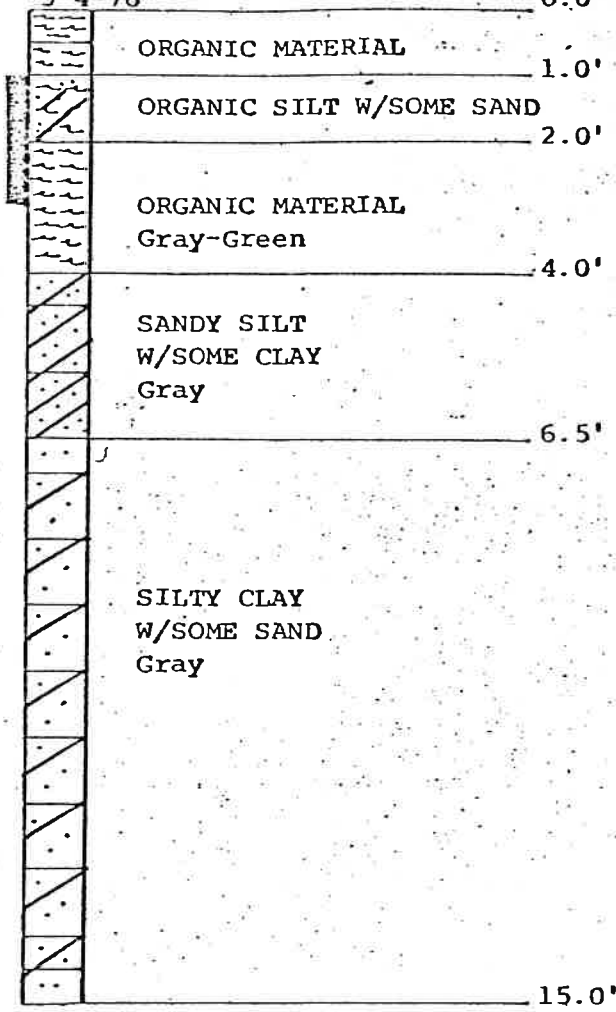


DWN: PLA	R&M CONSULTANTS, INC.	Log of Test Hole George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 5-6-76			PROJ.NO. 651133
SCALE: 1"=3'			DWG.NO. B-04


Soil Boring App
MOA PM&E
MOA GIS Main Page
Address or Grid Search
QUINHAGAK STREET SOUTH
SW2033A020
SW2033A032
SW2033A031
SW2033A007
SW2033A073
SW2033A074
E 63rd Ave
E 63rd Ave
Quinhagak St
SW2033A069
SW2033A072
SW2033A068
SW2033A008
SW2033A064
SW2033A
SW2033A066
SW2033A070
SW2033A065
SW2033A042
SW2033A040
SW2033A041
SW2033A075
SW2033A076
SW2033A036
E 64th Ave
E 64th Ave
Quinhagak St
SW2033C037
100ft
-149.845 61.163 Degrees
Matanuska-Susitna Borough GIS, Municipality of ...
POWERED BY esri

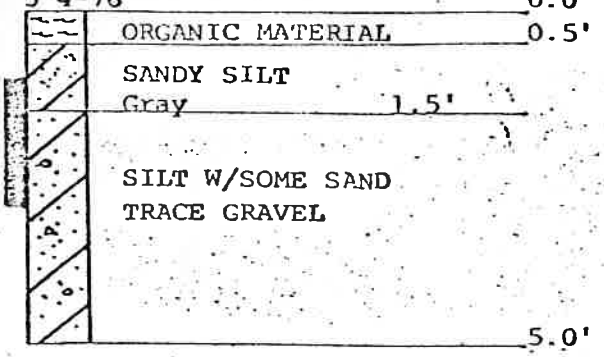
TH 3 (31)

5-4-76



TH 4 (32)

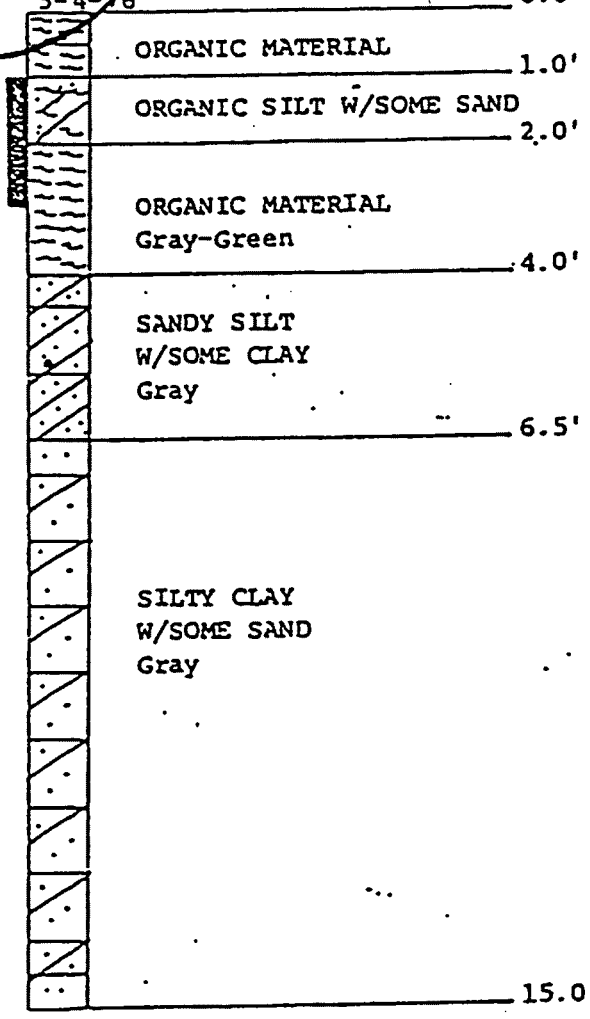
5-4-76



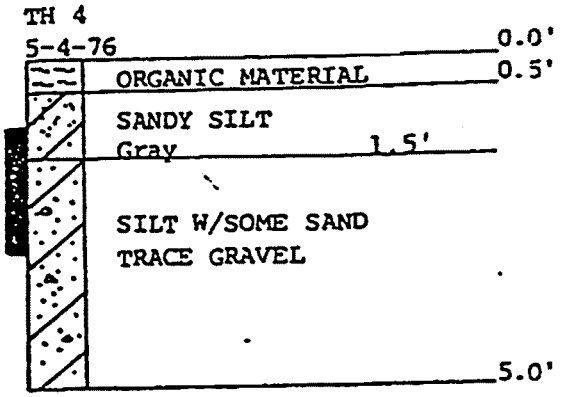
DWN: PLA	R&M CONSULTANTS, INC.	Log of Test Hole George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 5-6-76			PROJ.NO. 651133
SCALE: 1"=3'			DWG.NO. B-04

73

TH 3
5-4-76

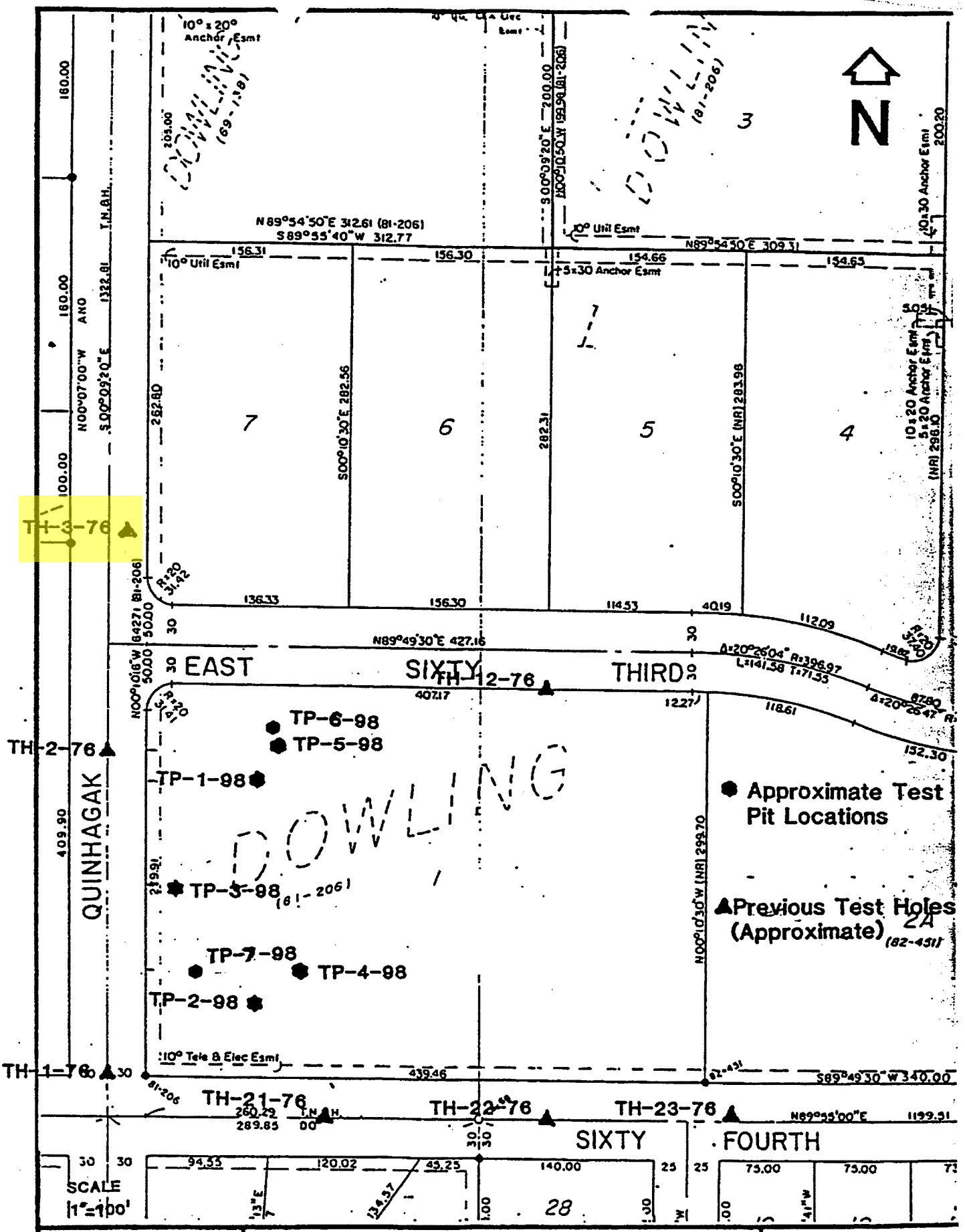


TH 4
5-4-76



DWN: PLA		Log of Test Hole George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 5-6-76			PROJ.NO. 651133
			DWG.NO. B-04

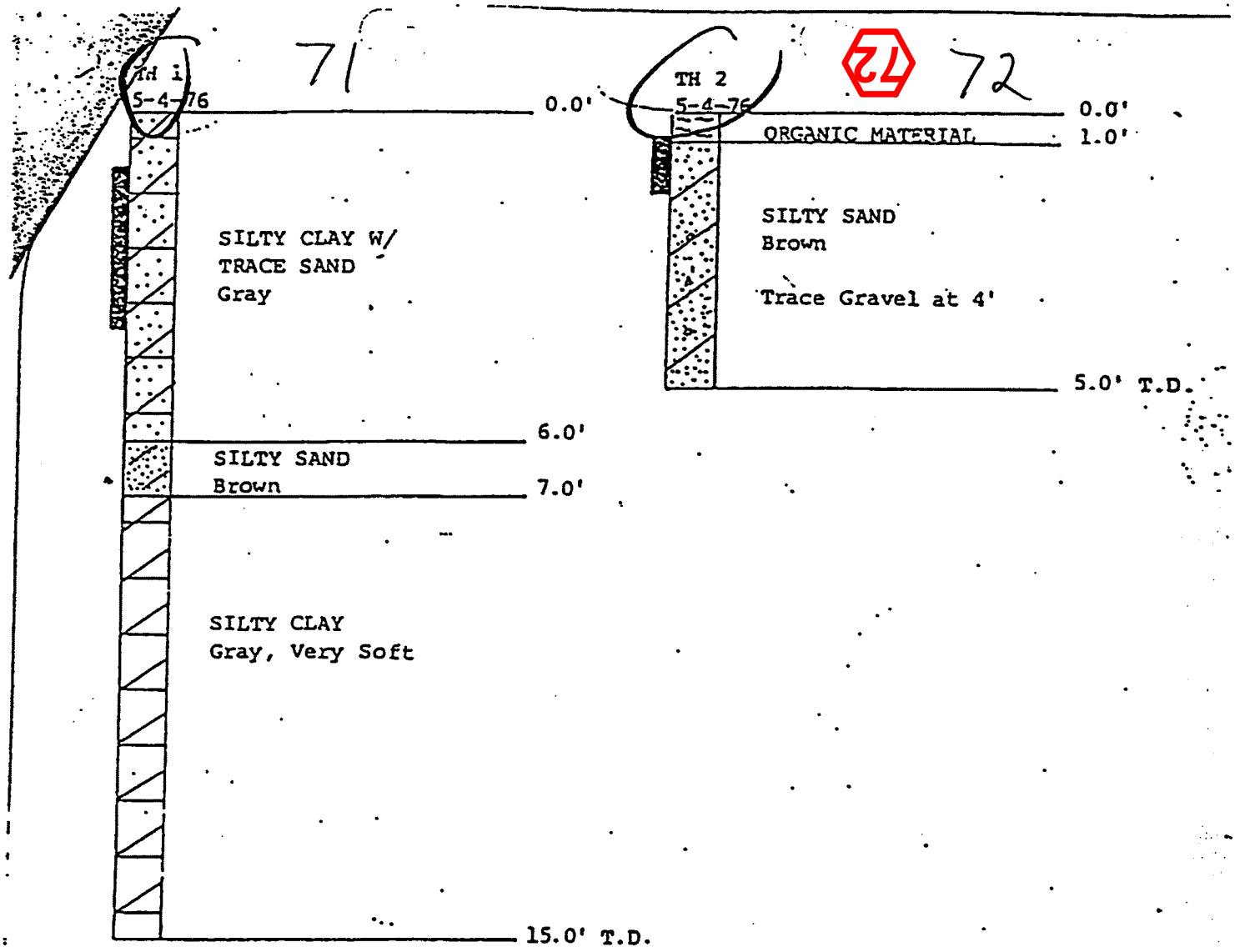
2033A #64-78



DOWL ENGINEERS

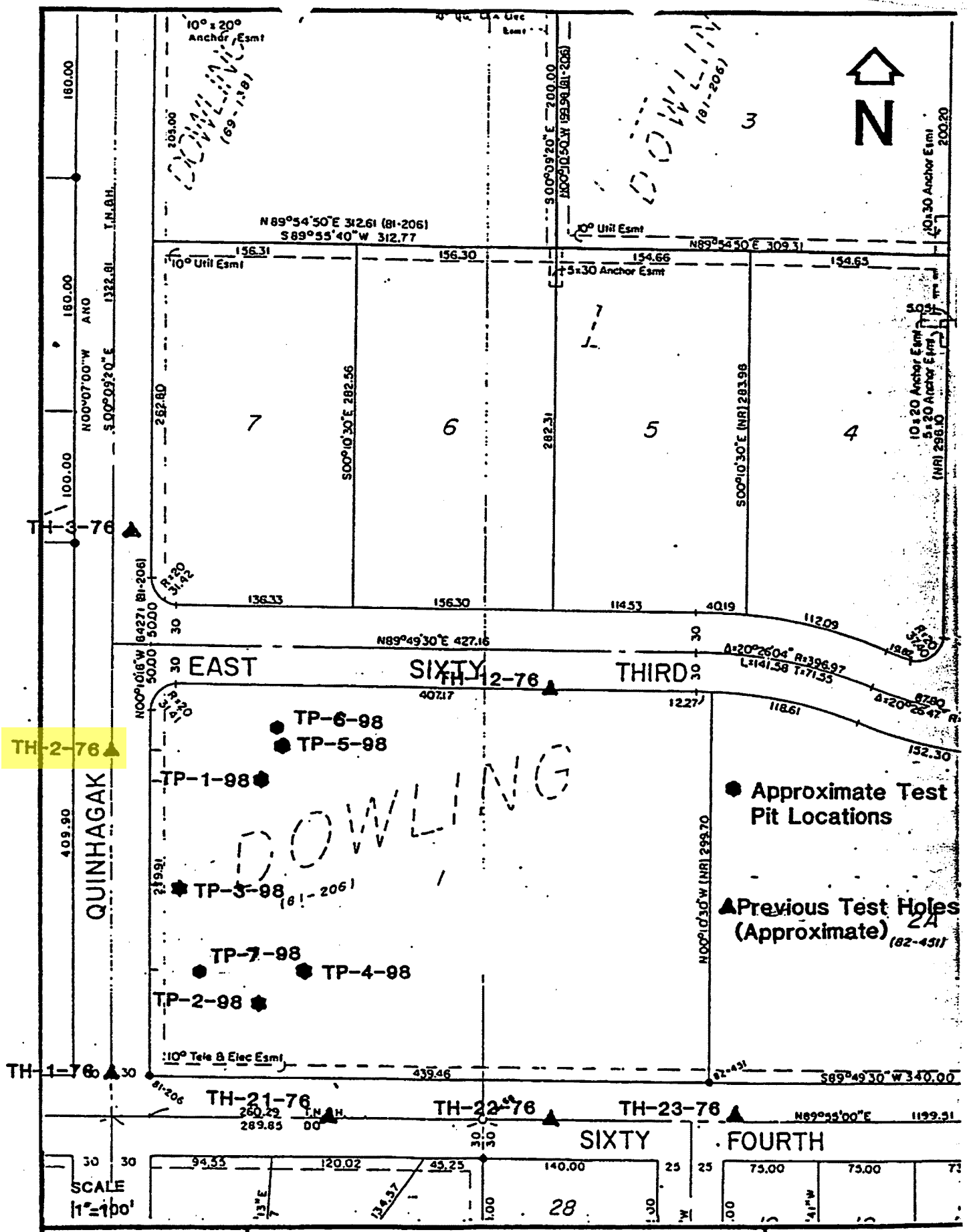
Test Pit Location Map
Quinhagak Street

FIGURE 1



DWN: PLA		Log of Test Holes	F.B.
CKD: WJL		George Jenson	GRID: 2033
DATE: 5-5-76		Anchorage, Alaska	PROJ.NO. 651133

2033A #64-78



DOWL ENGINEERS

Test Pit Location Map
Quinhagak Street

FIGURE 1

LOG OF TEST BORING

Date Begun 6-25-81
Date Completed 6-25-81
Rig No CME 55-Truck 110
Project No
Project Name
Location Quinhagak St. and 64th Ave.
Method Used 6" Solid Flite Auger
Field Party Grinder, Saddler TDC
Geologist Barnwell
Weather

R & M CONSULTANTS, INC.

Hole No. 6
Sheet 1 of 1
Total Depth 10

GROUND WATER TABLE			
W.D. = While Drilling		A.B. = After Boring	
Depth in Ft.		None	
Time			
Date			

Location Diagram:

Sampling Method	Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F
H	1				0				M	-40	
H	2				5				M	- -	

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.

Vegetation:

Collar Elevation

Reference

Smpl. 1
0-0" - 5.0'
1pb - cb

Brown-grey clay w/ some organic, dk. silt.

OH to OL

Smpl. 2
5.0-10.0'
1pb - cb

Grey - dk. brn. clay w/ some organic peat, small fr. silt.

OH to OL.

END

LOG OF TEST BORING

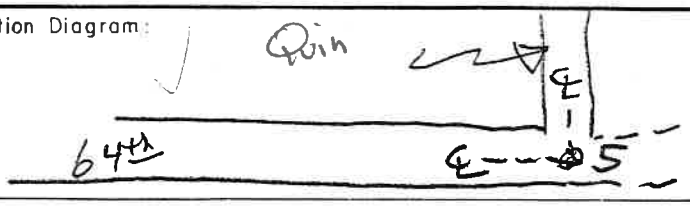
Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 truck 110
Project No
Project Name
Location Intersection Quinhagak & 64th Ave.
Method Used 6" Solid Flay Auger
Field Party Grindy, Hn O
Geologist Bunnwell
Weather Cloudy, cool

R & M CONSULTANTS, INC.

Hole No. 5
Sheet 1 of 1
Total Depth 10 ft.

GROUND WATER TABLE			
W.D = While Drilling		A B. = After Boring	
Depth in Ft.			
Time	None		
Date			

Location Diagram:



Sampling: Sam. Me. / Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation last, notes on drilling ease, bits used, etc.

Vegetation:

Collar Elevation | Reference

H 1 — Smpl. 1, 0-0-5.0', 1pb-cb — M — Brown-grey clay w/ some silt. — CL

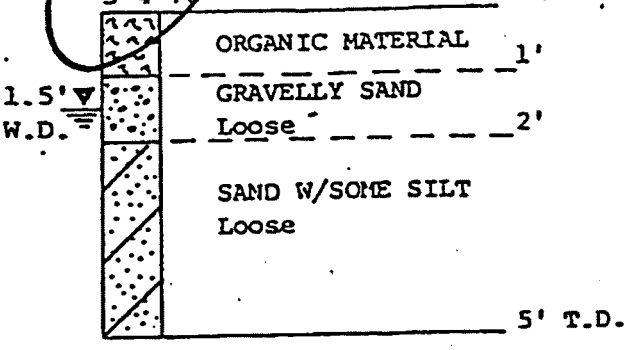
H 2 — Smpl. 2, 5.0-10.0', 1pb-cb — M — Grey clay w/ possibly < trace silt. — CH

END

75

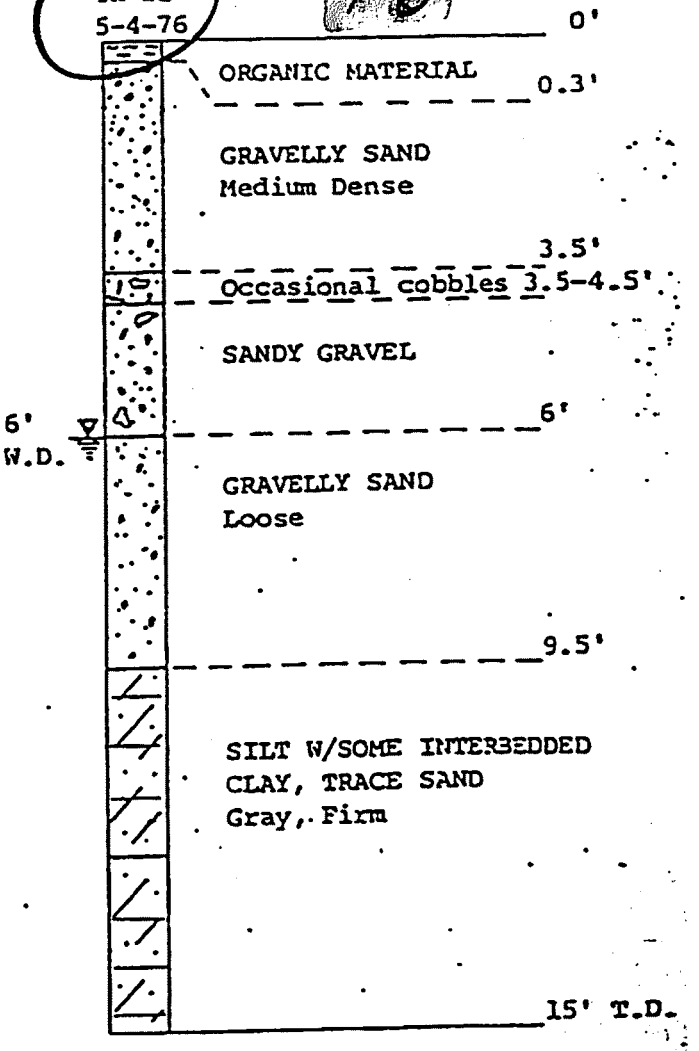
T5

TH 21
5-4-76



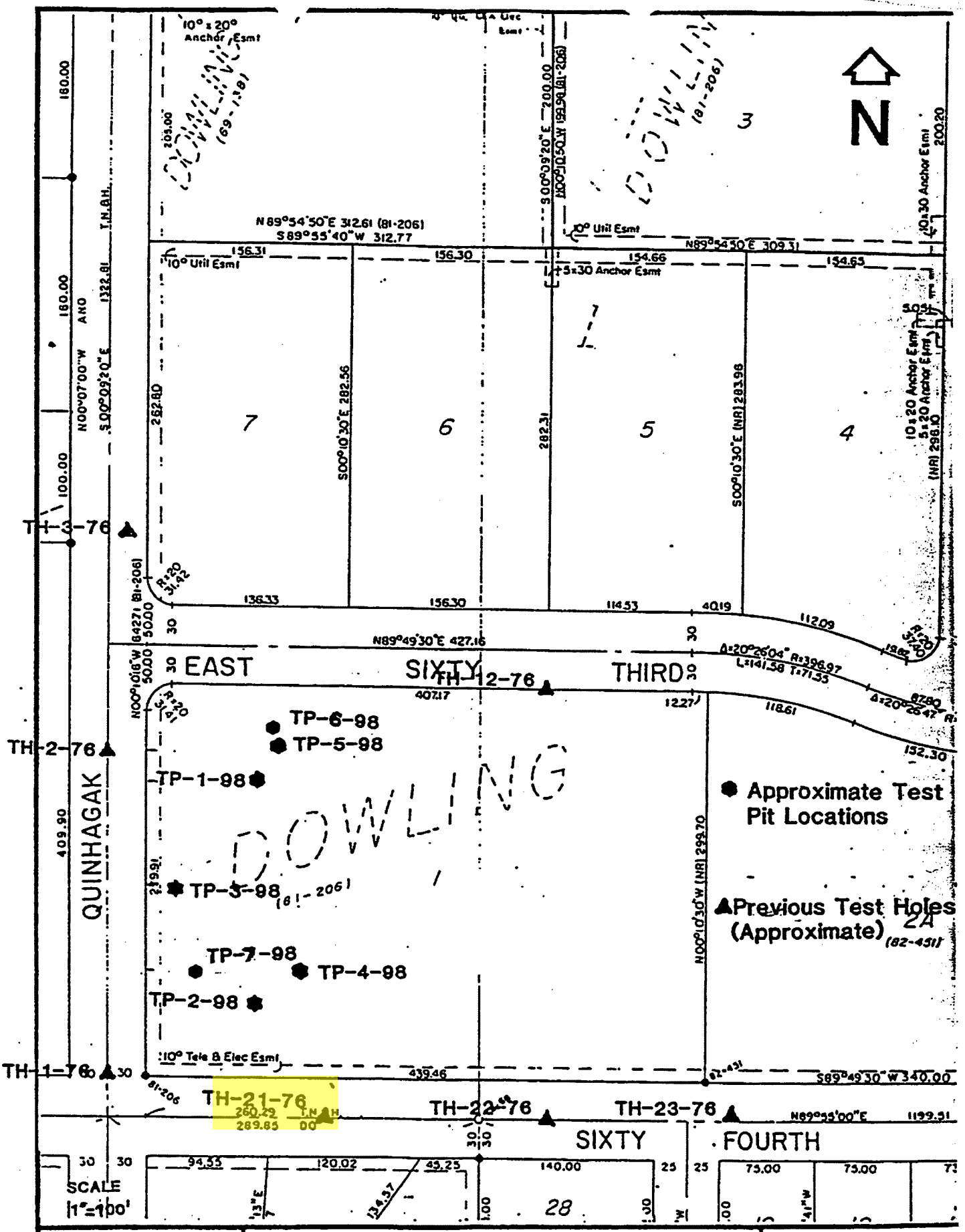
T6

TH 22
5-4-76



DWN: P.L.A.	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 11 May 76			PROJ.NO. 65113
SCALE: 1" = 3'			DWG.NO. B-13

2033A #64-78



DOWL ENGINEERS

Test Pit Location Map
Quinhagak Street

FIGURE 1

LOG OF TEST BORING

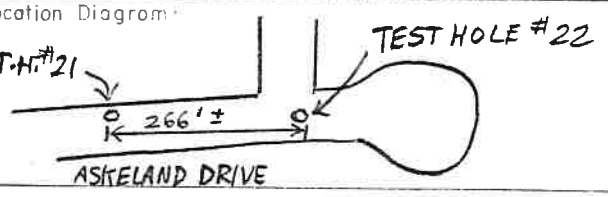
R & M CONSULTANTS, INC.

Date Begun 5/21/81
Date Completed 5/21/81
Rig No. MOBIL B50
Project No 151071
Project Name SHELIKOF RID
Location See diagram
Method Used STD. PENETRATION
Field Party L. WALTER + M. KALNOSKI Geologist E. OLSON
Weather SUNNY, 55°

Hole No 22
Sheet 1 of 1 (37)
Total Depth 11.0'

GROUND WATER TABLE		
W.D = While Drilling		A.B = After Boring
Depth in Ft.	4.5' WD	2.5' AB
Time	1:10 PM	1:20 PM
Date	5/21/81	5/21/81

Location Diagram:



Sampling: Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	DESCRIPTION: Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.
G 1				0			SM	D		SAMPLE #1 0.0'-1.0' 1 MT, 1 PB. SANDY GRAVEL W/ TRACE SILT. BROWN. GVL. SUBROUNDED, < 1½".
			AB	2						DRILLER NOTES SOFT DRILLING AT 3'. PEAT COMING UP IN AUGER TAILINGS.
			WD	3			M	L		SAMPLE #2 4.5'-6.0' 1 MT, 1 PB. SAND WITH SILT + TRACE ORGANICS. BROWN. SAND FINE. FROZEN.
2	8			4						
	10			5			VM	MD		
	6			6						SAMPLE #3 9.5'-11.0' 1 MT, 1 PB. SILTY SAND W/ TR. GRAVEL. GRAY. GVL. SUBROUNDED.
				7						
				8			M	MD		
3	7			9						
	6			0						SUMMARY: 0.0'-3.0' SANDY GRAVEL W/TR. SILT. 3.0'-4.5' PEAT. 4.5'-11.0': SILTY SAND W/ TR. GVL.
	8			1						
				2						T.D. @ 11.0'
				3						
				4						
				5						
				6						
				7						
				8						
				9						
				0						

T. of P.

Vegetation: NONE

Collar Elevation

Reference

Soil Boring App

MOA PM&E MOA GIS Main Page

Address or Grid Search

SW2033A008

SW2033A

SW2033A064

SW2033A066

SW2033B005

SW2033A070

SW2033A065

SW2033A026

Petersburg St

SW2033A018

SW2033A040

SW2033A042

SW2033A041

SW2033A075

SW2033A076

SW2033A036

SW2033B015

SW2033B014

E 64th Ave

E 64th Ave

Quinhagak St

E 64th Ave

E 64th Ave

SW2033C037

SW2033C036

Askeland Dr

SW2033C

SW2033C035

Askeland Dr

Galatea Dr

North Fork Little Campbell Creek

North Fork Little Campbell Creek

North Fork Little Campbell Creek

SW2033C034

Askeland Dr

SW2033C015

SW2033C027

SW2033C028

SW2033C008

SW2033C007

E 66th Ave

100ft

-149.847 61.164 Degrees

Microsoft | Matanuska-Susitna Borough GIS, Municipality of Anchorage, State of Alaska, © OpenSt...

POWERED BY esri

Test Hole #7 Table A WO #A18638
Logged By: O.M. Hatch
Date: Sept. 28, 1978

Depth in Feet

From	To	Soil Description
0.0'	1.0'	Brown Peat, Pt, damp, stiff.
1.0'	16.5'	F-4, brown to grey Clayey Silt, CL/ML, slightly sandy to 8.0', wood mixed to 2.5', damp, stiff, PL+ to PL-.

Bottom of Test Hole: 16.5'

Frost Line: None Observed

Free Water Level: Seepage at 2.0' while drilling
After 3 days 1.5'

Sample	Depth	Blows/6"	M%	Type of Sample	Dry Strength	Group	Unified	Temp °F
1	5.0'- 6.5'	4/7/7	19.5	SP	M-H	D	CL/ML	48
2	10.0'-11.5'	5/7/16	25.7	SP	L	D	CL/ML	44
3	15.0'-16.5'	11/19/14	30.6	SP	L	D	CL/ML	44

Remarks:
1. Type of Sample, G=Grab, SP = Standard Penetration, U = Undisturbed.
2. Dry Strength, N=None, L=Low, M=Medium, H=High.
3. Group refers to similar material, this study only.
4. General Information, see Sheet 1.
5. Frost and Textural Classification, see Sheet 2.
6. Unified Classification, see Sheet 3.

LOG OF TEST BORING

Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 truck 110
Project No
Project Name
Location 64th Ave. Near intsect. w/ Petersburg
Methad Used 6" Solid Flay Auger
Field Party Grinder
Geologist Bennell
Weather Cloudy, cool

R & M CONSULTANTS, INC.

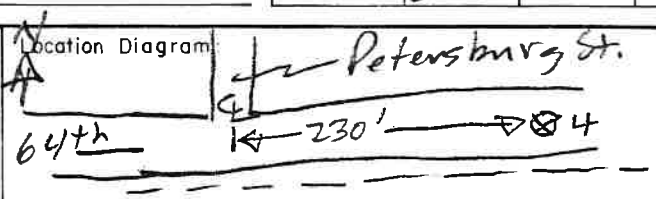
Hole No. 4
Sheet 1 of 1
Total Depth 10'

GROUND WATER TABLE		
(W.D.)-While Drilling		(A.B.)-After Boring
Depth in Ft.	8 WD	AB possible wet
Time	11 AM	
Date	6-25	

Sampling Method	Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.

Location Diagram



T, °F
Vegetation: None

Collar Elevation
Reference

Smpl. 1
0-0'-5.0'
1pb-cb

Brown grey silty clays. w/ trace gravel.
SC
Some organic peat at top 2" - 5"

Smpl. 2
5.0-10.0
1pb-cb.

Grey-brown clay w/ some silt.
CL

Inhomogeneous clay w/ silt. V. poorly graded.

END

LOG OF TEST BORING

Date Begun 6-25-81
Date Completed 6-25-81
Rig No CME 55-Truck 110
Project No
Project Name
Location Quinhagak St. and 64th Ave.
Method Used 6" Solid Flite Auger
Field Party Grinder, Saddler TDC
Geologist Barnwell
Weather

R & M CONSULTANTS, INC.

Hole No. 6
Sheet 1 of 1
Total Depth 10

GROUND WATER TABLE			
W.D. = While Drilling		A.B. = After Boring	
Depth in Ft.		None	
Time			
Date			

Location Diagram:

Sampling Method	Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F
H	1				0				M	-40	
H	2				5				M	- -	

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation lost, notes on drilling ease, bits used, etc.

Vegetation:

Collar Elevation

Reference

Smpl. 1
0-0" - 5.0'
1pb - cb

Brown-grey clay w/ some organic, dk. silt.

OH to OL

Smpl. 2
5.0-10.0'
1pb - cb

Grey - dk. brn. clay w/ some organic peat, small fr. silt.

OH to OL.

END

LOG OF TEST BORING

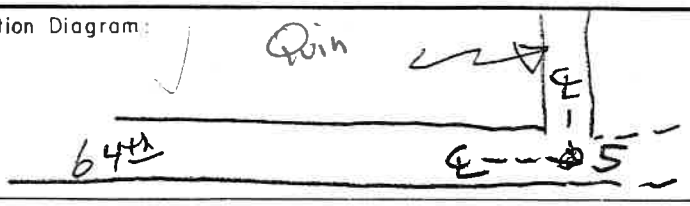
Date Begun 6-25-81
Date Completed 6-25-81
Rig No. CME 55 truck 110
Project No
Project Name
Location Intersection Quinhagak & 64th Ave.
Method Used 6" Solid Flay Auger
Field Party Grindy, Hn O
Geologist Bunnwell
Weather Cloudy, cool

R & M CONSULTANTS, INC.

Hole No. 5
Sheet 1 of 1
Total Depth 10 ft.

GROUND WATER TABLE			
W.D = While Drilling		A B. = After Boring	
Depth in Ft.			
Time	None		
Date			

Location Diagram:



Sampling: Sam. Me. / Sample No.	Blow Count	Location Sampled	Recovery	Depth in Feet	% Ice Content	Frozen ?	Soil Graph	Moisture	Consistency	T, °F

DESCRIPTION
Soil type, color, texture, estimated particle size, sampler driving notes, depths circulation last, notes on drilling ease, bits used, etc.

Vegetation:

Collar Elevation | Reference

H 1 — Smpl. 1, 0-0-5.0', 1pb-cb — M — Brown-grey clay w/ some silt. — CL

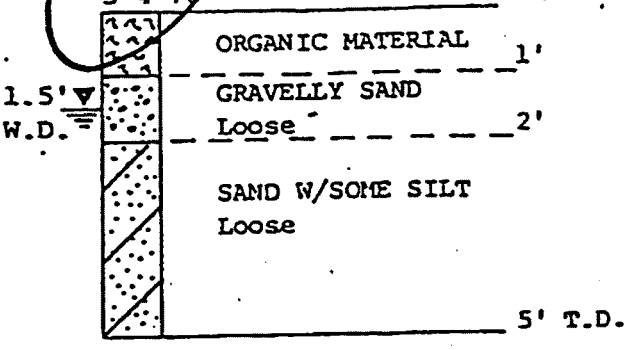
H 2 — Smpl. 2, 5.0-10.0', 1pb-cb — M — Grey clay w/ possibly < trace silt. — CH

END

75

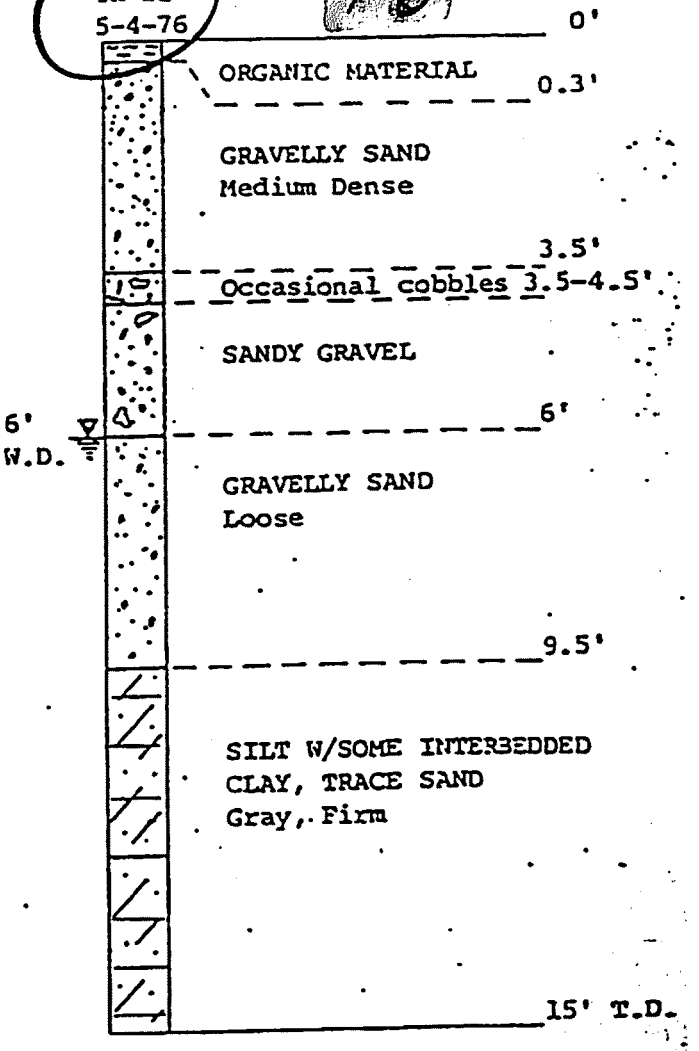
T5

TH 21
5-4-76



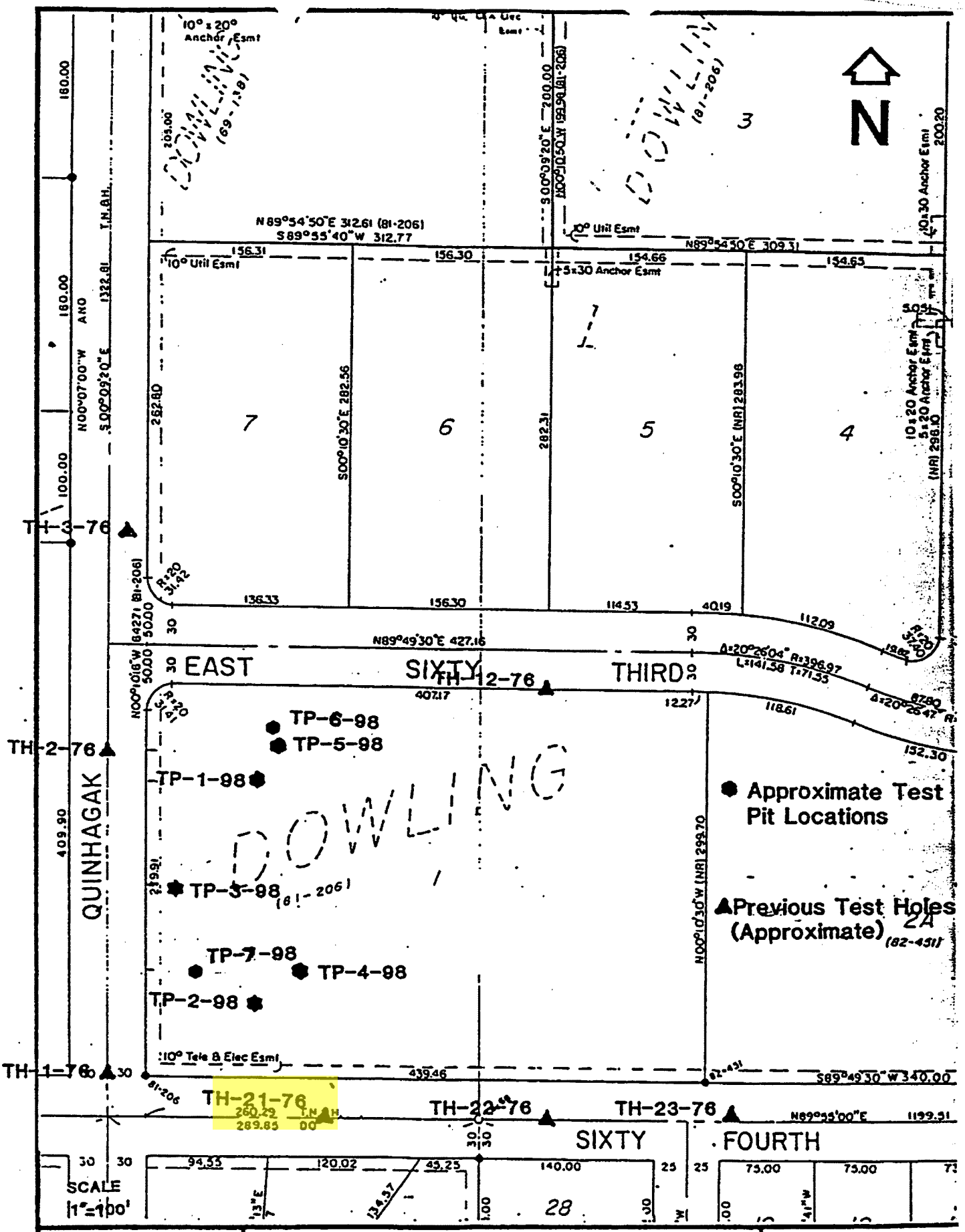
T6

TH 22
5-4-76



DWN: P.L.A.	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 11 May 76			PROJ.NO. 65113
SCALE: 1" = 3'			DWG.NO. B-13

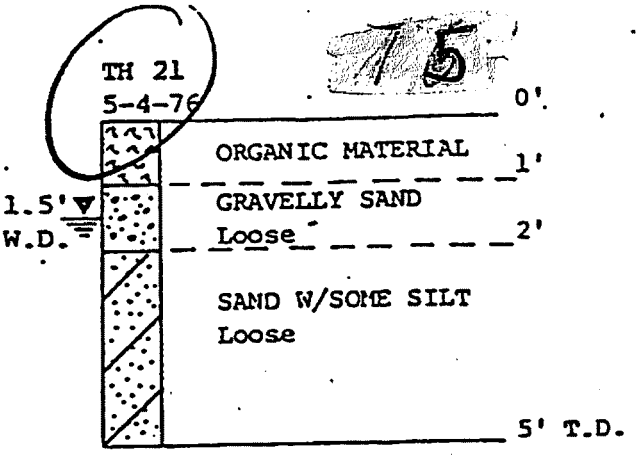
2033A #64-78

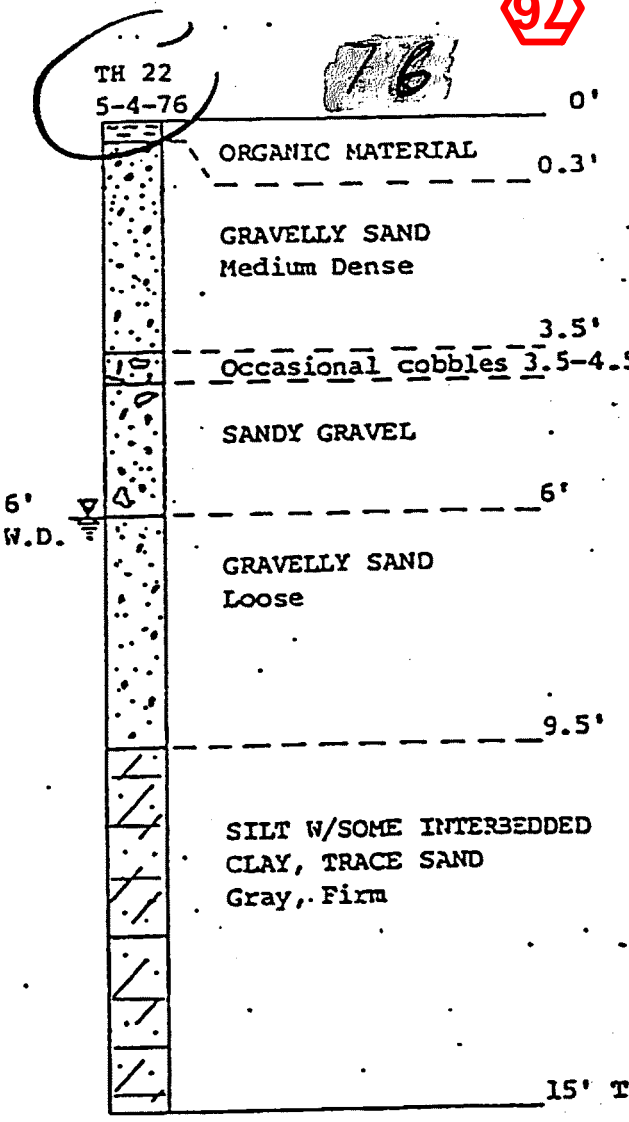


DOWL ENGINEERS

Test Pit Location Map
Quinhagak Street

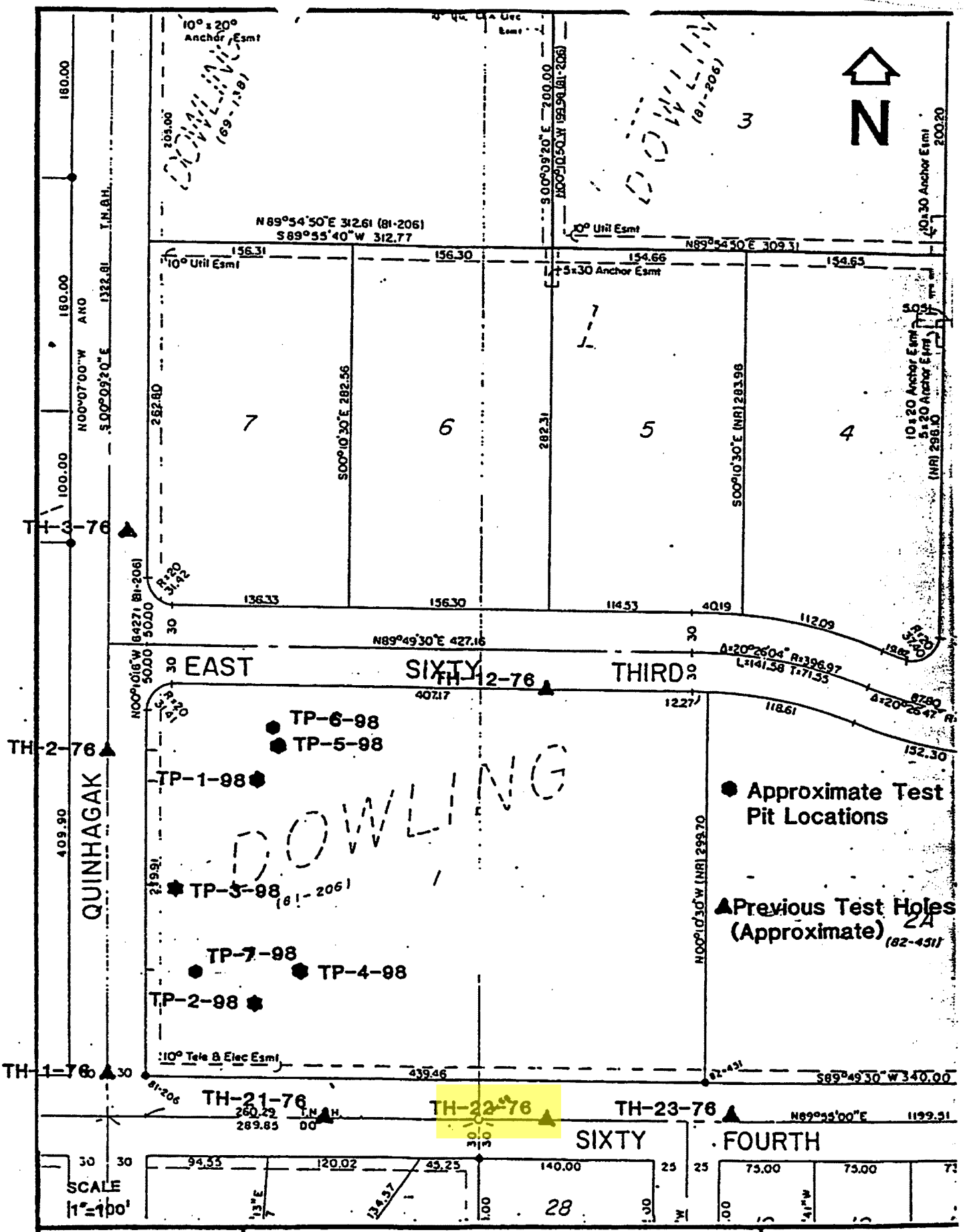
FIGURE 1





DWN: P.L.A.	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 11 May 76			PROJ.NO. 75113
SCALE: 1" = 3'			DWG.NO. B-13

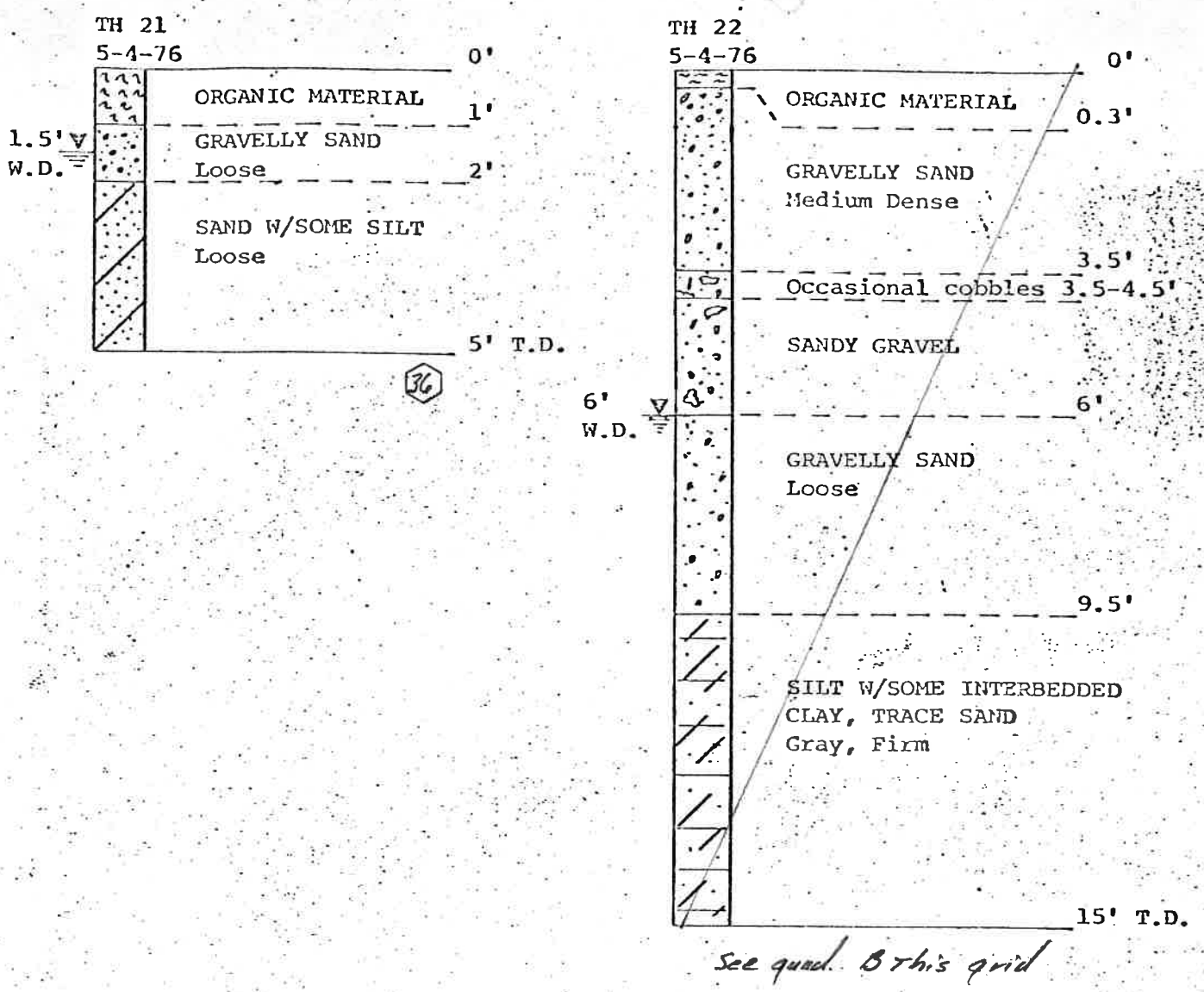
2033A #64-78



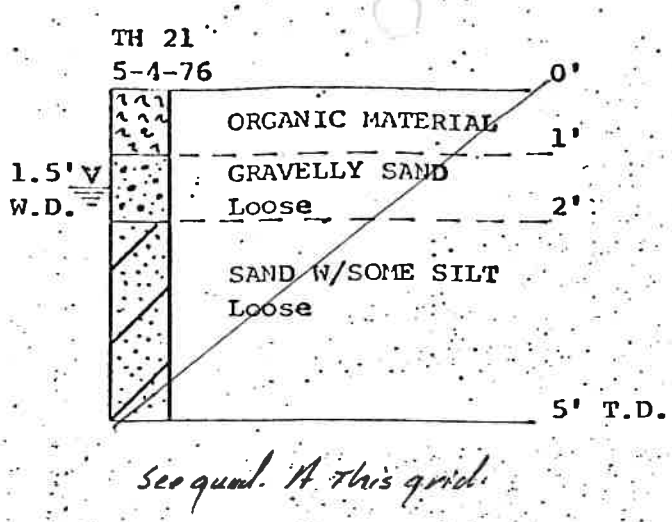
DOWL ENGINEERS

Test Pit Location Map
Quinhagak Street

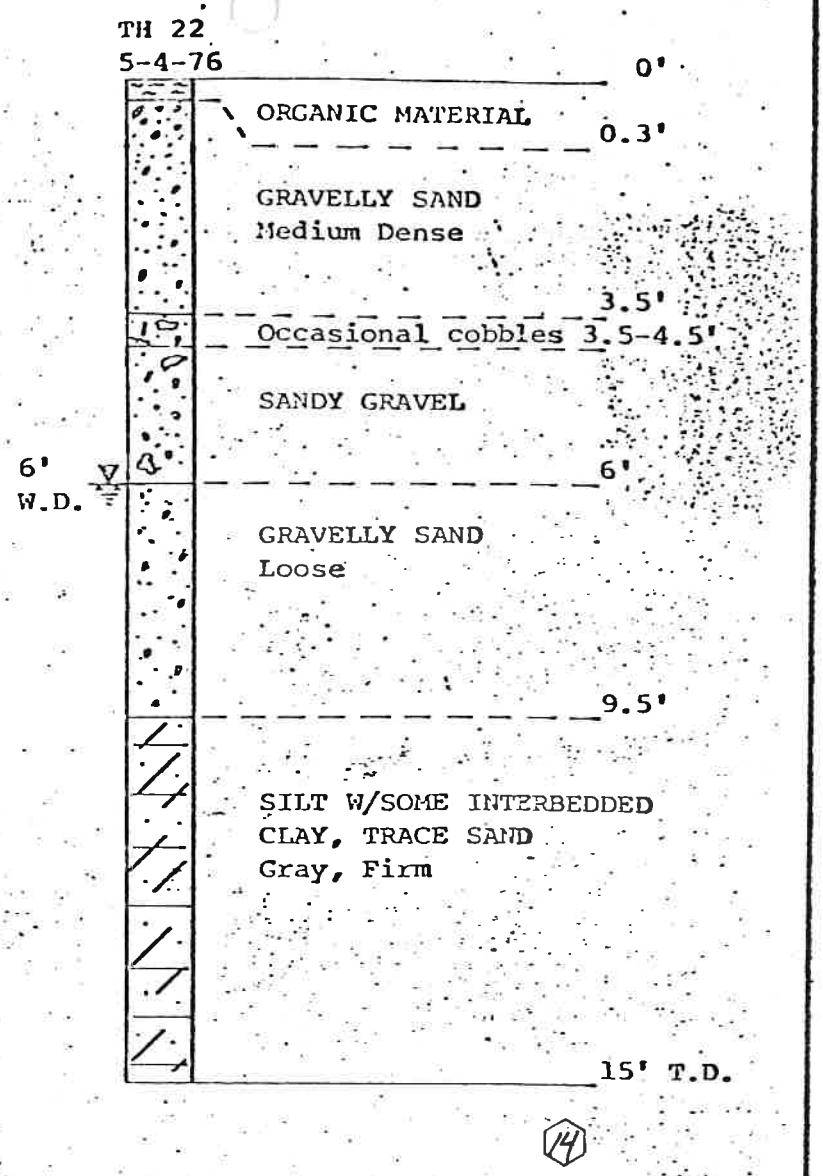
FIGURE 1



DWN: P.L.A.	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 11 MAY 76			PROJ.NO. 651133
SCALE: 1" = 3'			DWG.NO. B-13

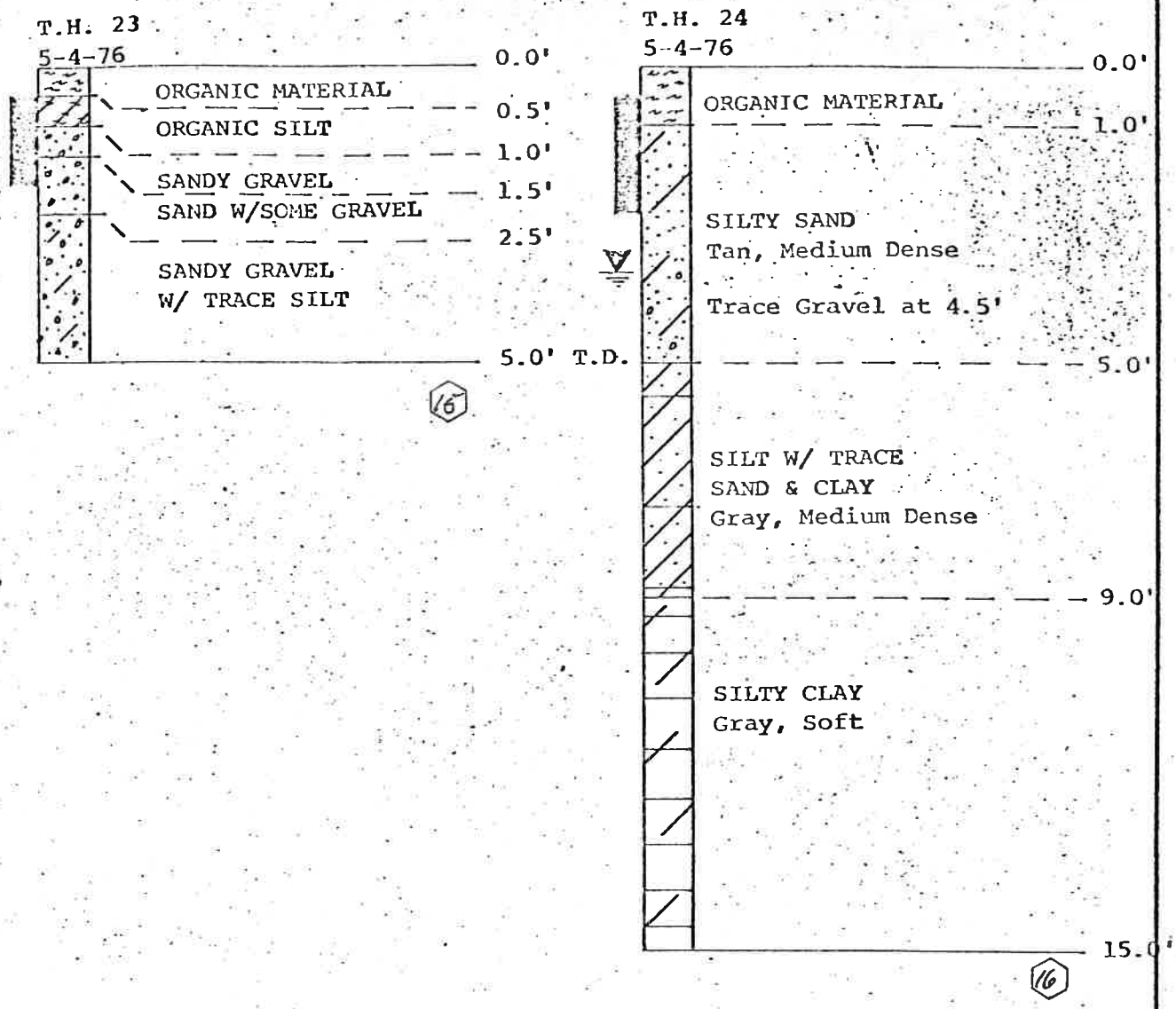


See quad. At this grid.



14

DWN: P.L.A.	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.
CKD: WJL			GRID: 2033
DATE: 11 MAY 76			PROJ.NO. 651133
SCALE: 1" = 3'			DWG.NO. B-13



DWN: PLA	R&M CONSULTANTS, INC.	Log of Test Holes George Jenson Anchorage, Alaska	F.B.	
CKD: WJL			GRID:	2033
DATE: 5-11-76			PROJ.NO.	651133
SCALE: 1"=3'			DWG.NO.	B-14

Appendix D

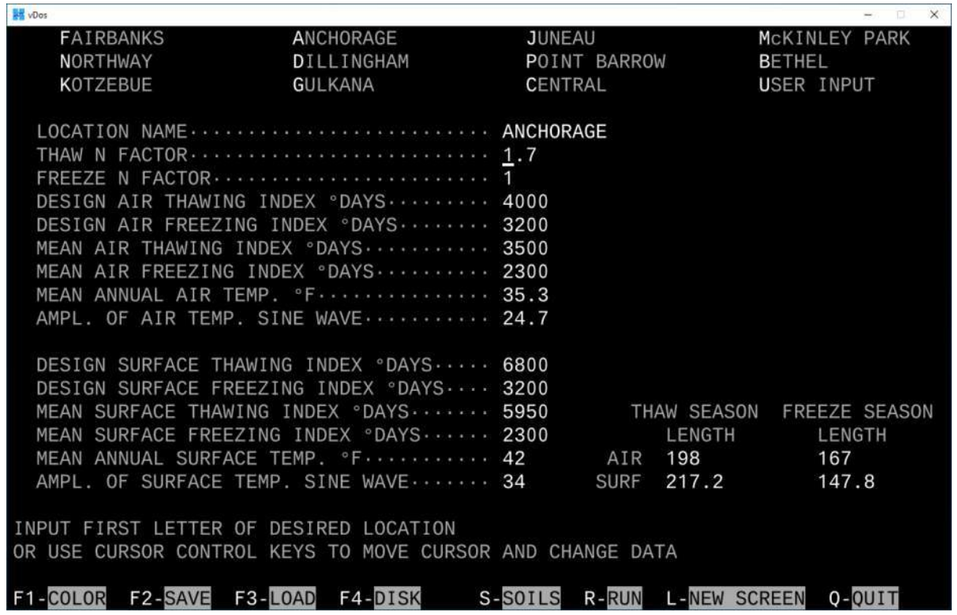
BERG2 Thermal Analysis Output

Included in this section:

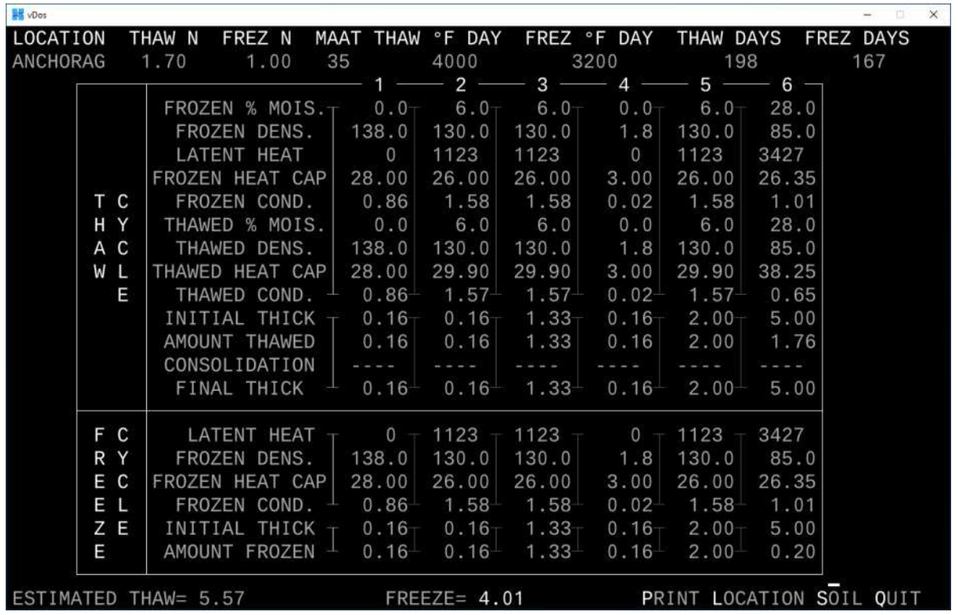
1) Output of BERG thermal modeling analysis

BERG2 Analysis – Limited Subgrade Frost Penetration Analysis – 2” Insulated Section

LOCATION/CLIMATE:



ANALYSIS RESULTS:



SOIL INPUTS

Layer	Thickness (ft)	Density (pcf)	M.C. (%)	Comment
Asphalt	0.17	138	-	-
Fill (Type II-A)	1.50	130	6.0	-
Insulation	0.17	1.8	-	-
Fill (Type II)	2.00	130	6.0	-
Subgrade	5.00	85	28	-

RESULTS

Parameter	Value
Total Section Thickness	3.83 ft
Thaw Depth	5.57 ft
Freeze Depth	4.01 ft
Subgrade Frost Penetration	0.20 ft
Subgrade Frost Percent[1]	5.2%

1. Equal to Subgrade Frost Penetration divided by Total Section Thickness

Traffic Data and Reports

Appendix G

Traffic Engineering

Municipality of Anchorage
Field Sheet

Data Section

Location: Dowling and Quinhagak

Distance: ____ ☒ at int ☐ ft ☐ mi

Posted Speed: ____

Latitude: ____ (optional) Longitude: ____ (optional)

Site Code (optional): 080911668/69/70

Equipment Number: Jamar 355 ☐ see diagram

8 Digit Code (for Manual counters): ____

Installer(s) (initials): JE/KC/CC

Weather: Sunny Temp: ____

Type: ☐ Electronic ☒ Pneumatic ☐ Manual ☐ Trail ☐ Other

Type of Study: AADT Volume

Dir: ☒ North ☐ South ☒ East ☒ West

Study Period: ____ Day(s) ____ Week(s)

☐ Standard AM 700-900 ____ to ____ Other Time

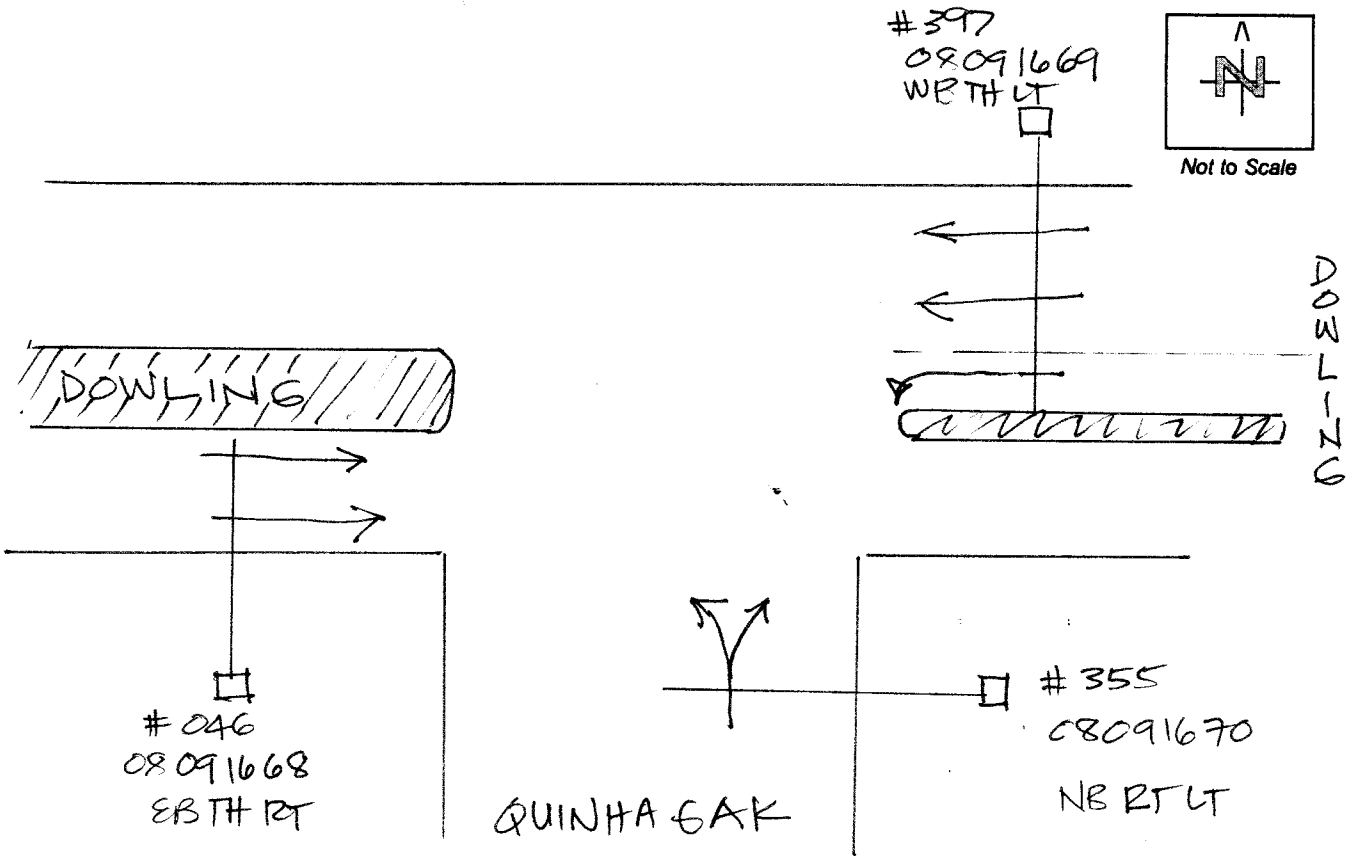
☐ Standard Midday 1100-100 ____ to ____ Other Time

☐ Standard PM 400-600 ____ to ____ Other Time

Installed: Date: 8/9/16 Time: 3:30 ☐ see diagram

Removed: Date: 8/11/16 Time: 1:20 ☐ see diagram

Comments (including unusual Roadway or Trail Condition): ____



Municipality of Anchorage

Data Source: MOA Data
Device Type: Pneumatic
Type: Intersection Volume
Report Date: 08/10/2016

Location: EAST DOWLING ROAD, ANCHORAGE and QUINHAGAK STREET, ANCHORAGE At: Intersection

Time Span: 15 Min

Vehicles

START_TIME	8/10/2016 Wednesday NBLR	8/10/2016 Wednesday EBTR	8/10/2016 Wednesday WBTL	NB	SB	EB	WB	ALL
12:00 AM	5	48	25	5	0	48	25	78
12:15 AM	3	37	23	3	0	37	23	63
12:30 AM	5	31	24	5	0	31	24	60
12:45 AM	1	26	31	1	0	26	31	58
01:00 AM	7	23	22	7	0	23	22	52
01:15 AM	1	24	15	1	0	24	15	40
01:30 AM	2	16	16	2	0	16	16	34
01:45 AM	0	23	8	0	0	23	8	31
02:00 AM	0	30	10	0	0	30	10	40
02:15 AM	2	13	11	2	0	13	11	26
02:30 AM	0	10	11	0	0	10	11	21
02:45 AM	3	14	6	3	0	14	6	23
03:00 AM	0	11	18	0	0	11	18	29
03:15 AM	3	17	19	3	0	17	19	39
03:30 AM	0	17	7	0	0	17	7	24
03:45 AM	4	16	14	4	0	16	14	34
04:00 AM	2	25	14	2	0	25	14	41
04:15 AM	6	18	33	6	0	18	33	57
04:30 AM	2	28	33	2	0	28	33	63
04:45 AM	4	31	46	4	0	31	46	81
05:00 AM	4	54	53	4	0	54	53	111
05:15 AM	9	76	78	9	0	76	78	163
05:30 AM	4	76	89	4	0	76	89	169
05:45 AM	8	95	68	8	0	95	68	171
06:00 AM	6	170	105	6	0	170	105	281
06:15 AM	5	144	155	5	0	144	155	304
06:30 AM	13	167	213	13	0	167	213	393
06:45 AM	2	227	208	2	0	227	208	437
07:00 AM	14	250	260	14	0	250	260	524
07:15 AM	17	301	366	17	0	301	366	684
07:30 AM	35	209	364	35	0	209	364	608
07:45 AM	22	215	251	22	0	215	251	488
08:00 AM	27	246	222	27	0	246	222	495
08:15 AM	20	239	243	20	0	239	243	502
08:30 AM	31	207	236	31	0	207	236	474
08:45 AM	23	205	207	23	0	205	207	435
09:00 AM	35	184	170	35	0	184	170	389
09:15 AM	22	226	181	22	0	226	181	429
09:30 AM	18	205	180	18	0	205	180	403
09:45 AM	22	203	164	22	0	203	164	389
10:00 AM	11	187	143	11	0	187	143	341
10:15 AM	18	192	168	18	0	192	168	378
10:30 AM	26	192	184	26	0	192	184	402

10:45 AM	31	184	186	31	0	184	186	401
11:00 AM	31	232	153	31	0	232	153	416
11:15 AM	29	260	148	29	0	260	148	437
11:30 AM	26	253	190	26	0	253	190	469
11:45 AM	32	247	187	32	0	247	187	466
12:00 PM	40	285	169	40	0	285	169	494
12:15 PM	29	246	176	29	0	246	176	451
12:30 PM	25	260	192	25	0	260	192	477
12:45 PM	26	280	183	26	0	280	183	489
01:00 PM	21	279	173	21	0	279	173	473
01:15 PM	41	223	175	41	0	223	175	439
01:30 PM	37	267	205	37	0	267	205	509
01:45 PM	28	248	162	28	0	248	162	438
02:00 PM	26	272	180	26	0	272	180	478
02:15 PM	22	260	194	22	0	260	194	476
02:30 PM	19	321	183	19	0	321	183	523
02:45 PM	30	295	210	30	0	295	210	535
03:00 PM	18	331	202	18	0	331	202	551
03:15 PM	33	329	225	33	0	329	225	587
03:30 PM	26	380	191	26	0	380	191	597
03:45 PM	37	383	291	37	0	383	291	711
04:00 PM	16	442	229	16	0	442	229	687
04:15 PM	20	448	232	20	0	448	232	700
04:30 PM	27	487	220	27	0	487	220	734
04:45 PM	32	446	221	32	0	446	221	699
05:00 PM	27	428	181	27	0	428	181	636
05:15 PM	28	338	220	28	0	338	220	586
05:30 PM	22	393	269	22	0	393	269	684
05:45 PM	15	294	232	15	0	294	232	541
06:00 PM	22	272	205	22	0	272	205	499
06:15 PM	25	247	203	25	0	247	203	475
06:30 PM	23	270	170	23	0	270	170	463
06:45 PM	16	203	177	16	0	203	177	396
07:00 PM	17	216	153	17	0	216	153	386
07:15 PM	22	175	135	22	0	175	135	332
07:30 PM	17	197	138	17	0	197	138	352
07:45 PM	18	202	106	18	0	202	106	326
08:00 PM	2	189	128	2	0	189	128	319
08:15 PM	15	203	120	15	0	203	120	338
08:30 PM	5	179	94	5	0	179	94	278
08:45 PM	17	164	102	17	0	164	102	283
09:00 PM	10	178	100	10	0	178	100	288
09:15 PM	15	187	95	15	0	187	95	297
09:30 PM	4	123	96	4	0	123	96	223
09:45 PM	4	120	82	4	0	120	82	206
10:00 PM	10	113	90	10	0	113	90	213
10:15 PM	7	92	66	7	0	92	66	165
10:30 PM	9	88	63	9	0	88	63	160
10:45 PM	9	88	54	9	0	88	54	151
11:00 PM	5	73	42	5	0	73	42	120
11:15 PM	3	61	39	3	0	61	39	103
11:30 PM	4	70	25	4	0	70	25	99
11:45 PM	0	41	30	0	0	41	30	71

Peak Hour Volumes

AM Peak	**NBLR**	**EBTR**	**WBTL**	**NB**	**SB**	**EB**	**WB**	**ALL**
07:00 AM - 08:00 AM	88	975	1241	88	0	975	1241	2304
Approach %	*100.00%*	*100.00%*	*100.00%*	*3.82%*	*0.00%*	*42.32%*	*53.86%*	
Midday Peak	**NBLR**	**EBTR**	**WBTL**	**NB**	**SB**	**EB**	**WB**	**ALL**
02:00 PM - 03:00 PM	97	1148	767	97	0	1148	767	2012
Approach %	*100.00%*	*100.00%*	*100.00%*	*4.82%*	*0.00%*	*57.06%*	*38.12%*	
PM Peak	**NBLR**	**EBTR**	**WBTL**	**NB**	**SB**	**EB**	**WB**	**ALL**
03:45 PM - 04:45 PM	100	1760	972	100	0	1760	972	2832
Approach %	*100.00%*	*100.00%*	*100.00%*	*3.53%*	*0.00%*	*62.15%*	*34.32%*	
Off Peak	**NBLR**	**EBTR**	**WBTL**	**NB**	**SB**	**EB**	**WB**	**ALL**
07:00 PM - 08:00 PM	74	790	532	74	0	790	532	1396
Approach %	*100.00%*	*100.00%*	*100.00%*	*5.30%*	*0.00%*	*56.59%*	*38.11%*	

Daily Total

TIME SPAN	NBLR	EBTR	WBTL	NB	SB	EB	WB	ALL
24 Hour	1515	17590	12986	1515	0	17590	12986	32091
Approach %	*100.00%*	*100.00%*	*100.00%*	*4.72%*	*0.00%*	*54.81%*	*40.47%*	

For Project:	Quinhagak	St.				
Project Notes:						
Location/Name:	Incoming					
Report Generated:	07/20/2022	16:56				
Speed Intervals	1 MPH					
Time Intervals	1					
Traffic Report From	07/14/2022	14:00:00	through	07/19/2022	13:59:59	
85th Percentile Speed	27 MPH					
85th Percentile Vehicles	837					
Max Speed	40 MPH	on	07/15/2022	09:16:19		
Total Vehicles	986					
AADT:	197					

Volumes - weekly counts

	Time	5 Day	7 Day
Average Daily		171	164
AM Peak	10:00	16	16
PM Peak	03:00	20	16

Speed

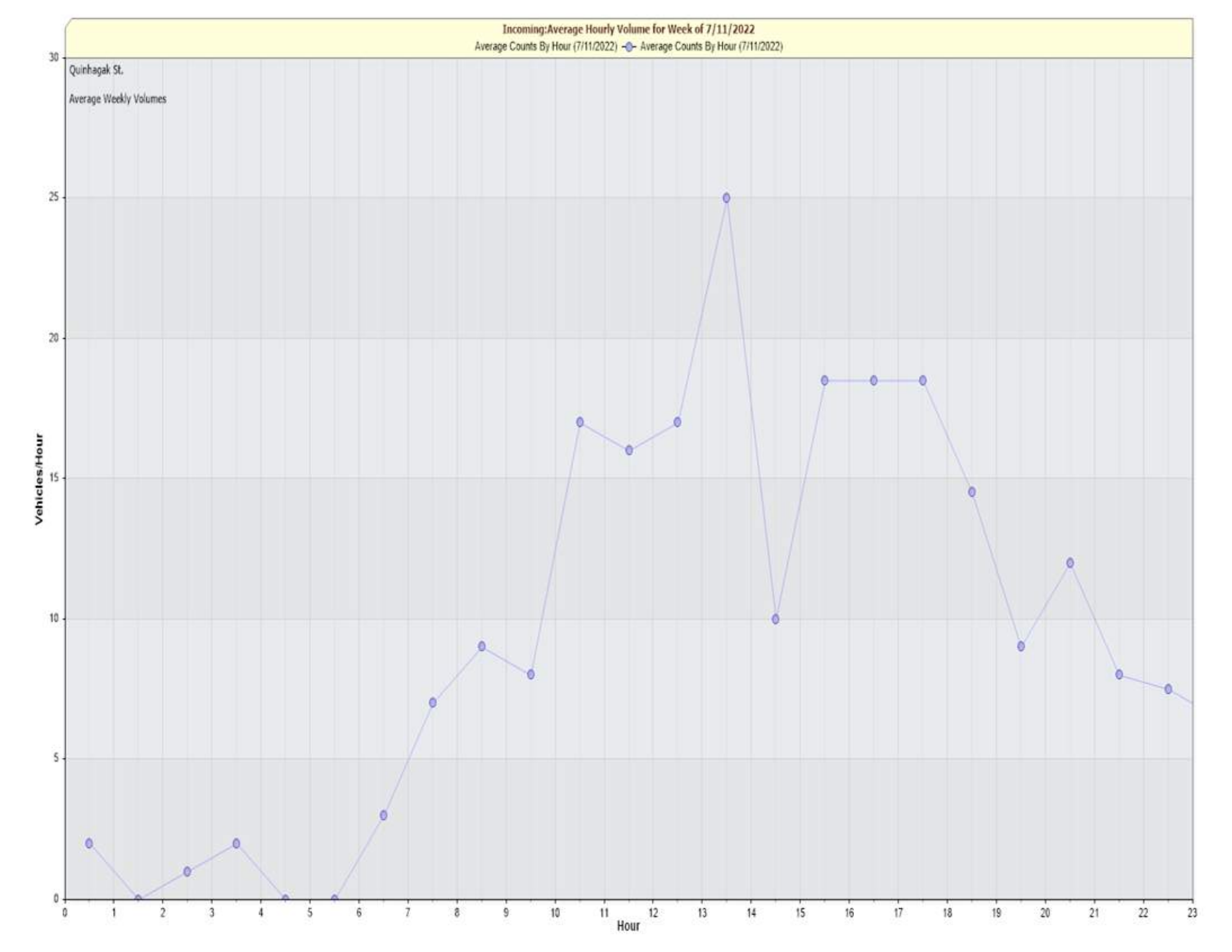
Speed Limit:	25
85th Percentile Speed:	27
Average Speed:	21.42

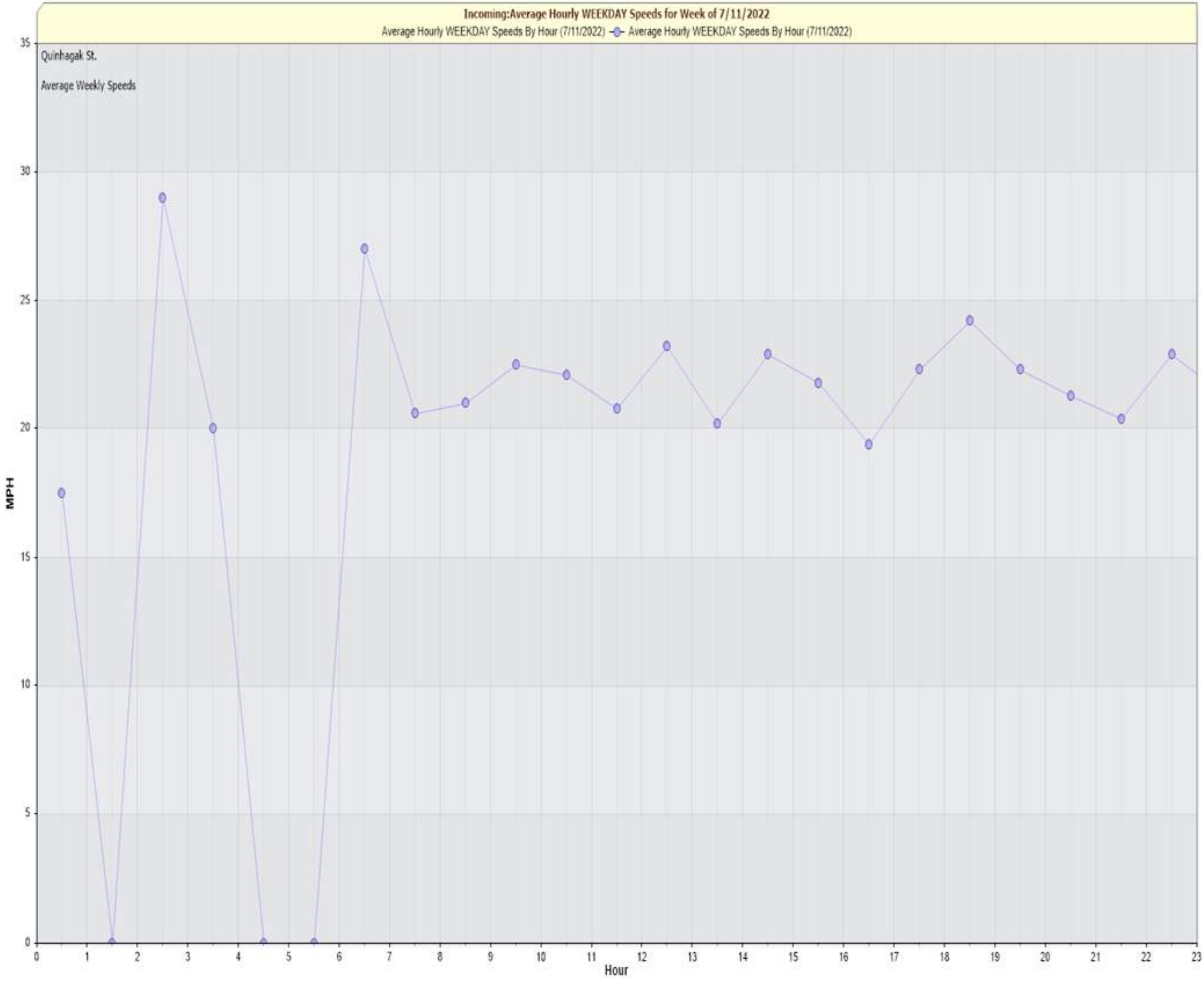
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	39	14	N/A	20	54	39	31
% over limit	14.8	19.7	N/A	18.3	22.1	22.5	24.6
Avg Speeder	28.4	27.5	N/A	28.0	29.5	28.4	29.6

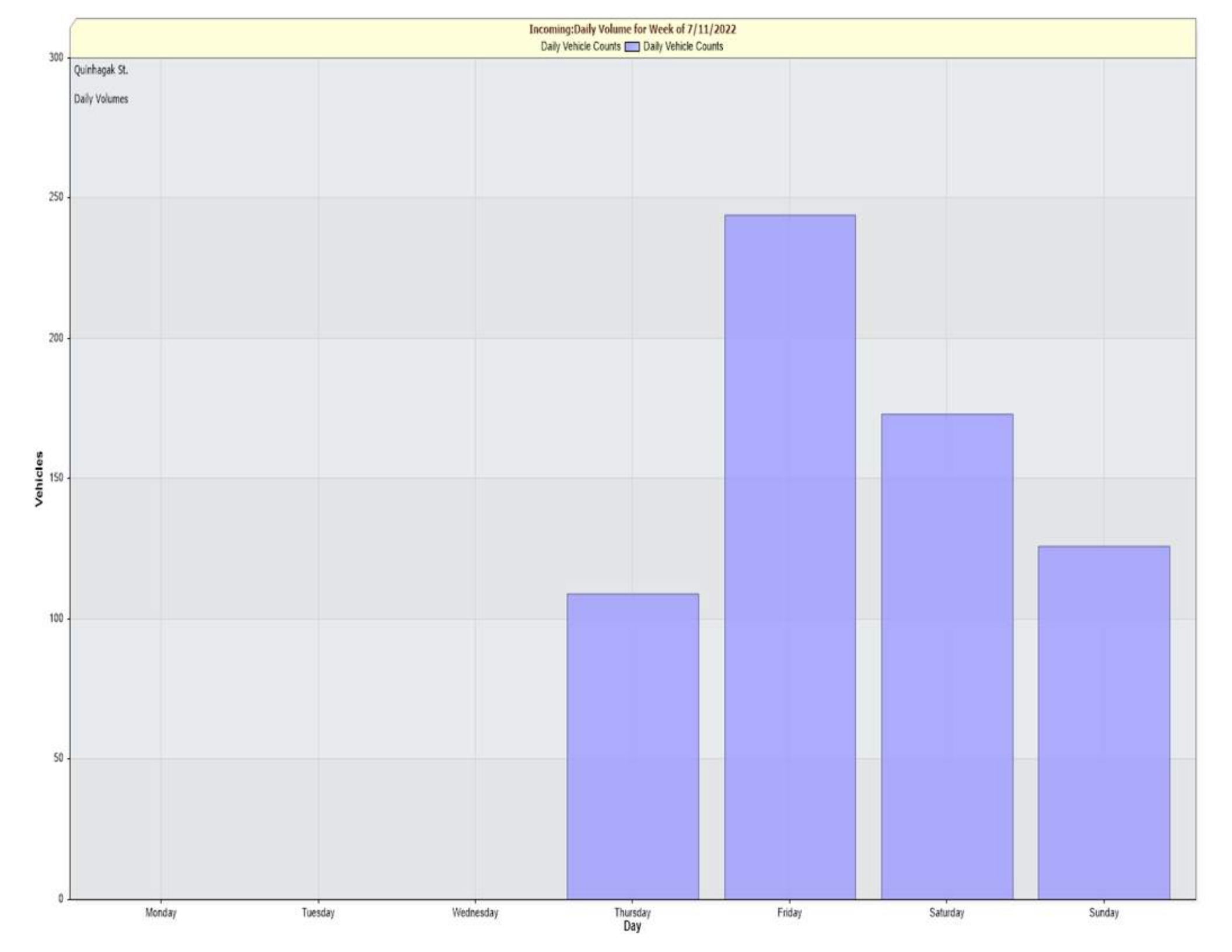
Class Counts

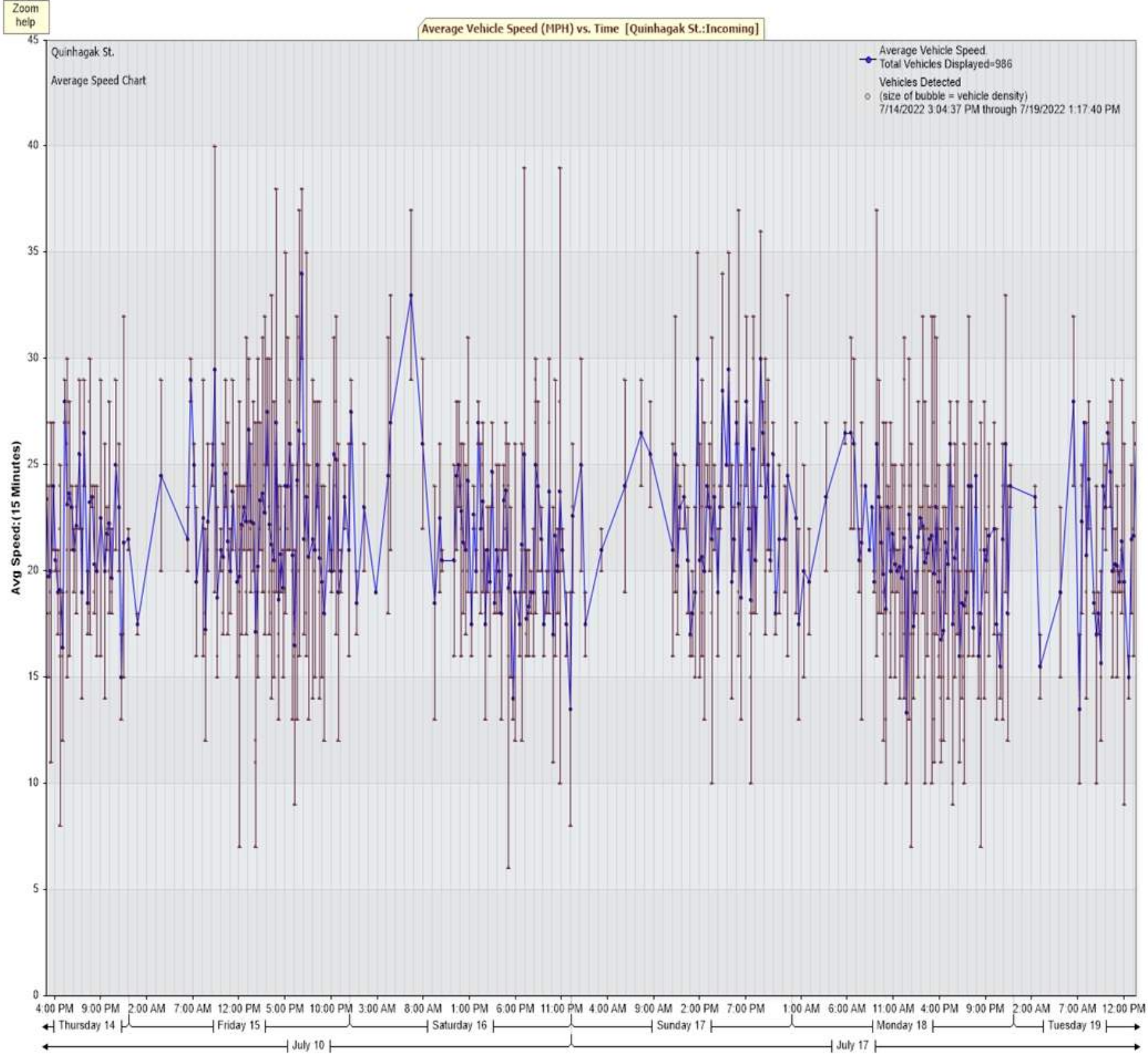
	Number	%
VEH_SM	2	0.2
VEH_MED	967	98.1
VEH_LG	17	1.7

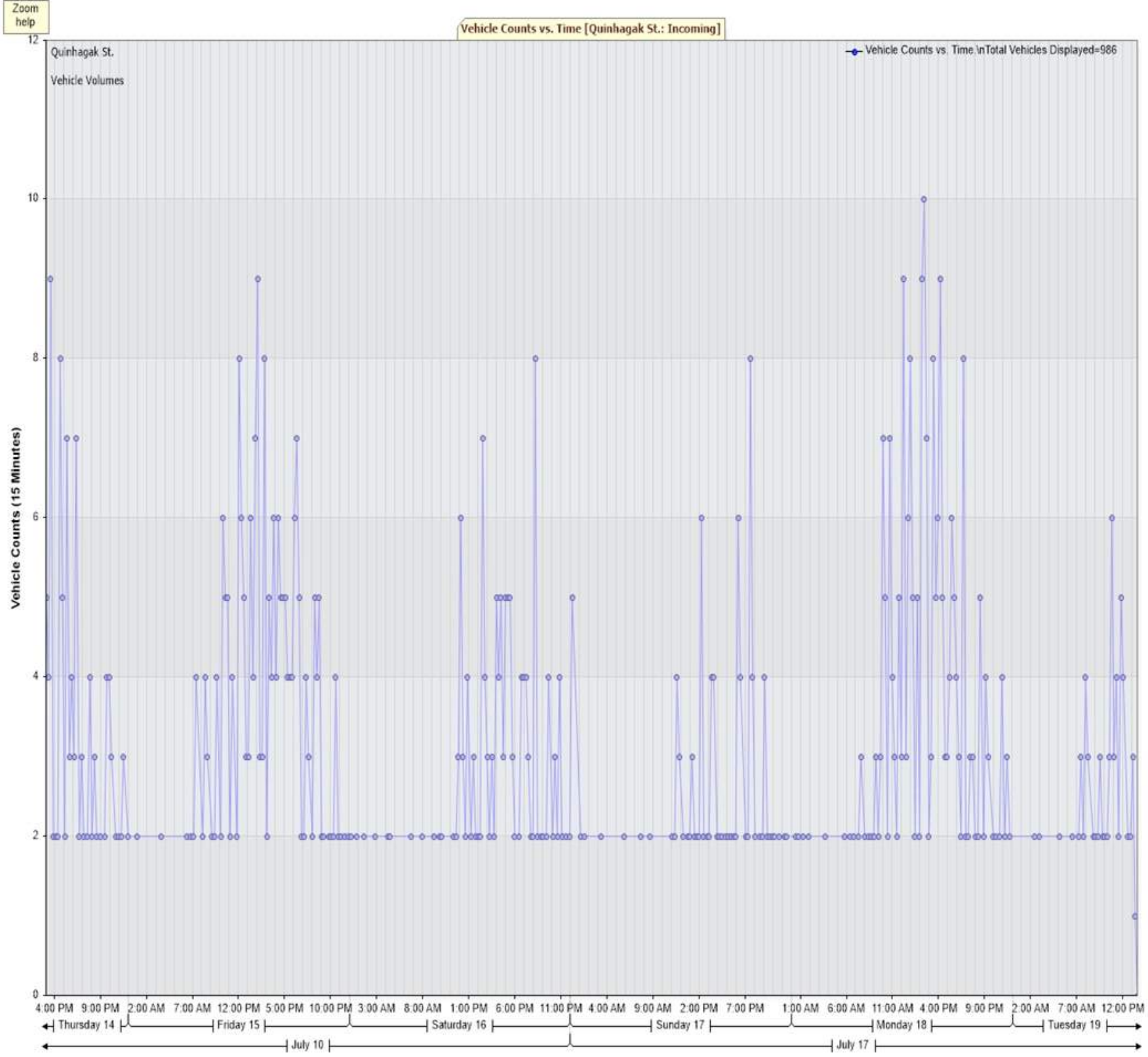
[VEH_SM=motorcycle, VEH_MED = sedan, VEH_LG = truck]

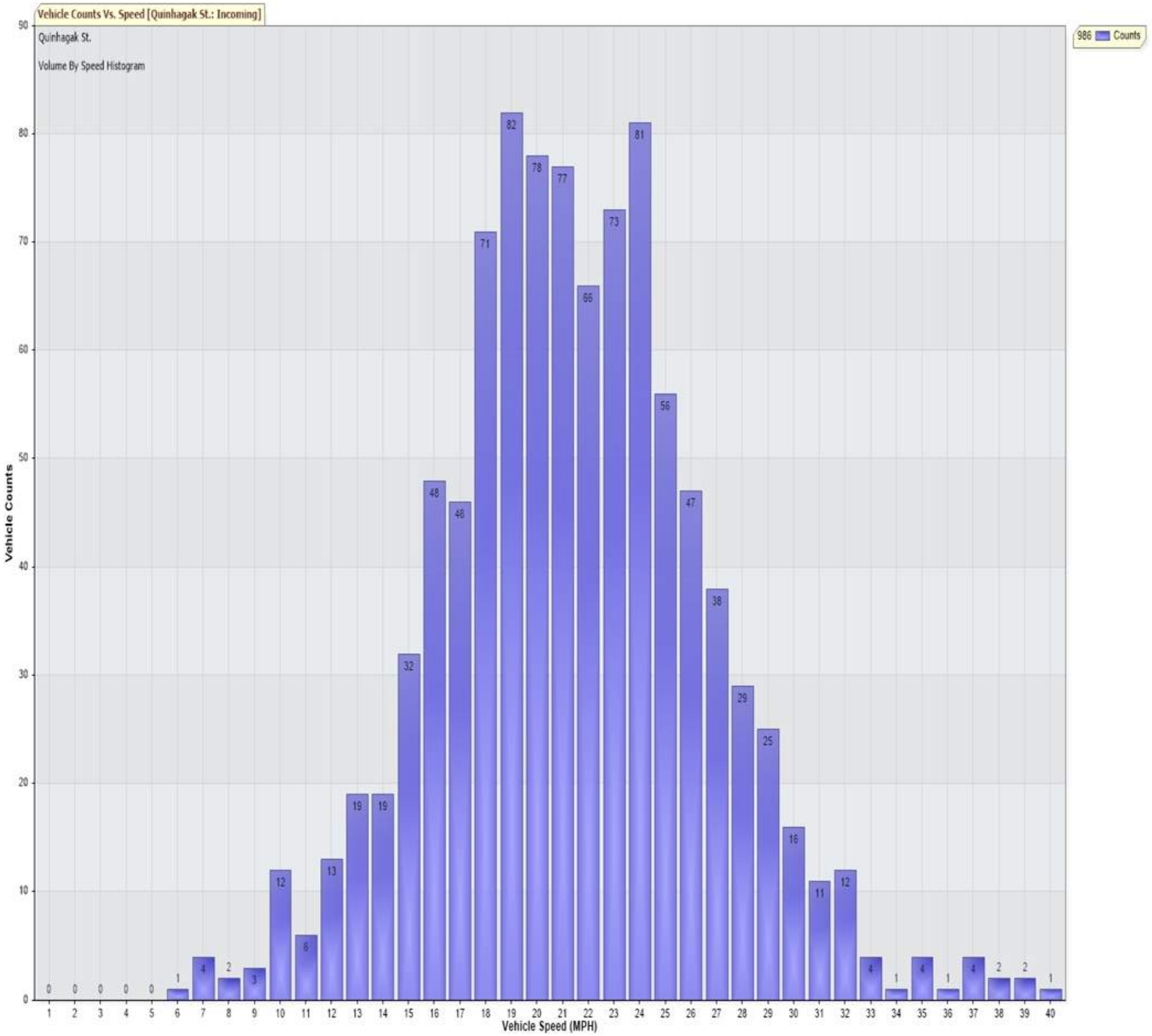

Incoming:Average Hourly Volume for Week of 7/11/2022
Average Counts By Hour (7/11/2022)
Average Counts By Hour (7/11/2022)
Quinhagak St.
Average Weekly Volumes
Vehicles/Hour
Hour
0
5
10
15
20
25
30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

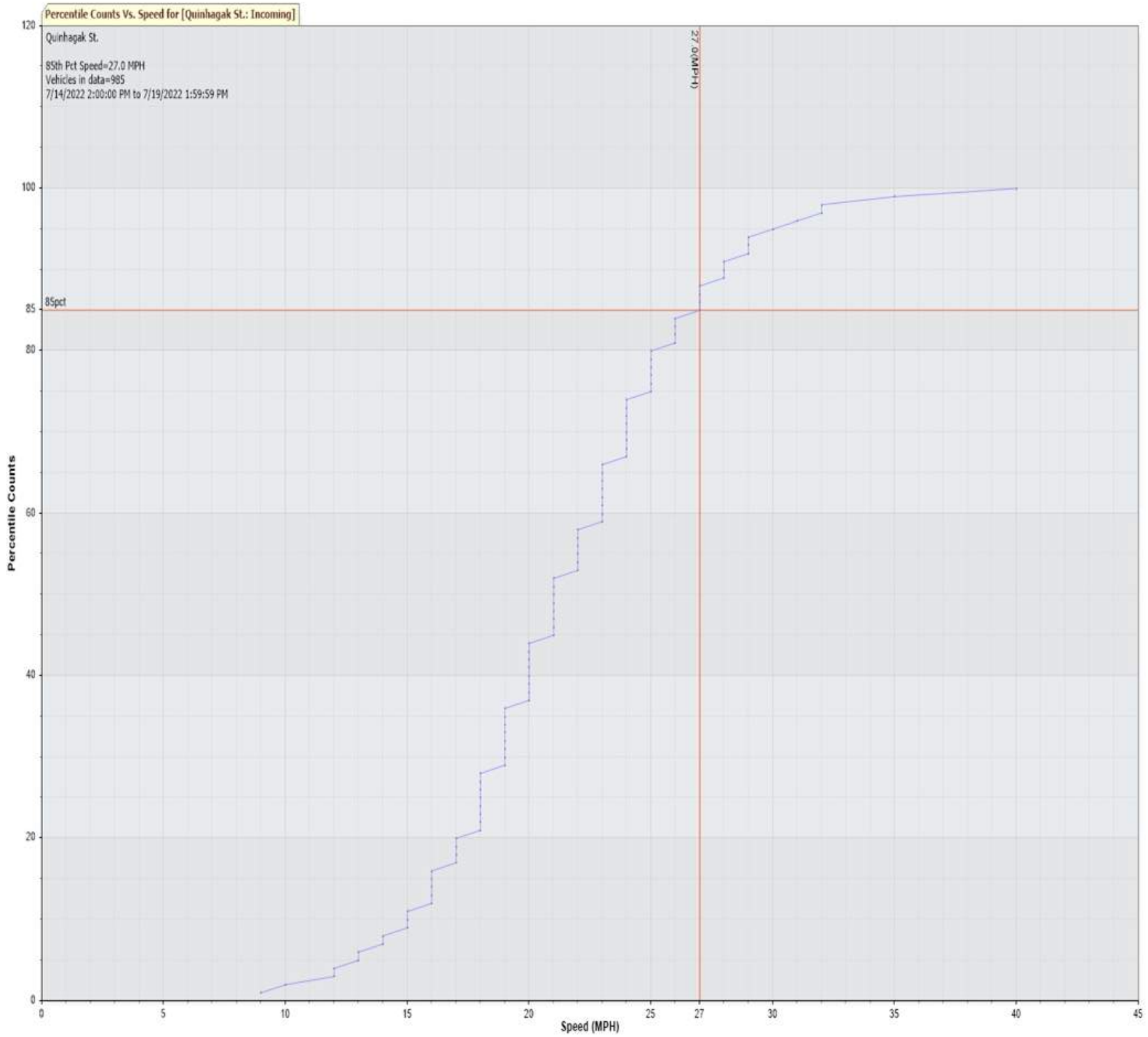

Incoming:Average Hourly WEEKDAY Speeds for Week of 7/11/2022
Average Hourly WEEKDAY Speeds By Hour (7/11/2022)
Average Hourly WEEKDAY Speeds By Hour (7/11/2022)
Quinhagak St.
Average Weekly Speeds
MPH
Hour
0
5
10
15
20
25
30
35
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

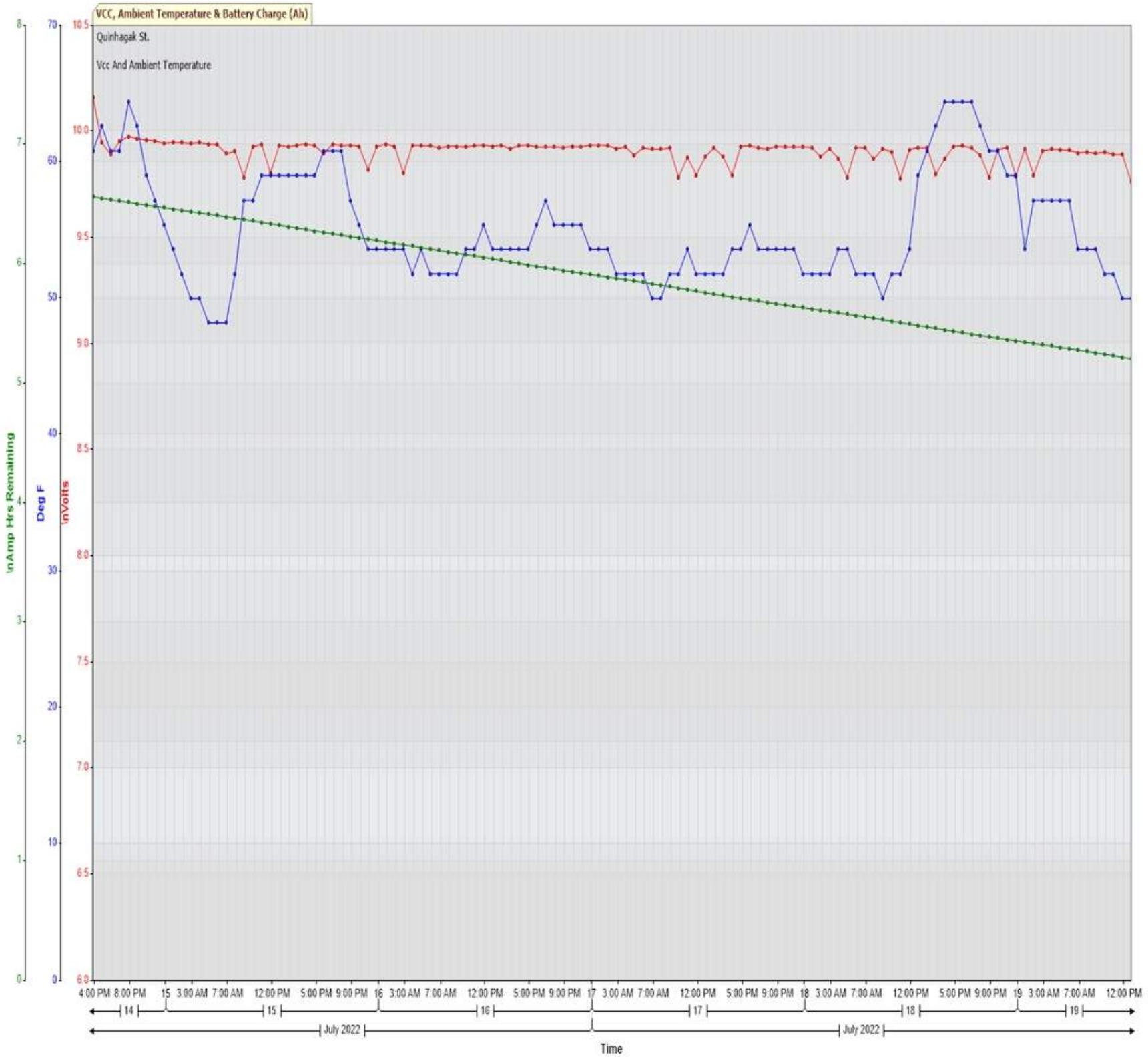

Incoming:Daily Volume for Week of 7/11/2022
Daily Vehicle Counts
Daily Vehicle Counts
Quinhagak St.
Daily Volumes
300
250
200
150
100
50
0
Vehicles
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Day


Zoom help
Average Vehicle Speed (MPH) vs. Time [Quinhagak St.:Incoming]
Quinhagak St.
Average Speed Chart
Average Vehicle Speed
Total Vehicles Displayed=986
Vehicles Detected
(size of bubble = vehicle density)
7/14/2022 3:04:37 PM through 7/19/2022 1:17:40 PM
Avg Speed:(15 Minutes)
0
5
10
15
20
25
30
35
40
45
4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM 5:00 PM 10:00 PM 3:00 AM 8:00 AM 1:00 PM 6:00 PM 11:00 PM 4:00 AM 9:00 AM 2:00 PM 7:00 PM 1:00 AM 6:00 AM 11:00 AM 4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM
Thursday 14
Friday 15
Saturday 16
Sunday 17
Monday 18
Tuesday 19
July 10
July 17


Zoom help
Vehicle Counts vs. Time [Quinhagak St.: Incoming]
Quinhagak St.
Vehicle Volumes
Vehicle Counts vs. Time \nTotal Vehicles Displayed=986
Vehicle Counts (15 Minutes)
0
2
4
6
8
10
12
4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM 5:00 PM 10:00 PM 3:00 AM 8:00 AM 1:00 PM 6:00 PM 11:00 PM 4:00 AM 9:00 AM 2:00 PM 7:00 PM 1:00 AM 6:00 AM 11:00 AM 4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM
Thursday 14
Friday 15
Saturday 16
Sunday 17
Monday 18
Tuesday 19
July 10
July 17


Vehicle Counts Vs. Speed [Quinhagak St.: Incoming]
Quinhagak St.
Volume By Speed Histogram
986 Counts
Vehicle Counts
Vehicle Speed (MPH)
0 0 0 0 0 1 4 2 3 12 6 13 19 19 32 48 46 71 82 78 77 66 73 81 56 47 38 29 25 16 11 12 4 1 4 1 4 2 2 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
0 10 20 30 40 50 60 70 80 90


Percentile Counts Vs. Speed for [Quinhagak St.: Incoming]
Quinhagak St.
85th Pct Speed=27.0 MPH
Vehicles in data=985
7/14/2022 2:00:00 PM to 7/19/2022 1:59:59 PM
27.0(MPH)
85pct
Percentile Counts
Speed (MPH)
0
20
40
60
80
85
100
120
0
5
10
15
20
25
27
30
35
40
45


VCC, Ambient Temperature & Battery Charge (Ah)
Quinhagak St.
Vcc And Ambient Temperature
nAmp Hrs Remaining
Deg F
nVolts
4:00 PM 8:00 PM 15 3:00 AM 7:00 AM 12:00 PM 5:00 PM 9:00 PM 16 3:00 AM 7:00 AM 12:00 PM 5:00 PM 9:00 PM 17 3:00 AM 7:00 AM 12:00 PM 5:00 PM 9:00 PM 18 3:00 AM 7:00 AM 12:00 PM 5:00 PM 9:00 PM 19 3:00 AM 7:00 AM 12:00 PM
14
15
16
17
18
19
July 2022
July 2022
Time

For Project:	Quinhagak	St.				
Project Notes:						
Location/Name:	Outgoing					
Report Generated:	07/20/2022	16:56				
Speed Intervals	1 MPH					
Time Intervals	Instant					
Traffic Report From	07/14/2022	14:00:00	through	07/19/2022	13:59:59	
85th Percentile Speed	29 MPH					
85th Percentile Vehicles	1459					
Max Speed	57 MPH	on	07/18/2022	21:25:08		
Total Vehicles	1717					
AADT:	343					

Volumes - weekly counts

	Time	5 Day	7 Day
Average Daily		310	286
AM Peak	11:00	31	27
PM Peak	04:00	36	29

Speed

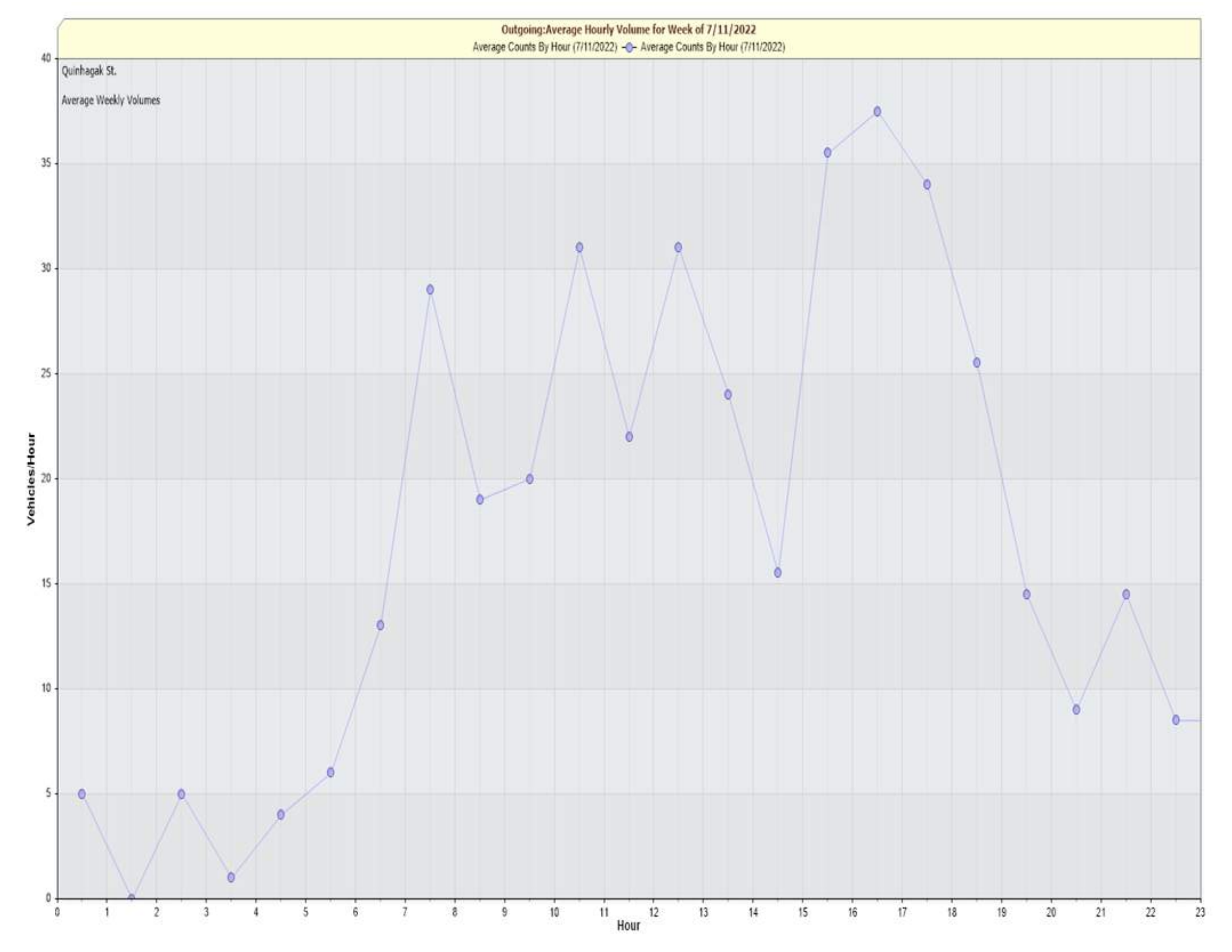
Speed Limit:	25
85th Percentile Speed:	29
Average Speed:	23.01

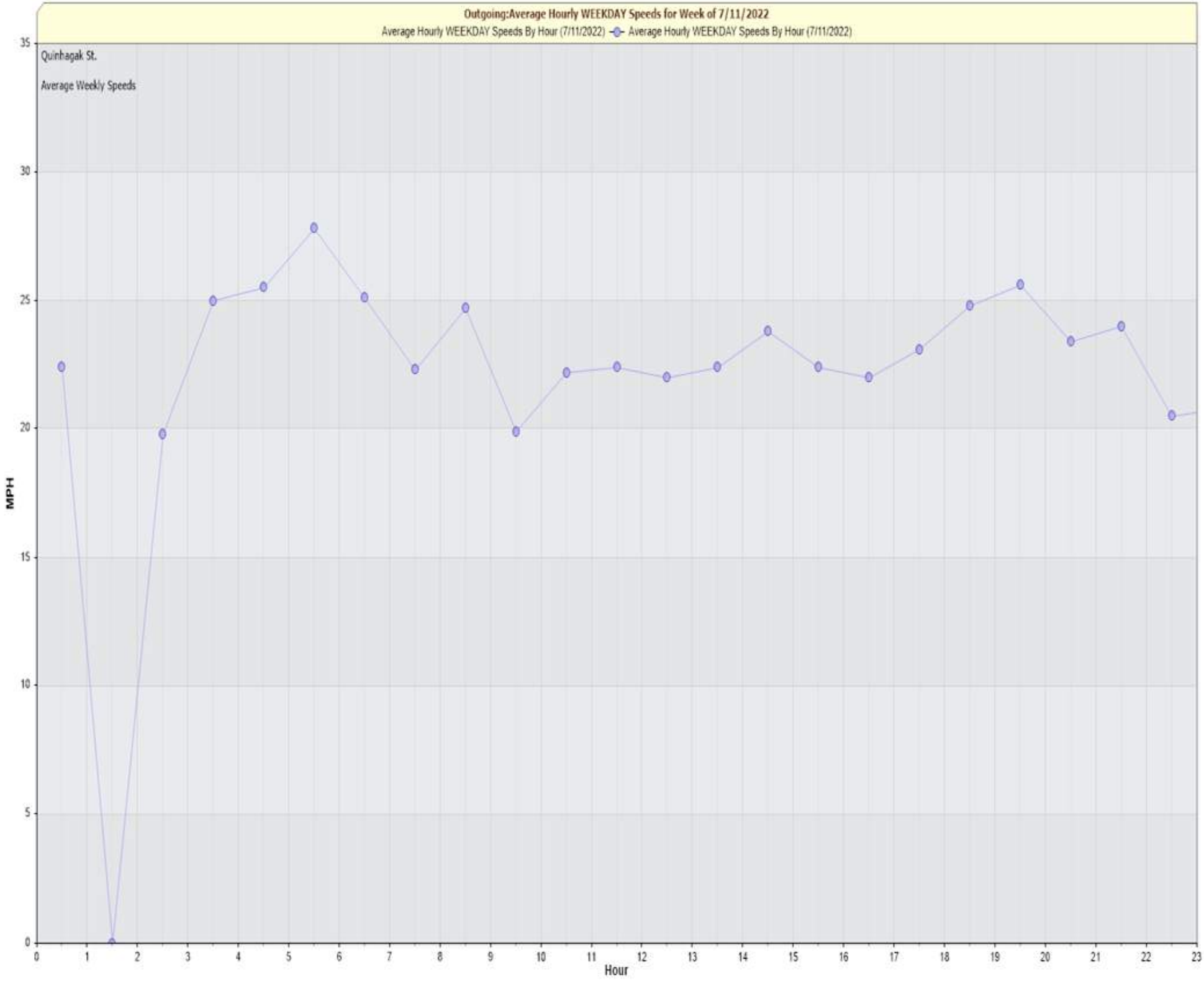
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	132	50	N/A	52	147	76	70
% over limit	30.3	26.3	N/A	27.5	34.4	28.8	33.0
Avg Speeder	30.2	29.1	N/A	29.7	29.5	29.6	30.1

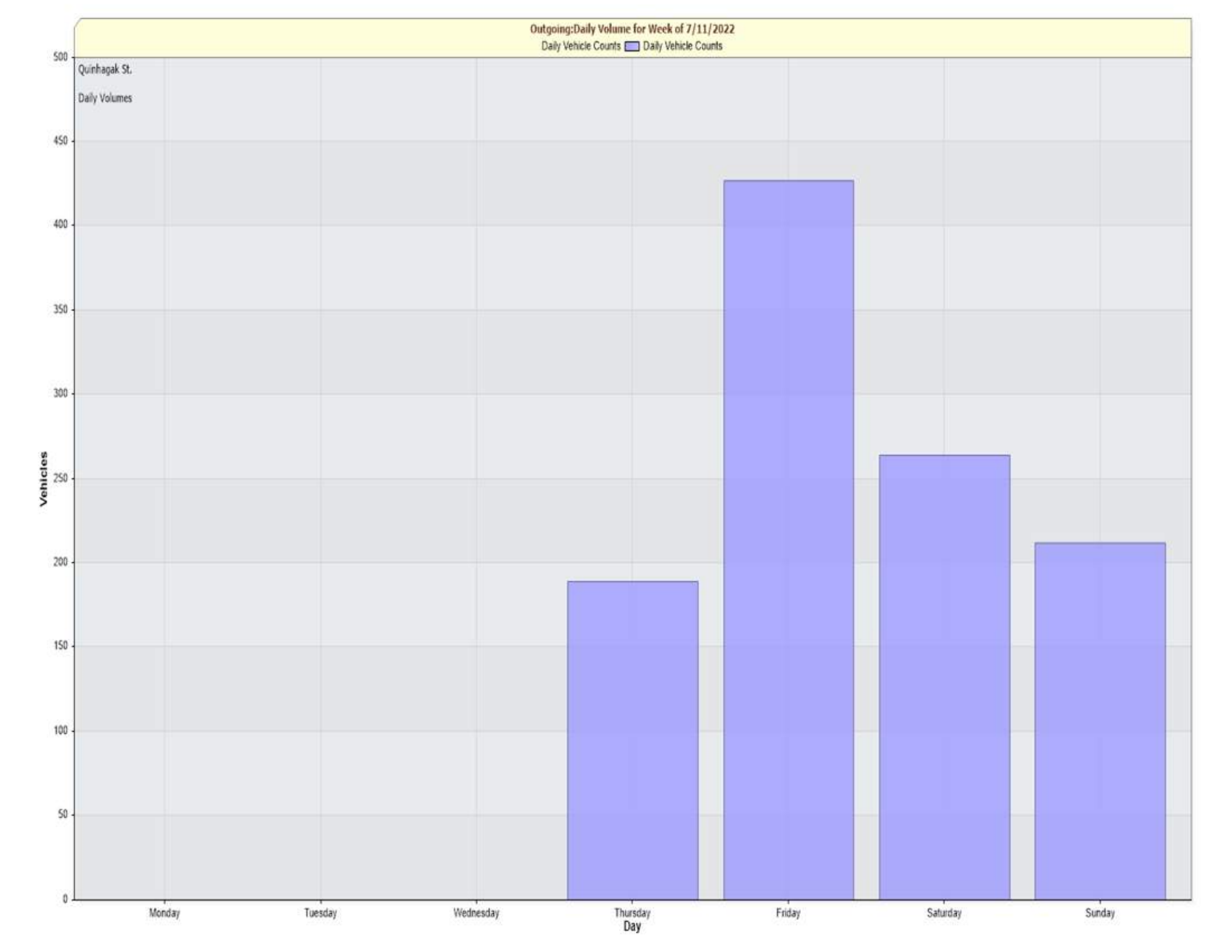
Class Counts

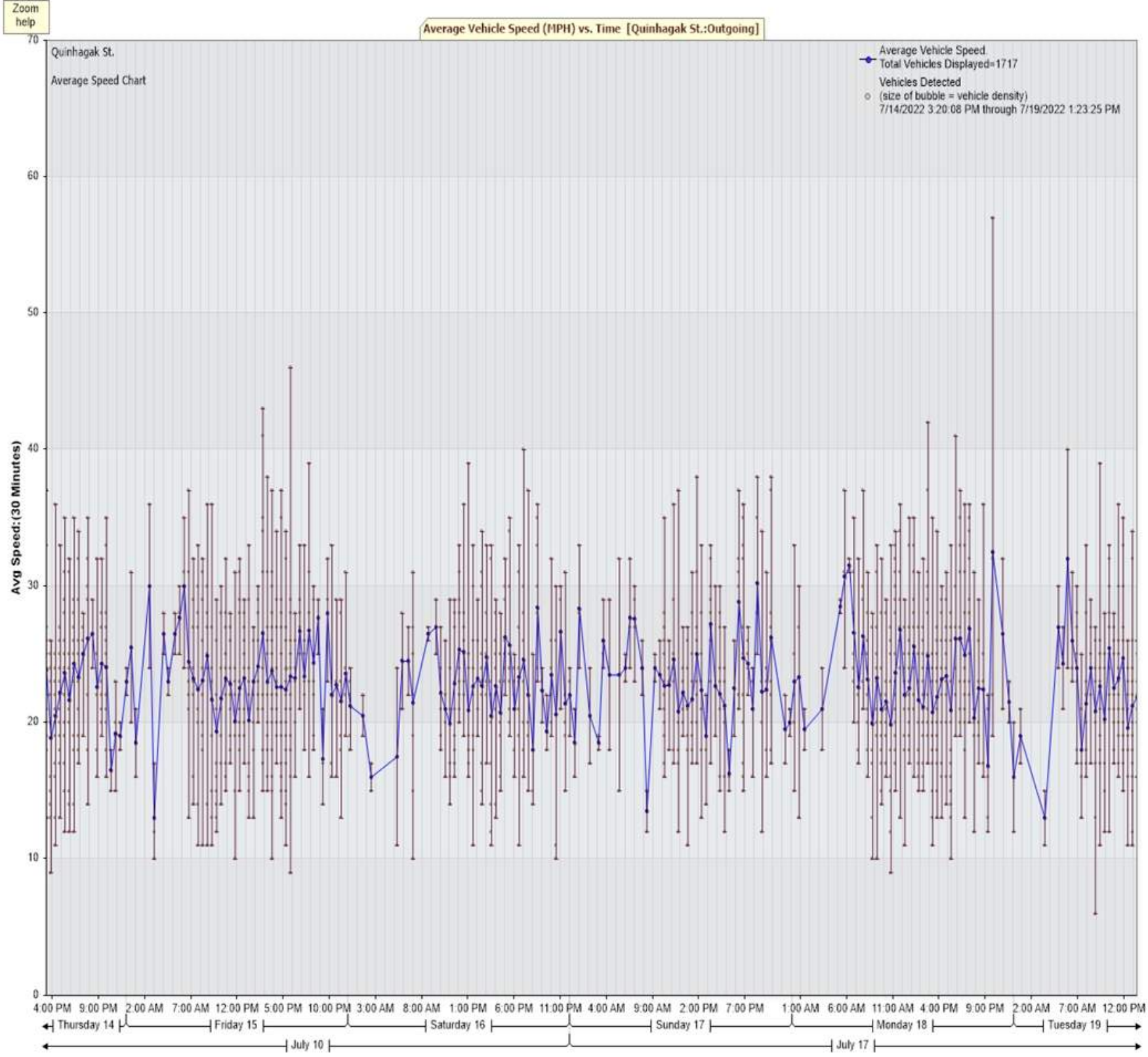
	Number	%
VEH_SM	4	0.2
VEH_MED	1650	96.1
VEH_LG	63	3.7

[VEH_SM=motorcycle, VEH_MED = sedan, VEH_LG = truck]


Outgoing:Average Hourly Volume for Week of 7/11/2022
Average Counts By Hour (7/11/2022)
Average Counts By Hour (7/11/2022)
Quinhagak St.
Average Weekly Volumes
Vehicles/Hour
Hour
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23


Outgoing:Average Hourly WEEKDAY Speeds for Week of 7/11/2022
Average Hourly WEEKDAY Speeds By Hour (7/11/2022)
Average Hourly WEEKDAY Speeds By Hour (7/11/2022)
Quinhagak St.
Average Weekly Speeds
MPH
Hour
0
5
10
15
20
25
30
35
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23


Outgoing:Daily Volume for Week of 7/11/2022
Daily Vehicle Counts
Daily Vehicle Counts
Quinhagak St.
Daily Volumes
500
450
400
350
300
250
200
150
100
50
0
Vehicles
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Day


Zoom help
Average Vehicle Speed (MPH) vs. Time [Quinhagak St.:Outgoing]
Quinhagak St.
Average Speed Chart
Average Vehicle Speed
Total Vehicles Displayed=1717
Vehicles Detected
(size of bubble = vehicle density)
7/14/2022 3:20:08 PM through 7/19/2022 1:23:25 PM
Avg Speed:(30 Minutes)
0
10
20
30
40
50
60
70
4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM 5:00 PM 10:00 PM 3:00 AM 8:00 AM 1:00 PM 6:00 PM 11:00 PM 4:00 AM 9:00 AM 2:00 PM 7:00 PM 1:00 AM 6:00 AM 11:00 AM 4:00 PM 9:00 PM 2:00 AM 7:00 AM 12:00 PM
Thursday 14
Friday 15
Saturday 16
Sunday 17
Monday 18
Tuesday 19
July 10
July 17

DataSource: MOA Data
Location: QUINHAGAK STREET, ANCHORAGE **and:** EAST 64TH AVENUE, ANCHORAGE
At: Intersection **Station: Type:** Intersection Volume **Report Date:** 11/17/2022

Study Type: Intersection Volume

START_TIME	11/17/2022 Thursday NBL	11/17/2022 Thursday NBT	11/17/2022 Thursday NBR	11/17/2022 Thursday SBL	11/17/2022 Thursday SBT	11/17/2022 Thursday SBR	11/17/2022 Thursday EBL	11/17/2022 Thursday EBT	11/17/2022 Thursday EBR	11/17/2022 Thursday WBL	11/17/2022 Thursday WBT	11/17/2022 Thursday WBR	NB	SB	EB	WB	ALL
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	1	0	1	0	0	0	0	0	0	2	1	1	0	2	4
5:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	1	2
5:30 AM	1	0	0	0	0	2	1	0	0	0	1	3	1	2	1	4	8
5:45 AM	0	0	0	0	0	1	0	1	0	0	2	0	0	1	1	2	4
6:00 AM	0	1	0	0	0	0	0	0	1	0	1	2	1	0	1	3	5
6:15 AM	1	1	0	0	0	0	0	0	0	0	1	2	2	0	0	3	5
6:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
6:45 AM	1	1	0	1	0	0	3	0	0	0	2	1	2	1	3	3	9
7:00 AM	2	1	0	0	0	4	1	0	0	0	4	2	3	4	1	6	14
7:15 AM	1	2	0	1	0	6	3	0	3	0	1	3	3	7	6	4	20
7:30 AM	2	6	0	3	3	16	6	1	0	1	3	4	8	22	7	8	45
7:45 AM	2	1	0	0	4	53	36	0	3	1	5	2	3	57	39	8	107
8:00 AM	3	1	0	2	2	64	43	4	16	0	6	4	4	68	63	10	145
8:15 AM	2	4	0	2	4	14	36	1	3	0	2	2	6	20	40	4	70
8:30 AM	2	2	0	2	1	3	1	0	2	0	1	3	4	6	3	4	17
8:45 AM	2	2	0	4	1	7	0	0	0	0	0	4	4	12	0	4	20
9:00 AM	1	3	0	0	2	6	3	0	0	1	2	1	4	8	3	4	19
9:15 AM	3	1	0	1	3	3	1	0	0	1	2	1	4	7	1	4	16
9:30 AM	2	0	1	1	1	5	2	0	0	0	2	1	3	7	2	3	15
9:45 AM	1	3	1	0	1	2	1	1	1	0	1	2	5	3	3	3	14
10:00 AM	2	1	0	1	2	3	3	2	0	0	1	4	3	6	5	5	19

10:15 AM	1	0	0	3	0	4	4	1	1	0	1	0	1	7	6	1	15
10:30 AM	2	0	0	2	1	5	0	1	0	0	2	3	2	8	1	5	16
10:45 AM	0	4	0	1	2	5	3	1	2	0	2	3	4	8	6	5	23
11:00 AM	1	1	0	2	2	5	4	0	0	0	2	0	2	9	4	2	17
11:15 AM	0	0	0	2	3	10	4	1	0	0	0	1	0	15	5	1	21
11:30 AM	2	0	0	3	1	5	5	0	0	0	2	2	2	9	5	4	20
11:45 AM	3	1	0	4	3	5	3	0	2	2	2	2	4	12	5	6	27
12:00 PM	3	1	0	3	2	4	5	0	1	0	1	2	4	9	6	3	22
12:15 PM	0	2	1	0	2	6	3	2	1	0	3	3	3	8	6	6	23
12:30 PM	2	0	0	1	2	8	8	1	2	1	3	1	2	11	11	5	29
12:45 PM	1	1	0	1	2	5	5	0	1	0	0	1	2	8	6	1	17
1:00 PM	2	0	0	4	0	11	4	1	2	0	1	0	2	15	7	1	25
1:15 PM	0	2	0	3	2	5	1	3	0	1	1	2	2	10	4	4	20
1:30 PM	3	1	1	2	3	8	6	1	2	0	3	2	5	13	9	5	32
1:45 PM	2	2	0	0	4	6	2	0	2	0	0	1	4	10	4	1	19
2:00 PM	0	1	0	0	5	7	6	0	2	0	0	0	1	12	8	0	21
2:15 PM	1	1	0	5	4	9	4	1	3	0	1	1	2	18	8	2	30
2:30 PM	1	1	0	3	4	20	11	0	4	1	2	2	2	27	15	5	49
2:45 PM	2	1	0	1	1	33	5	0	2	0	3	0	3	35	7	3	48
3:00 PM	0	4	0	4	3	27	68	1	17	0	1	1	4	34	86	2	126
3:15 PM	2	1	0	6	4	10	21	2	3	0	1	6	3	20	26	7	56
3:30 PM	0	3	0	2	4	11	4	1	3	0	2	2	3	17	8	4	32
3:45 PM	2	2	1	7	9	5	3	3	2	0	1	1	5	21	8	2	36
4:00 PM	0	2	0	6	3	8	3	2	2	3	3	5	2	17	7	11	37
4:15 PM	2	2	0	4	7	12	17	1	4	0	1	2	4	23	22	3	52
4:30 PM	0	2	2	7	6	10	17	1	2	0	1	3	4	23	20	4	51
4:45 PM	3	3	0	4	6	8	8	4	2	1	3	3	6	18	14	7	45
5:00 PM	1	2	1	7	1	8	7	2	2	1	0	3	4	16	11	4	35
5:15 PM	2	2	0	3	6	9	8	2	8	0	2	2	4	18	18	4	44
5:30 PM	2	2	0	2	3	5	5	2	5	0	2	1	4	10	12	3	29
5:45 PM	5	0	0	3	3	4	4	1	4	0	0	1	5	10	9	1	25
6:00 PM	0	4	0	4	2	5	1	2	0	0	1	3	4	11	3	4	22
6:15 PM	2	0	0	4	3	4	2	1	3	0	4	1	2	11	6	5	24
6:30 PM	0	2	0	3	1	4	3	0	1	0	3	5	2	8	4	8	22
6:45 PM	2	1	0	2	2	0	0	1	1	0	0	1	3	4	2	1	10
7:00 PM	1	0	0	5	3	3	0	0	2	0	3	1	1	11	2	4	18
7:15 PM	1	1	0	7	4	1	2	0	1	0	0	0	2	12	3	0	17
7:30 PM	2	2	0	3	7	0	0	0	4	0	1	2	4	10	4	3	21
7:45 PM	3	0	1	1	3	2	0	1	3	0	1	3	4	6	4	4	18
8:00 PM	0	1	0	3	6	0	0	1	0	0	0	1	1	9	1	1	12
8:15 PM	0	0	0	2	4	0	1	1	1	0	0	0	0	6	3	0	9
8:30 PM	0	0	0	1	3	0	1	2	0	0	0	0	0	4	3	0	7
8:45 PM	0	4	0	2	2	2	0	0	1	0	1	0	4	6	1	1	12
9:00 PM	1	2	0	1	4	1	0	2	0	0	1	0	3	6	2	1	12
9:15 PM	1	6	0	3	2	0	0	0	0	0	2	0	7	5	0	2	14
9:30 PM	2	1	0	2	5	1	0	0	0	0	0	0	3	8	0	0	11
9:45 PM	0	1	0	2	1	0	1	1	0	0	1	0	1	3	2	1	7
10:00 PM	1	1	0	1	1	0	1	0	0	0	1	1	2	2	1	2	7
10:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	0	2
10:30 PM	0	0	0	0	1	1	0	0	1	0	1	0	0	2	1	1	4

10:45 PM	1	0	0	1	1	0	0	0	1	0	1	0	1	2	1	1	5
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes

AM Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NB	SB	EB	WB	ALL
07:30 AM - 08:30 AM	9	12	0	7	13	147	121	6	22	2	16	12	21	167	149	30	367
Approach %	42.86%	57.14%	0.00%	4.19%	7.78%	88.02%	81.21%	4.03%	14.77%	6.67%	53.33%	40.00%	5.72%	45.50%	40.60%	8.17%	

Midday Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NB	SB	EB	WB	ALL
02:00 PM - 03:00 PM	4	4	0	9	14	69	26	1	11	1	6	3	8	92	38	10	148
Approach %	50.00%	50.00%	0.00%	9.78%	15.22%	75.00%	68.42%	2.63%	28.95%	10.00%	60.00%	30.00%	5.41%	62.16%	25.68%	6.76%	

PM Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NB	SB	EB	WB	ALL
03:00 PM - 04:00 PM	4	10	1	19	20	53	96	7	25	0	5	10	15	92	128	15	250
Approach %	26.67%	66.67%	6.67%	20.65%	21.74%	57.61%	75.00%	5.47%	19.53%	0.00%	33.33%	66.67%	6.00%	36.80%	51.20%	6.00%	

Off Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NB	SB	EB	WB	ALL
07:00 PM - 08:00 PM	7	3	1	16	17	6	2	1	10	0	5	6	11	39	13	11	74
Approach %	63.64%	27.27%	9.09%	41.03%	43.59%	15.38%	15.38%	7.69%	76.92%	0.00%	45.45%	54.55%	14.86%	52.70%	17.57%	14.86%	

Daily Total

TIME SPAN	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NB	SB	EB	WB	ALL
24 Hour	90	101	10	160	180	491	400	58	129	14	105	117	201	831	587	236	1855
Approach %	44.78%	50.25%	4.98%	19.25%	21.66%	59.09%	68.14%	9.88%	21.98%	5.93%	44.49%	49.58%	10.84%	44.80%	31.64%	12.72%	

Municipality of Anchorage

Collision Events

Date Range: **1/1/2014 - 12/31/2021**
Intersection Related: **Yes**
Location: **Street: QUINHAGAK STREET @ EAST 64TH AVENUE**

Date	Time	Dir	Street	Cross Reference	1st Harmful Event Location	Most Harmful Event	Impact	Unit No.	Most Contributing Unit	Unit Event	Vehicle Circumstances 1	Vehicle Circumstances 2	Vehicle Action	Human Circum 1	Human Circum 2	Human Circum 3	Human Circum 4	Alcohol / Drugs Suspected	Int Related
05/16/2014	02:33 PM	None	EAST 64TH AVENUE, ANCHORAGE	QUINHAGAK STREET, ANCHORAGE	Roadside	Motor Vehicle In-Transport	Front-to-Front	1	Yes	Motor Vehicle In-Transport	None		Straight ahead	Unk	HR			No / No	Related
								2	No	Motor Vehicle In-Transport	None		Stopped	Other				No / No	Related
09/25/2015	09:50 AM	None	QUINHAGAK STREET, ANCHORAGE	EAST 64TH AVENUE, ANCHORAGE	Roadway	Motor Vehicle In-Transport	Sideswipe - Same Direction	1	Yes	Motor Vehicle In-Transport	None		Passing	Improper passing				No / No	Related
								2	No	Motor Vehicle In-Transport	None		Stopped					/	Related
01/21/2020	08:21 AM	None	EAST 64TH AVENUE, ANCHORAGE	QUINHAGAK STREET, ANCHORAGE	Roadway	Motor Vehicle In-Transport	Angle	1	Yes	Motor Vehicle In-Transport	None		Straight ahead	Stop sign violation				No / No	Related
								2	No	Motor Vehicle In-Transport	None		Straight ahead	No improper driving				No / No	Related

Municipality of Anchorage

Collision Events

Date Range: **1/1/2014 - 12/31/2021**
Intersection Related: **Yes**
Location: **Street: QUINHAGAK STREET @ EAST 63RD AVENUE**

Date	Time	Dir	Street	Cross Reference	1st Harmful Event Location	Most Harmful Event	Impact	Unit No.	Most Contributing Unit	Unit Event	Vehicle Circumstances 1	Vehicle Circumstances 2	Vehicle Action	Human Circum 1	Human Circum 2	Human Circum 3	Human Circum 4	Alcohol / Drugs Suspected	Int Related
02/16/2018	02:50 PM	None	QUINHAGAK STREET, ANCHORAGE	EAST 63RD AVENUE, ANCHORAGE	Roadway	Motor Vehicle In-Transport	Angle	1	Yes	Motor Vehicle In-Transport	None		Passing	Unk	HR			No / No	Related
								2	No	Motor Vehicle In-Transport	None		Turning left	Unk				No / No	Related
								3	No	Not-In-Motion or Working Motor Vehicle is Struck by Motor Vehicle In-Transport	None		Parked					/	Related

Memorandum

Date: September 6, 2022
To: Russ Oswald, PE, PLS & Jennifer Noffke – MOA PM&E
Through: Justin Keene, PE - CRW Engineering Group, LLC
From: Kelly Yanoshek, EIT - CRW Engineering Group, LLC
Project: Quinhagak Street Reconstruction
Project No: MOA PM&E#21-13 (CRW#10155.00)
Subject: Parking Study

Purpose and Background

The Municipality of Anchorage Project Management & Engineering Department (PM&E) plans to reconstruct Quinhagak Street from East Dowling Road to Askeland Drive. To aid in the design of the improvements, an on-street parking study was completed for the project roadway. The purpose of the study was to document the current use of on-street parking for consideration in the design of the proposed improvements. Parked vehicles within the adjacent parking lots/driveways were also noted during the study to document available adjacent off-street parking.

Quinhagak Street is approximately 1,500 feet long and runs parallel and between Petersburg Street and Tuttle Place. Adjacent Quinhagak Street parcels are zoned for industrial use from East Dowling Road to East 64th Avenue then the zoning changes to residential south of East 64th Avenue to Askeland Drive. Many of the business access driveways/parking areas along Quinhagak Street are fenced off and a few of the lots have fencing with privacy slats preventing accurate parking analysis on-property.

The parking study was based on observations from four separate site visits, documenting parked vehicles located along the roadway and in visible, adjacent parking lots. Site visits were completed on one weekday afternoon/evening and one weekend afternoon/evening.

Responses from Questionnaire

A survey questionnaire was mailed and e-mailed out to the residents/owners within and near the project limits in June 2022. A total of 21 responses were received of which 5 owned properties along Quinhagak Street. The question regarding if there should be space for on-street parking along Quinhagak Street & the responses are shown in the table below.

Question	Answers
Do you think there should be space for on-street parking along Quinhagak Street?	**No (17)**, Yes (3)

Of the three respondents who answered yes, one of them lives along Quinhagak Street and the other two live within the project limits. The respondent who lives along Quinhagak Street lives northwest of the Quinhagak Street/Askeland Drive intersection.

Observations

The observations took place Thursday, July 14, 2022 and Saturday, July 16, 2022. The weather on Thursday was sunny, with temperatures in the 60s and Saturday was overcast with similar temperatures. The attached figure summarizes the parking observations during the site visits.

During the parking study only one car was parked on the roadway near Askeland Drive. This vehicle was parked in the same location for all four site visits. Parking lots/driveways were visually observed to analyze occupancy to assess available off-street parking. The parking lot observations were recorded as a percentage of capacity utilization and are also noted on the attached figure.

Recent construction on East Dowling Road at the Seward Highway may have affected the parking counts with less traffic driving through Quinhagak Street correlating to the low number of parked vehicles on the roadway.

Conclusions

With no cars observed parked on the roadway except for near Askeland Drive, there is no shortage of available on-street parking. Each business in the industrial zone north of East 64th Avenue also appears to have enough parking on their private lots.

The greatest demand for on-street parking appears to be closer to Askeland Drive in the residential zone where there are a few driveways requiring on-street parking. This is also in the same location where the lone resident responded that they think there should be space for on-street parking on Quinhagak Street.

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PM&E PROJECT NUMBER 21-13
QUINHAGAK STREET RECONSTRUCTION
PARKING STUDY

Project:	10155.00
Drawn By:	NRI
Scale:	Graphic
Date:	9/6/2022
Figure:	1

File Path: J:\JobsData\10155.00 Quinhagak Street Reconstruction\00 CADD 2019\04 GIS\05 Parking Map\05 Parking Map.aprx

Service Layer: Maxar Technologies Inc., Alaska Geospatial Office, USGS

Easement Spreadsheets

Appendix H

Quinhagak Street Reconstruction - Alternative 2: ROW Summary

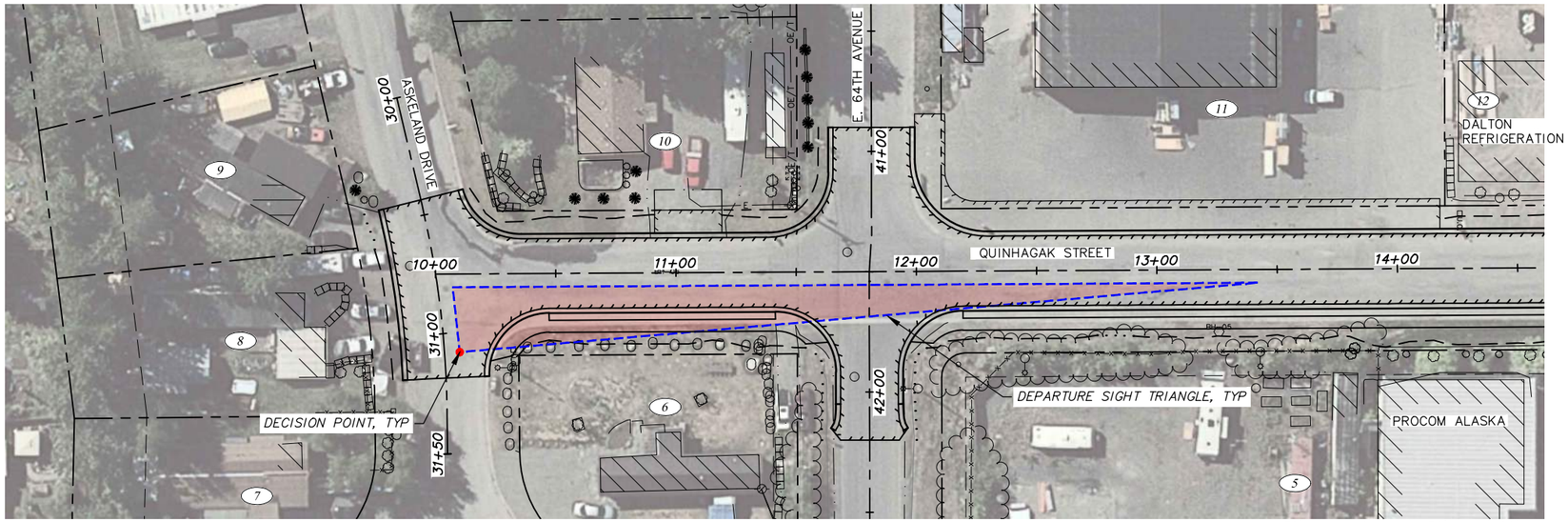
PARCEL	PUE	SE	TCE	FHE	Drainage Easement	# Of TCP's
1			X	X	X	3
2					X	1
3				X	X	1
4					X	3
5						1
6				X	X	0
7						0
8						0
9						0
10						2
11						1
12						2
13						1
14						2
15			X			2
16						2
17						2
TOTAL	0	0	2	3	5	23

Quinhagak Street Reconstruction - Alternative 3: ROW Summary

PARCEL	PUE	SE	TCE	FHE	Drainage Easement	# Of TCP's
1			X			3
2						1
3						1
4						3
5						0
6				X		1
7						0
8						0
9						0
10						2
11						1
12						1
13						1
14						1
15			X			2
16						2
17						2
TOTAL	0	0	2	1	0	21

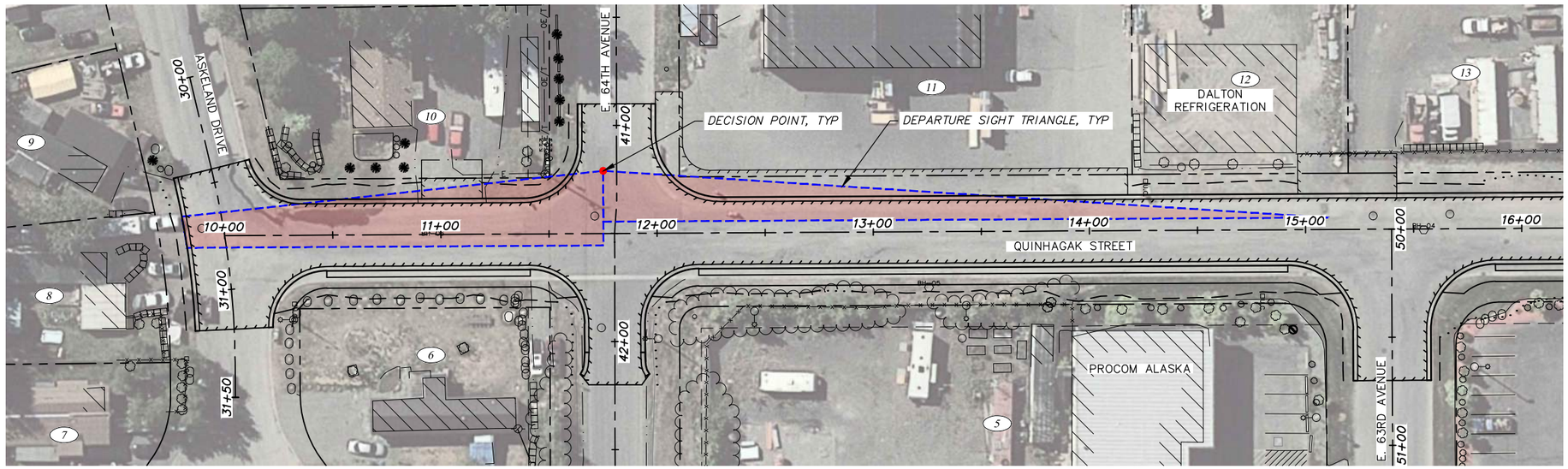
Intersection Departure Sight Triangles

Appendix I



1 **QUINHAGAK STREET & ASKELAND DRIVE INTERSECTION**

SCALE: GRAPHIC



2 **QUINHAGAK STREET & E. 64TH AVENUE INTERSECTION**

SCALE: GRAPHIC

NOTE:

DECISION POINT FOR EACH INTERSECTION IS SETBACK 18' FROM EDGE OF TRAVELED WAY PER FIGURE 1-19 OF THE MOA DCM. DESIGN SPEED OF 30 MPH FOR QUINHAGAK STREET IS USED IN SIGHT DISTANCE ANALYSIS.

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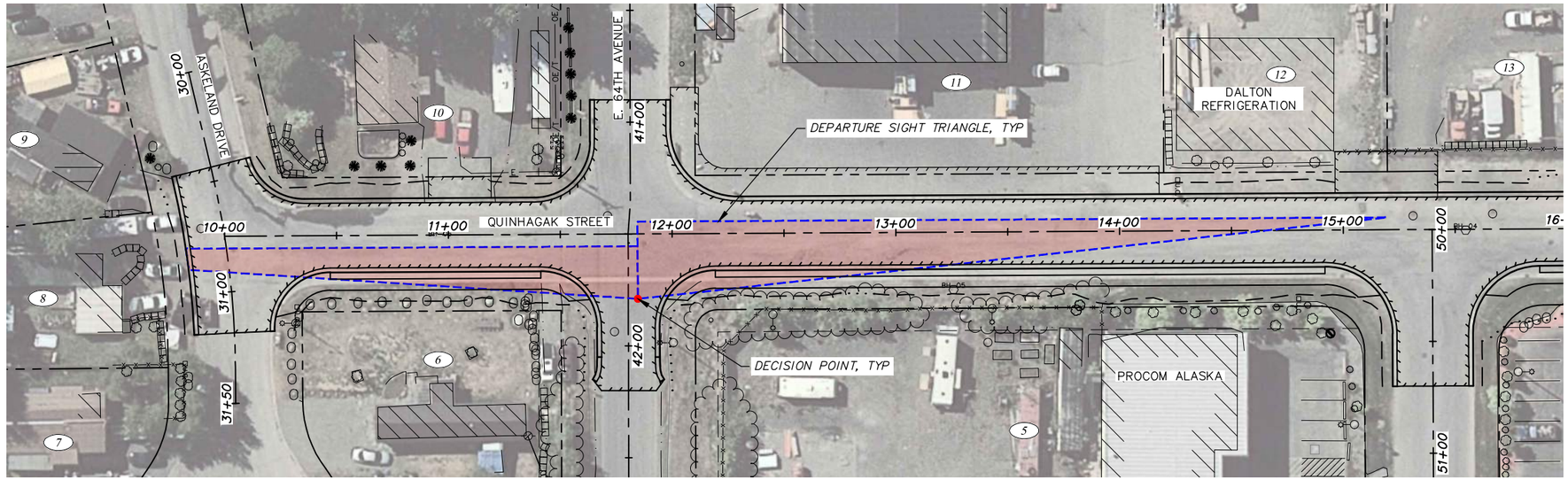
PROJECT MANAGEMENT AND ENGINEERING DEPARTMENT

21-13 QUINHAGAK STREET RECONSTRUCTION

INTERSECTION DEPARTURE SIGHT TRIANGLES

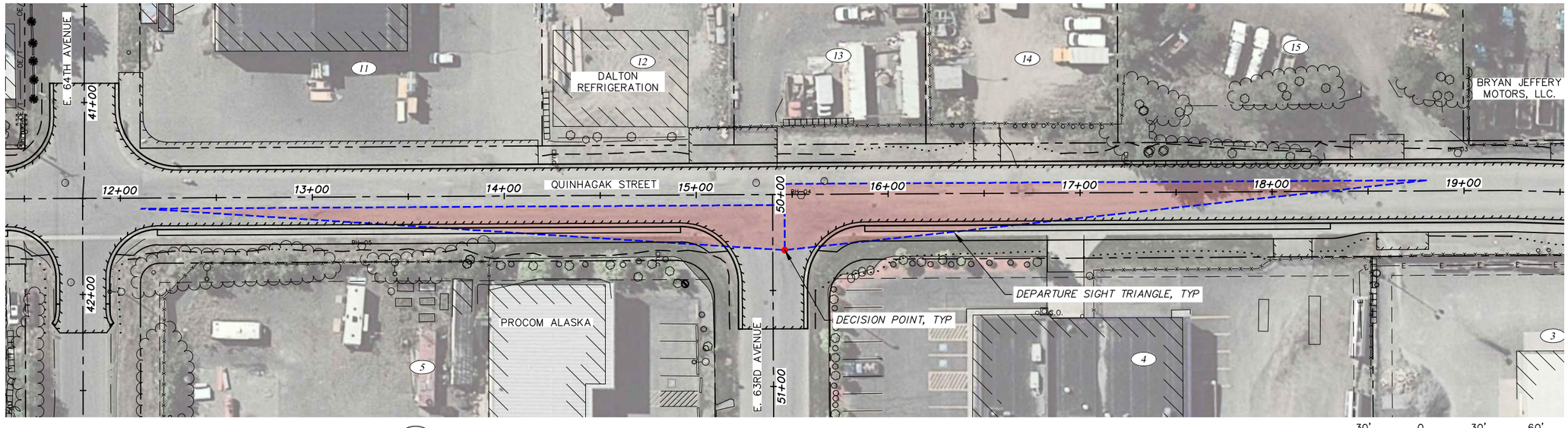
SCALE HOR. 1"=30' VER. N/A | GRID SW2033 | DATE NOV 2023 | STATUS DSR | SHEET 11 of 12

File: J:\JobsData\10155.00 Quinhagak Street Reconstruction\00 CADD 2019\02 Figures\01 DSR\03 Sight Triangles\10155.00 Intersection Sight Triangles.dwg



1 **QUINHAGAK STREET & E. 64TH AVENUE INTERSECTION**

SCALE: GRAPHIC



2 **QUINHAGAK STREET & E. 63RD AVENUE INTERSECTION**

SCALE: GRAPHIC

NOTE:

DECISION POINT FOR EACH INTERSECTION IS SETBACK 18' FROM EDGE OF TRAVELED WAY PER FIGURE 1-19 OF THE MOA DCM. DESIGN SPEED OF 30 MPH FOR QUINHAGAK STREET IS USED IN SIGHT DISTANCE ANALYSIS.

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PROJECT MANAGEMENT AND ENGINEERING DEPARTMENT

21-13 QUINHAGAK STREET RECONSTRUCTION

INTERSECTION DEPARTURE SIGHT TRIANGLES

SCALE HOR. 1"=30' VER. N/A | GRID SW2033 | DATE NOV 2023 | STATUS DSR | SHEET 12 of 12

File: J:\JobsData\10155.00 Quinhagak Street Reconstruction\00 CADD 2019\02 Figures\01 DSR\03 Sight Triangles\10155.00 Intersection Sight Triangles.dwg

Project Cost Estimates

Appendix J

Quinhagak Street Reconstruction
MOA Project No. 21-13

ENGINEER'S ESTIMATE - FINAL DSR - ALTERNATIVE 2

ITEM No.	MASS No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule A - Roadway Improvements									
A-1	20.02	Storm Water Pollution Prevention Plan (Type 3)	LS	1	1.00	0	1	$30,000	$30,000
A-2	20.03	Test Pit for Utility Locate	Hour	24	1.00	0	24	$800	$19,200
A-3	20.04	Clearing and Grubbing	LS	1	1.00	0	1	$30,000	$30,000
A-4	20.07	Remove Sidewalk or Concrete Apron	SY	85	1.00	0	85	$35	$2,975
A-5	20.08	Remove Curb and Gutter	LF	3,161	1.00	0	3,161	$12	$37,932
A-6	20.09	Remove Pavement	SY	7,462	1.00	0	7,462	$4	$29,848
A-7	20.10	Unusable Excavation	CY	18,001	1.20	-2	21,600	$19	$410,400
A-8	20.12	Dewatering	LS	1	1.00	0	1	$12,000	$12,000
A-9	20.21	Classified Fill and Backfill (Type II)	Ton	10,245	1.20	-2	12,300	$18	$221,400
A-10	20.21	Classified Fill and Backfill (Type II-A)	Ton	8,324	1.20	-2	10,000	$19	$190,000
A-11	20.22	Leveling Course	Ton	730	1.06	-1	770	$60	$46,200
A-12	20.25	Geotextile (Type A)	SY	9,618	1.00	-1	9,620	$2	$19,240
A-13	20.26	Insulation Board (R-9)	SF	69,234	1.01	-1	69,930	$4	$279,720
A-14	20.26	Insulation Board (R-4.5)	SF	6,034	1.01	-1	6,090	$3	$18,270
A-15	30.02	P.C.C. Curb and Gutter (All Types)	LF	3,216	1.00	0	3,216	$40	$128,640
A-16	30.03	P.C.C. Sidewalk (6" Thick, Standard Finish)	SY	782	1.00	0	782	$120	$93,840
A-17	30.04	P.C.C. Curb Ramp (6" Thick)	EA	7	1.00	0	7	$4,500	$31,500
A-18	30.04	Detectable Warnings	SF	77	1.00	0	77	$150	$11,550
A-19	30.10	Colored Concrete (Red, 6" Thick, Imprinted)	SY	283	1.00	0	283	$300	$84,900
A-20	40.06	A.C. Pavement (Class D)	Ton	665	1.00	0	665	$175	$116,375
A-21	40.06	A.C. Pavement (Class E)	Ton	758	1.06	-1	800	$175	$140,000
A-22	50.06	Remove and Replace Manhole Cone Section	EA	3	1.00	0	3	$2,650	$7,950
A-23	50.06	Remove and Replace Manhole Cover and Frame	EA	4	1.00	0	4	$1,400	$5,600
A-24	55.08	Adjust Storm Drain Manhole Ring to Finish Grade	EA	1	1.00	0	1	$1,000	$1,000
A-25	60.03	Remove and Replace Valve Box Top Section	EA	9	1.00	0	9	$700	$6,300
A-26	60.04	Furnish and Install Fire Hydrant Assembly (Single Pumper)	EA	3	1.00	0	3	$12,000	$36,000
A-27	60.05	Adjust Key Box	EA	5	1.00	0	5	$600	$3,000
A-28	60.08	Decommission Fire Hydrant Assembly (Single Pumper)	EA	3	1.00	0	3	$3,500	$10,500
A-29	65.02	Construction Survey Measurement	LS	1	1.00	0	1	$50,000	$50,000
A-30	65.02	Two-Person Survey Crew	Hour	40	1.00	0	40	$250	$10,000
A-31	70.08	Remove and Reset Fence	LF	119	1.05	0	125	$55	$6,875
A-32	70.08	Remove Fence	LF	10	1.00	0	10	$14	$140
A-33	70.08	Remove and Reset Gate	LF	86	1.00	0	86	$20	$1,720
A-34	70.10	Inlaid Traffic Markings (Methyl Methacrylate, 24" White, 125 Mil)	LF	78	1.00	0	78	$100	$7,800
A-35	70.11	Standard Sign	SF	66	1.00	0	66	$110	$7,260
A-36	70.12	Traffic Maintenance	LS	1	1.00	0	1	$190,000	$190,000
A-37	70.16	Temporary Group Mailboxes	LS	1	1.00	0	1	$7,000	$7,000
A-38	70.17	Relocate Mailbox	EA	1	1.00	0	1	$800	$800
A-39	70.22	Removal/Disposal and/or Salvage/Installation of Obstructions	LS	1	1.00	0	1	$20,000	$20,000
A-40	70.23	Temporary Fencing	LF	205	1.05	0	215	$20	$4,300
A-41	75.11	Salvage and Relocate or Dispose Existing Boulder	EA	20	1.00	0	20	$150	$3,000
A-42	75.12	Temporary Tree Protection Fence	LF	300	1.00	0	300	$18	$5,400
A-43	75.13	Landscaping	LS	1	1.00	0	1	$25,000	$25,000
								TOTAL	**$2,363,635**

ITEM No.	MASS No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule B - Drainage Improvements									
B-1	20.13	Trench Dewatering	LS	1	1.00	0	1	$75,000	$75,000
B-2	20.13	Trench Excavation and Backfill (Various Depths)	LF	3,182	1.00	0	3,182	$35	$111,370
B-3	20.15	Furnish Trench Backfill (Type II)	Ton	580	1.20	0	696	$20	$13,920
B-4	20.19	Foundation Backfill (Type C Filter Material)	Ton	200	1.10	0	220	$35	$7,700
B-5	20.26	Insulation Board (R-20)	SF	1,000	1.10	0	1,100	$7	$7,700
B-6	20.27	Disposal of Unusable or Surplus Material	CY	296	1.20	0	355	$25	$8,875
B-7	55.03	Furnish, Install, and Televise Subdrain with Geotextile (10-Inch, Type SP, (	LF	110	1.00	0	110	$75	$8,250
B-8	55.03	Furnish, Install, and Televise Subdrain with Geotextile (12-Inch, Type SP, (	LF	1,336	1.00	0	1,336	$85	$113,560
B-9	55.03	Furnish, Install, and Televise Subdrain with Geotextile (18-Inch, Type SP, (	LF	1,340	1.00	0	1,340	$95	$127,300
B-10	55.03	Furnish, Install, and Televise Subdrain with Geotextile (24-Inch, Type SP, (	LF	122	1.00	0	122	$125	$15,250
B-11	55.03	Furnish, Install, and Televise Subdrain with Geotextile (30-Inch, Type SP, (	LF	230	1.00	0	230	$135	$31,050
B-12	55.03	Furnish, Install, and Televise Subdrain with Geotextile (36-Inch, Type SP, (	LF	44	1.00	0	44	$200	$8,800
B-13	55.04	Connect to Existing Storm Drain System	EA	6	1.00	0	6	$3,000	$18,000
B-14	55.05	Construct (Type I) Manhole	EA	10	1.00	0	10	$7,000	$70,000
B-15	55.05	Construct (Type I) Catch Basin Manhole	EA	1	1.00	0	1	$8,000	$8,000
B-16	55.05	Construct (Type II) Manhole	EA	3	1.00	0	3	$11,000	$33,000
B-17	55.05	Construct (Type II) Catch Basin Manhole	EA	8	1.00	0	8	$11,500	$92,000
B-18	55.05	Construct (Type II) Bypass Manhole	EA	1	1.00	0	1	$30,000	$30,000
B-19	55.09	Construct Catch Basin	EA	11	1.00	0	11	$6,000	$66,000
B-20	55.11	Remove Manhole	EA	7	1.00	0	7	$1,200	$8,400
B-21	55.11	Remove Catch Basin	EA	10	1.00	0	10	$1,000	$10,000
B-22	55.18	Construct Footing Drain Service with Geotextile (6-inch, Type SP, Class 2	EA	11	1.00	0	11	$2,500	$27,500
B-23	55.22	Oil and Grit Separator (Stormceptor STC XXX)	EA	1	1.00	0	1	$30,000	$30,000
B-24	55.27	Storm Drain Bypass System	LS	1	1.00	0	1	$60,000	$60,000
B-25	70.07	Remove Pipe	LF	1,417	1.00	0	1,417	$15	$21,255
								TOTAL	**$1,002,930**

Quinhagak Street Reconstruction
MOA Project No. 21-13

ENGINEER'S ESTIMATE - FINAL DSR - ALTERNATIVE 2

ITEM No.	MASS No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule C - Illumination Improvements									
C-1	80.01	Temporary Illumination	LS	1	1.00	0	1	$10,000	$10,000
C-2	80.02	Trench and Backfill (2'W x 3.5'D)	LF	1,520	1.10	-1	1,670	$17	$28,390
C-3	80.04	Driven Pile Luminaire Pole Foundations	EA	11	1.00	0	11	$2,500	$27,500
C-4	80.05	Fixed Base Luminaire Pole (26-29 Ft. Length)	EA	11	1.00	0	11	$4,800	$52,800
C-5	80.05	Spare Fixed Base Luminaire Pole (28 Ft. Length)	EA	1	1.00	0	1	$3,750	$3,750
C-6	80.05	Luminaire Arm (6-17 Ft. Length)	EA	14	1.00	0	14	$850	$11,900
C-7	80.07	GRC Steel Conduit (2 inch)	LF	1,647	1.05	-1	1,730	$23	$39,790
C-8	80.08	Junction Box (Type IA)	EA	13	1.00	0	13	$1,250	$16,250
C-9	80.10	3 Conductor 8 AWG Type XHHW-2 Cable	LF	1,604	1.05	-1	1,680	$8	$13,440
C-10	80.23	Luminaire (5000 Lm, Medium, Type 2)	EA	8	1.00	0	8	$561	$4,488
C-11	80.23	Luminaire (6000 Lm, Medium, Type 2)	EA	2	1.00	0	2	$611	$1,222
C-12	80.23	Luminaire (7000 Lm, Medium, Type 2)	EA	4	1.00	0	4	$661	$2,644
C-13	80.23	Spare Luminaire (5000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$411	$411
C-14	80.23	Spare Luminaire (6000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$461	$461
C-15	80.23	Spare Luminaire (7000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$511	$511
C-16	80.28	Remove Luminaire	EA	2	1.00	0	2	$1,200	$2,400
								TOTAL	**$215,957**

Schedule A - Roadway Improvements	$2,363,635
Schedule B - Drainage Improvements	$1,002,930
Schedule C - Illumination Improvements	$215,957
Total Estimated Construction Cost:	**$3,582,522**

Quinhagak Street
MOA Project No. 21-13

Utility Relocation Cost Estimate Summary Alternative 2	
Electric (CEA)	$34,000
Telephone (ACS)	$18,000
Cable Television (GCI)	$442,000
Natural Gas (ENSTAR)	$349,000
Subtotal:	*$843,000*
Construction Contingency (15%)	*$126,000*
Total Utility Relocation Cost:	**$969,000**

Quinhagak Street
MOA Project No. 21-13
ACS Utility Conflict Summary
Alternative 2

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
ACS-1	12+08	Crossing	UG Telephone	Roadway Structural Section, Storm Drain Pipe, Storm Drain Structure	Relocate	56	LF	$110	$6,160
ACS-2	24+46	Crossing	UG Telephone	Roadway Structural Section, Storm Drain Structures	Lower as Needed	50	LF	$151	$7,550

Construction Costs:	$13,710
Engineering/Administration (30%):	$4,113
Total:	**$18,000**

Quinhagak Street
MOA Project No. 21-13
CEA Utility Conflict Summary
Alternative 2

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
CEA-1	22+01	RT	Pad Mount Transformer	Storm Drain Pipe	Relocate as Needed	1	EA	$19,365	$19,365
CEA-2	24+45	Crossing	3ø 4 Wire Primary Conductor	Roadway Structural Section, Storm Drain Structures	Relocate as Needed	52	LF	$124	$6,448

Construction Costs:	$25,813
Engineering/Administration (30%):	$7,744
Total:	**$34,000**

Quinhagak Street
MOA Project No. 21-13
ENSTAR Utility Conflict Summary
Alternative 2

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
ENSTAR-1	10+23	Crossing	2" Plastic Main	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Lower as Needed	70	LF	$172	$12,019
ENSTAR-2	10+21 - 11+45	LT	2" Plastic Main	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate	125	LF	$172	$21,463
ENSTAR-3	10+54	LT	5/8" Plastic Service	Subdrain Pipe	Relocate	1	EA	$3,090	$3,090
ENSTAR-4	12+06	Crossing	12" Pressurized Transmission Main	Roadway Structural Section, Subdrain Pipe, Storm Drain Structure	Relocate	57	LF	$591	$33,664
ENSTAR-5	14+87 - 24+38	RT	2" Plastic Main	Subdrain Pipes, Storm Drain Structures	Relocate	952	LF	$172	$163,458
ENSTAR-6	14+92	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structure	Relocate	1	EA	$3,090	$3,090
ENSTAR-7	15+17	RT	2" Plastic Main	Storm Drain Structure	Relocate as Needed	17	LF	$172	$2,919
ENSTAR-8	16+37	RT	7/8" Plastic Service	Subdrain Pipe	Relocate	1	EA	$3,846	$3,846
ENSTAR-9	17+15	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe	Lower as Needed	1	EA	$3,090	$3,090
ENSTAR-10	18+59	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate	1	EA	$3,090	$3,090
ENSTAR-11	19+49	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe	Lower as Needed	1	EA	$3,090	$3,090
ENSTAR-12	20+00	RT	7/8" Plastic Service	Subdrain Pipe	Relocate as Needed	1	EA	$3,846	$3,846
ENSTAR-13	21+61	RT	7/8" Plastic Service	Roadway Structural Section, Subdrain Pipe	Relocate as Needed	1	EA	$3,846	$3,846
ENSTAR-14	24+36	Crossing	7/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate as Needed	1	EA	$3,846	$3,846
ENSTAR-15	24+38	RT	7/8" Plastic Service	Storm Drain Structures	Relocate as Needed	1	EA	$3,846	$3,846

Construction Costs:	$268,202
Engineering/Administration (30%)	$80,461
Total:	**$349,000**

Quinhagak Street
MOA Project No. 21-13
GCI Utility Conflict Summary
Alternative 2

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
GCI-1	10+25 - 11+54	RT	.750 Coaxial Cable	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate	143	LF	$110	$15,730
GCI-2	10+27 - 11+55	RT	.500 Coaxial Cable	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate as Needed	142	LF	$96	$13,632
GCI-3	10+32	RT	CATV Pedestal	Roadway Structural Section, Subdrain Pipe, Storm Drain Structure	Relocate as Needed	1	EA	$1,476	$1,476
GCI-4	11+51	Crossing	.625 Coaxial Cable	Roadway Structural Section	Lower as Needed	49	LF	$103	$5,047
GCI-5	11+57	Crossing	.500 and .750 Coaxial Cables	Roadway Structural Section	Lower as Needed	98	LF	$103	$10,094
GCI-6	11+62 - 12+00	LT	.500 and .750 Coaxial Cables	Roadway Structural Section	Lower as Needed	75	LF	$103	$7,725
GCI-7	11+54 - 14+80	RT	.625 Coaxial Cable	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate	329	LF	$103	$33,887
GCI-8	12+21 - 16+01	LT	.750 Coaxial Cable	Storm Drain Pipe, Storm Drain Structures	Relocate	381	LF	$110	$41,910
GCI-9	12+21 - 17+24	LT	.500 Coaxial Cable	Roadway Structural Section, Subdrain Pipes, Storm Drain Structures	Relocate	506	LF	$96	$48,576
GCI-10	13+99 - 14+33	LT	.625 Coaxial Cable	Subdrain Pipe, Storm Drain Structures	Lower as Needed	34	LF	$103	$3,502
GCI-11	14+26	LT	CATV Pedestal	Storm Drain Structures	Relocate as Needed	1	EA	$1,476	$1,476
GCI-12	14+26 - 17+24	LT	(2) .625 Coaxial Cables	Subdrain Pipes, Storm Drain Structures	Relocate	600	LF	$103	$61,800
GCI-13	14+80	RT	CATV Pedestal	Subdrain Pipe	Relocate as Needed	1	EA	$1,476	$1,476
GCI-14	17+24	LT	CATV Pedestal	Subdrain Pipe	Relocate as Needed	1	EA		$0
GCI-15	17+24 - 24+46	LT	.750 Coaxial Cable	Roadway Structural Section, Subdrain Pipes, Storm Drain Structures	Relocate	725	LF	$110	$79,750
GCI-16	24+03	LT	Communications Vault	Subdrain Pipe	Relocate as Needed	1	EA	$5,906	$5,906
GCI-17	24+47	Crossing	UG Fiber Optic Cables	Roadway Structural Section	Lower as Needed	48	LF	$165	$7,920

Construction Costs:	$339,907
Engineering/Administration (30%)	$101,972
Total:	**$442,000**

Date: 11/1/2023 **Basis:** **Prepared By:** **CRW** **Ver. 5.1**

Project: Quinhagak Street Reconstruction Alternative 2

Project Number: **21-13** [B]=local bond; [S]=state grant; [F]= federal grant

DESIGN		Design Management	$52,527	
	Start 20??	PM&E Design Services	$0	
		PM&E Design Survey	$0	
		PM&E Design Soil	$0	
		Contractual Dsgn Sers (Basic)	$570,000	
		Contractual Dsgn Sers (Add'l)	$215,000	
		Contractual Design Survey	$70,000	
		Contractual Design Soils	$33,000	
		Miscellaneous	$0	
Subtotal				$940,527
UTILITIES		AWWU	$0	
	Start 20??	MOA Shoring	$0	
		CEA	$39,000	
		ACS	$21,000	
		GCI	$508,000	
		Enstar	$401,000	
Subtotal				$969,000
ROW		Real Estate Services	$43,000	
	Start 20??	Land Acquisition	$32,000	
Subtotal				$75,000
CONSTRUCTION		Construction Management	$82,409	
	Start 20??	Inspection	$218,563	
		Materials Testing	$35,830	
		Survey	$32,247	
		Miscellaneous	$0	
		Construction Contract	$3,583,000	
Subtotal				$3,952,049
MISCELLANEOUS		Bond Overhead (15.0%)	$1,142,396	
		Grant Overhead (0.0%)	$0	
		Contingency (15%)	$537,000	
Subtotal				$1,679,396
PROJECT TOTAL				$7,615,972

WEBPAGE DATA	
Environ	$0
DS	$235,132
Prelim Dsgn	$470,263
Final Dsgn	$235,132
ROW	$75,000
Utilities	$969,000
Const	$5,631,445
Total	$7,615,972

Quinhagak Street Reconstruction
MOA Project No. 21-13

ENGINEER'S ESTIMATE - FINAL DSR - ALTERNATIVE 3

ITEM No.	MASS No.	Special No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule A - Roadway Improvements										
A-1	20.02		Storm Water Pollution Prevention Plan (Type 3)	LS	1	1.00	0	1	$31,000	$31,000
A-2	20.03		Test Pit for Utility Locate	Hour	24	1.00	0	24	$800	$19,200
A-3	20.04		Clearing and Grubbing	LS	1	1.00	0	1	$31,000	$31,000
A-4	20.07		Remove Sidewalk or Concrete Apron	SY	85	1.00	0	85	$35	$2,975
A-5	20.08		Remove Curb and Gutter	LF	3,161	1.00	0	3,161	$12	$37,932
A-6	20.09		Remove Pavement	SY	7,462	1.00	0	7,462	$4	$29,848
A-7	20.10		Unusable Excavation	CY	19,082	1.20	-2	22,900	$19	$435,100
A-8	20.12		Dewatering	LS	1	1.00	0	1	$12,000	$12,000
A-9	20.21		Classified Fill and Backfill (Type II)	Ton	12,229	1.20	-2	14,700	$18	$264,600
A-10	20.21		Classified Fill and Backfill (Type II-A)	Ton	9,008	1.20	-2	10,800	$19	$205,200
A-11	20.22		Leveling Course	Ton	750	1.06	-1	800	$60	$48,000
A-12	20.25		Geotextile (Type A)	SY	9,618	1.00	-1	9,620	$2	$19,240
A-13	20.26		Insulation Board (R-9)	SF	69,234	1.01	-1	69,930	$4	$279,720
A-14	20.26		Insulation Board (R-4.5)	SF	6,034	1.01	-1	6,090	$3	$18,270
A-15	30.02		P.C.C. Curb and Gutter (All Types)	LF	3,216	1.00	0	3,216	$40	$128,640
A-16	30.03		P.C.C. Sidewalk (4" Thick, Standard Finish)	SY	654	1.00	0	654	$100	$65,400
A-17	30.03		P.C.C. Sidewalk (6" Thick, Standard Finish)	SY	127	1.00	0	127	$120	$15,240
A-18	30.04		P.C.C. Curb Ramp (6" Thick)	EA	7	1.00	0	7	$4,500	$31,500
A-19	30.04		Detectable Warnings	SF	77	1.00	0	77	$150	$11,550
A-20	30.10		Colored Concrete (Red, 4" Thick, Imprinted)	SY	240	1.00	0	240	$250	$60,000
A-21	30.10		Colored Concrete (Red, 6" Thick, Imprinted)	SY	43	1.00	0	43	$300	$12,900
A-22	40.06		A.C. Pavement (Class D)	Ton	665	1.06	-1	700	$175	$122,500
A-23	40.06		A.C. Pavement (Class E)	Ton	780	1.06	-1	830	$175	$145,250
A-24	50.06		Remove and Replace Manhole Cone Section	EA	3	1.00	0	3	$2,650	$7,950
A-25	50.06		Remove and Replace Manhole Cover and Frame	EA	4	1.00	0	4	$1,400	$5,600
A-26	55.08		Adjust Storm Drain Manhole Ring to Finish Grade	EA	1	1.00	0	1	$1,000	$1,000
A-27	60.03		Remove and Replace Valve Box Top Section	EA	11	1.00	0	11	$700	$7,700
A-28	60.04		Furnish and Install Fire Hydrant Assembly (Single Pumper)	EA	1	1.00	0	1	$12,000	$12,000
A-29	60.05		Adjust Key Box	EA	5	1.00	0	5	$600	$3,000
A-30	60.08		Decommission Fire Hydrant Assembly (Single Pumper)	EA	1	1.00	0	1	$3,500	$3,500
A-31	65.02		Construction Survey Measurement	LS	1	1.00	0	1	$50,000	$50,000
A-32	65.02		Two-Person Survey Crew	Hour	40	1.00	0	40	$250	$10,000
A-33	70.08		Remove and Reset Fence	LF	119	1.05	0	125	$55	$6,875
A-34	70.08		Remove Fence	LF	10	1.00	0	10	$14	$140
A-35	70.08		Remove and Reset Gate	LF	86	1.00	0	86	$20	$1,720
A-36	70.10		Inlaid Traffic Markings (Methyl Methacrylate, 24" White, 125 Mil)	LF	78	1.00	0	78	$100	$7,800
A-37	70.11		Standard Sign	SF	66	1.00	0	66	$110	$7,260
A-38	70.12		Traffic Maintenance	LS	1	1.00	0	1	$200,000	$200,000
A-39	70.16		Temporary Group Mailboxes	LS	1	1.00	0	1	$7,000	$7,000
A-40	70.17		Relocate Mailbox	EA	1	1.00	0	1	$800	$800
A-41	70.22		Removal/Disposal and/or Salvage/Installation of Obstructions	LS	1	1.00	0	1	$20,000	$20,000
A-42	70.23		Temporary Fencing	LF	205	1.05	0	215	$20	$4,300
A-43	75.11		Salvage and Relocate or Dispose Existing Boulder	EA	20	1.00	0	20	$150	$3,000
A-44	75.12		Temporary Tree Protection Fence	LF	300	1.00	0	300	$18	$5,400
A-45	75.13		Landscaping	LS	1	1.00	0	1	$25,000	$25,000
									TOTAL	**$2,417,110**

ITEM No.	MASS No.	Special No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule B - Drainage Improvements										
B-1	20.13	0.00	Trench Dewatering	LS	1	1.00	0	1	$75,000	$75,000
B-2	20.13	0.00	Trench Excavation and Backfill (Various Depths)	LF	1,820	1.00	0	1,820	$35	$63,700
B-3	20.15	0.00	Furnish Trench Backfill (Type II)	Ton	280	1.20	0	336	$20	$6,720
B-4	20.19	0.00	Foundation Backfill (Type C Filter Material)	Ton	170	1.10	0	187	$35	$6,545
B-5	20.26	0.00	Insulation Board (R-20)	SF	1,000	1.10	0	1,100	$7	$7,700
B-6	20.27	0.00	Disposal of Unusable or Surplus Material	CY	142	1.20	0	170	$25	$4,250
B-7	55.03	0.00	Furnish, Install, and Televise Subdrain with Geotextile (10-Inch, Type SP,	LF	90	1.00	0	90	$75	$6,750
B-8	55.03	0.00	Furnish, Install, and Televise Subdrain with Geotextile (12-Inch, Type SP,	LF	393	1.00	0	393	$85	$33,405
B-9	55.03	0.00	Furnish, Install, and Televise Subdrain with Geotextile (18-Inch, Type SP,	LF	984	1.00	0	984	$95	$93,480
B-10	55.03	0.00	Furnish, Install, and Televise Subdrain with Geotextile (24-Inch, Type SP,	LF	113	1.00	0	113	$125	$14,125
B-11	55.03	0.00	Furnish, Install, and Televise Subdrain with Geotextile (30-Inch, Type SP,	LF	240	1.00	0	240	$135	$32,400
B-12	55.04	0.00	Connect to Existing Storm Drain System	EA	7	1.00	0	7	$3,000	$21,000
B-13	55.05	0.00	Construct (Type I) Manhole	EA	9	1.00	0	9	$7,000	$63,000
B-14	55.05	0.00	Construct (Type I) Catch Basin Manhole	EA	0	1.00	0	0	$8,000	$0
B-15	55.05	0.00	Construct (Type II) Manhole	EA	4	1.00	0	4	$11,000	$44,000
B-16	55.05	0.00	Construct (Type II) Catch Basin Manhole	EA	0	1.00	0	0	$11,500	$0
B-17	55.05	0.00	Construct (Type II) Bypass Manhole	EA	2	1.00	0	2	$30,000	$60,000
B-18	55.09	0.00	Construct Catch Basin	EA	16	1.00	0	16	$6,000	$96,000
B-19	55.11	0.00	Remove Manhole	EA	5	1.00	0	5	$1,200	$6,000
B-20	55.11	0.00	Remove Catch Basin	EA	10	1.00	0	10	$1,000	$10,000
B-21	55.18	95.04	Construct Footing Drain Service with Geotextile (6-inch, Type SP, Class 2	EA	11	1.00	0	11	$2,500	$27,500
B-22	55.22	0.00	Oil and Grit Separator (Stormceptor STC XXX)	EA	1	1.00	0	1	$30,000	$30,000
B-23	55.27	0.00	Storm Drain Bypass System	LS	1	1.00	0	1	$60,000	$60,000
B-24	70.07	0.00	Remove Pipe	LF	1,325	1.00	0	1,325	$15	$19,875
									TOTAL	**$781,450**

Quinhagak Street Reconstruction
MOA Project No. 21-13

ENGINEER'S ESTIMATE - FINAL DSR - ALTERNATIVE 3

ITEM No.	MASS No.	Special No.	ITEM DESCRIPTION	UNIT	CALC. QUANT	CONT. FACTOR	ROUND FACTOR	EST QUANT	UNIT PRICE	TOTAL COST
Schedule C - Illumination Improvements										
C-1	80.01	0.00	Temporary Illumination	LS	1	1.00	0	1	$10,000	$10,000
C-2	80.02	0.00	Trench and Backfill (2'W x 3.5'D)	LF	1,520	1.10	-1	1,670	$17	$28,390
C-3	80.04	0.00	Driven Pile Luminaire Pole Foundations	EA	11	1.00	0	11	$2,500	$27,500
C-4	80.05	95.04	Fixed Base Luminaire Pole (26-29 Ft. Length)	EA	11	1.00	0	11	$4,800	$52,800
C-5	80.05	95.04	Spare Fixed Base Luminaire Pole (28 Ft. Length)	EA	1	1.00	0	1	$3,750	$3,750
C-6	80.05	95.04	Luminaire Arm (6-17 Ft. Length)	EA	14	1.00	0	14	$850	$11,900
C-7	80.07	0.00	GRC Steel Conduit (2 inch)	LF	1,647	1.05	-1	1,730	$23	$39,790
C-8	80.08	95.04	Junction Box (Type IA)	EA	13	1.00	0	13	$1,250	$16,250
C-9	80.10	0.00	3 Conductor 8 AWG Type XHHW-2 Cable	LF	1,604	1.05	-1	1,680	$8	$13,440
C-10	80.23	95.04	Luminaire (5000 Lm, Medium, Type 2)	EA	8	1.00	0	8	$561	$4,488
C-11	80.23	95.04	Luminaire (6000 Lm, Medium, Type 2)	EA	2	1.00	0	2	$611	$1,222
C-12	80.23	95.04	Luminaire (7000 Lm, Medium, Type 2)	EA	4	1.00	0	4	$661	$2,644
C-13	80.23	95.04	Spare Luminaire (5000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$411	$411
C-14	80.23	95.04	Spare Luminaire (6000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$461	$461
C-15	80.23	95.04	Spare Luminaire (7000 Lm, Medium, Type 2)	EA	1	1.00	0	1	$511	$511
C-16	80.28	95.04	Remove Luminaire	EA	2	1.00	0	2	$1,200	$2,400
									TOTAL	**$215,957**

Schedule A - Roadway Improvements	$2,417,110
Schedule B - Drainage Improvements	$781,450
Schedule C - Illumination Improvements	$215,957
Total Estimated Construction Cost:	**$3,414,517**

Quinhagak Street
MOA Project No. 21-13

Utility Relocation Cost Estimate Summary Alternative 3	
Electric (CEA)	$9,000
Telephone (ACS)	$18,000
Cable Television (GCI)	$356,000
Natural Gas (ENSTAR)	$276,000
Subtotal:	*$659,000*
Construction Contingency (15%)	*$99,000*
Total Utility Relocation Cost:	**$758,000**

Quinhagak Street
MOA Project No. 21-13
ACS Utility Conflict Summary
Alternative 3

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
ACS-1	12+08	Crossing	UG Telephone	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Adjust as Needed	54	LF	$110	$5,940
ACS-2	24+46	Crossing	UG Telephone	Roadway Structural Section, Storm Drain Structures	Relocate or Adjust as Needed	50	LF	$151	$7,550

Construction Costs:	$13,490
Engineering/Administration (30%):	$4,047
Total:	**$18,000**

Quinhagak Street
MOA Project No. 21-13
CEA Utility Conflict Summary
Alternative 3

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
CEA-1	24+45	Crossing	UG 3ø 4 Wire Primary Conductor	Roadway Structural Section, Storm Drain Structures	Relocate as Needed	52	LF	$124	$6,448

Construction Costs:	$6,448
Engineering/Administration (30%):	$1,934
Total:	**$9,000**

Quinhagak Street
MOA Project No. 21-13
ENSTAR Utility Conflict Summary
Alternative 3

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
ENSTAR-1	10+23	Crossing	2" Plastic Main	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate	80	LF	$172	$13,736
ENSTAR-2	10+21 - 11+52	LT	2" Plastic Main	Roadway Structural Section, Footing Drain Service	Adjust as Needed	133	LF	$172	$22,836
ENSTAR-3	12+06	Crossing	12" Pressurized Transmission Main	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate as Needed	75	LF	$591	$44,295
ENSTAR-4	14+87 - 15+74	RT	2" Plastic Main	Roadway Structural Section, Subdrain Pipes, Storm Drain Structures	Relocate	87	LF	$172	$14,938
ENSTAR-5	14+92	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structure	Relocate as Needed	1	EA	$3,090	$3,090
ENSTAR-6	15+17	RT	2" Plastic Main	Storm Drain Structure	Relocate as Needed	35	LF	$172	$6,010
ENSTAR-7	17+15	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe	Lower as Needed	1	EA	$3,090	$3,090
ENSTAR-8	18+59	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate as Needed	1	EA	$3,090	$3,090
ENSTAR-9	18+81 - 18+91	RT	2" Plastic Main	Footing Drain Service	Lower as Needed	10	LF	$172	$1,717
ENSTAR-10	19+49	Crossing	5/8" Plastic Service	Roadway Structural Section, Subdrain Pipe	Lower as Needed	1	EA	$3,090	$3,090
ENSTAR-11	19+49 - 24+86	RT	2" Plastic Main	Roadway Structural Section, Footing Drain Services, Storm Drain Structures	Relocate as Needed	538	LF	$172	$92,375
ENSTAR-12	24+36	Crossing	7/8" Plastic Service	Roadway Structural Section, Subdrain Pipe, Storm Drain Structures	Relocate as Needed	1	EA	$3,846	$3,846

Construction Costs:	$212,113
Engineering/Administration (30%)	$63,634
Total:	**$276,000**

Quinhagak Street
MOA Project No. 21-13
GCI Utility Conflict Summary
Alternative 3

Id No.	APPROX. STATION	OFFSET	UTILITY CONFLICT	DESCRIPTION OF CONFLICT	RECOMMENDED ACTION	AMOUNT	UNIT	UNIT PRICE	COST
GCI-1	10+25 - 11+54	RT	.750 Coaxial Cable	Roadway Structural Section, Footing Drain Service, Storm Drain Structure	Relocate	143	LF	$110	$15,730
GCI-2	10+27 - 11+55	RT	.500 Coaxial Cable	Roadway Structural Section, Footing Drain Service, Storm Drain Structure	Relocate as Needed	139	LF	$96	$13,344
GCI-3	10+32	RT	CATV Pedestal	Roadway Structural Section, Storm Drain Structure	Relocate	1	EA	$1,476	$1,476
GCI-4	11+51	Crossing	.625 Coaxial Cable	Roadway Structural Section, Subdrain Pipe	Lower as Needed	49	LF	$103	$5,047
GCI-5	11+57	Crossing	.500 and .750 Coaxial Cables	Roadway Structural Section	Lower as Needed	98	LF	$110	$10,780
GCI-6	11+62 - 12+11	LT	.500 and .750 Coaxial Cables	Roadway Structural Section, Storm Drain Structure	Relocate as Needed	103	LF	$110	$11,330
GCI-7	11+54 - 14+79	RT	.625 Coaxial Cable	Roadway Structural Section	Lower as Needed	326	LF	$103	$33,578
GCI-8	12+18 - 12+28	LT	.500 and .750 Coaxial Cable	Footing Drain Service	Lower as Needed	20	LF	$110	$2,200
GCI-9	12+40 - 17+24	LT	.500 and .750 Coaxial Cable	Roadway Structual Section & Storm Drain Structures	Relocate as Needed	484	LF	$110	$53,240
GCI-10	14+26 - 17+24	LT	(2) .625 Coaxial Cables	Roadway Structual Section & Storm Drain Structures	Relocate as Needed	301	LF	$103	$31,003
GCI-11	17+24	LT	CATV Pedestal	Footing Drain Service	Relocate as Needed	1	EA	$1,476	$1,476
GCI-12	17+24 - 24+15	LT	.750 Coaxial Cable	Roadway Structural Section, Footing Drain Services, Storm Drain Structure	Relocate	693	LF	$110	$76,230
GCI-13	21+06 - 21+31	LT	.750 Coaxial Cable	Footing Drain Service, Storm Drain Structure	Relocate as Needed	25	LF	$110	$2,750
GCI-14	24+03	LT	Communications Vault	Subdrain Pipe	Relocate as Needed	1	EA	$5,906	$5,906
GCI-15	24+33 - 24+56	LT	.750 Coaxial Cable	Storm Drain Structure	Relocate as Needed	13	LF	$110	$1,430
GCI-16	24+47	Crossing	UG Fiber Optic Cables	Roadway Structural Section, Storm Drain Structures	Lower as Needed	48	LF	$165	$7,920

Construction Costs:	$273,440
Engineering/Administration (30%)	$82,032
Total:	**$356,000**

Date: 11/1/2023 **Basis:** **Prepared By:** **CRW** **Ver. 5.1**

Project: Quinhagak Street Reconstruction Alternative 3

Project Number: **21-13** [B]=local bond; [S]=state grant; [F]= federal grant

DESIGN		Design Management	$50,064	
	Start 20??	PM&E Design Services	$0	
		PM&E Design Survey	$0	
		PM&E Design Soil	$0	
		Contractual Dsgn Sers (Basic)	$570,000	
		Contractual Dsgn Sers (Add'l)	$215,000	
		Contractual Design Survey	$70,000	
		Contractual Design Soils	$33,000	
		Miscellaneous	$0	
Subtotal				$938,064
UTILITIES		AWWU	$0	
	Start 20??	MOA Shoring	$0	
		CEA	$10,000	
		ACS	$21,000	
		GCI	$409,000	
		Enstar	$317,000	
Subtotal				$757,000
ROW		Real Estate Services	$21,000	
	Start 20??	Land Acquisition	$0	
Subtotal				$21,000
CONSTRUCTION		Construction Management	$78,545	
	Start 20??	Inspection	$208,315	
		Materials Testing	$34,150	
		Survey	$30,735	
		Miscellaneous	$0	
		Construction Contract	$3,415,000	
Subtotal				$3,766,745
MISCELLANEOUS		Bond Overhead (15.0%)	$1,057,907	
		Grant Overhead (0.0%)	$0	
		Contingency (15%)	$512,000	
Subtotal				$1,569,907
PROJECT TOTAL				$7,052,716

WEBPAGE DATA	
Environ	$0
DS	$234,516
Prelim Dsgn	$469,032
Final Dsgn	$234,516
ROW	$21,000
Utilities	$757,000
Const	$5,336,652
Total	$7,052,716