MATANUSKA-SUSITNA BOROUGH ACTION MEMORANDUM **AM No. 22-017**

SUBJECT: Award of proposal number 22-078P (A) to Lounsbury & Associates, Inc. for the contract amount of $369,919.00 to design improvements to Hidden Hills Road.

AGENDA OF: March 15, 2022

ASSEMBLY ACTION:
Approved under the consent agenda 3-15-22

MANAGER RECOMMENDATION: Present to the assembly for consideration.

APPROVED BY MICHAEL BROWN, BOROUGH MANAGER: MB

Route To:	Department/Individual	Initials	Remarks
	Purchasing Officer		
	Public Works Director	Terry Dolan Digitally signed by Terry Dolan Date: 2022.03.02 15:35:26 -09'00'	
	Finance Director		
	Borough Attorney		
	Borough Clerk	3/7/22	

ATTACHMENT(S): Fiscal Note: Yes X No
Analysis Sheet (1p)
Scope of Services (38p)

SUMMARY STATEMENT: On January 17, 2022, the Matanuska-Susitna Borough Purchasing Division issued a solicitation requesting Proposals from qualified firms to design upgrades to Hidden Hills road. The Hidden Hills Reconstruction project will reconstruct the roadway to collector road standards from the Parks Highway to South Caswell Loop. Work will include roadways, drainage, excavation, pavement, signing, and striping.

Services purchased will support the Public Works Department's mission in assembly district #7.

In response to the advertisement, four proposals were received. A proposal evaluation team made up of Borough Public Works staff evaluated the proposals and selected Lounsbury & Associates, Inc. as the most advantageous firm for the Borough.

The final completion for the project is October 31, 2023.

In accordance with MSB 3.08.170(B), Administration requests authority to modify the resulting contract completion date by 30 days for unforeseen circumstances.

The Public Works Department, Project Management Division will be administering the contract.

RECOMMENDATION OF ADMINISTRATION: Award of **PROPOSAL NUMBER 22-078P (A)** to **LOUNSBURY & ASSOCIATES, INC.** for the contract amount of **THREE HUNDRED SIXTY NINE THOUSAND NINE HUNDRED NINETEEN DOLLARS AND 00/100 CENTS ($369,919.00)** to **DESIGN IMPROVEMENTS TO HIDDEN HILLS ROAD.**

MATANUSKA-SUSITNA BOROUGH
FISCAL NOTE

Agenda Date: March 15, 2022

SUBJECT: Award of proposal number 22-078P (A) to Lounsbury & Associates, Inc. for the contract amount of $369,919.00 to design improvements to Hidden Hills Road.

ORIGINATOR: Purchasing

FISCAL ACTION (TO BE COMPLETED BY FINANCE)	FISCAL IMPACT YES NO
AMOUNT REQUESTED 369,919	FUNDING SOURCE Roads+Bridges Cap Projects
FROM ACCOUNT # 430.000.000 4XX.XXX	PROJECT #35471=254,939 35472=114,980
TO ACCOUNT :	PROJECT #
VERIFIED BY: MMcMM	CERTIFIED BY:
DATE: 3/2/22	DATE:

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027
Personnel Services						
Travel						
Contractual						
Supplies						
Equipment						
Land/Structures						
Grants, Claims						
Miscellaneous						
TOTAL OPERATING						

CAPITAL	370.0					

REVENUE						

FUNDING: (Thousands of Dollars)

General Fund						
State/Federal Funds						
Other	370.0					
TOTAL	370.0					

POSITIONS:

Full-Time						
Part-Time						
Temporary						

ANALYSIS: (Attach a separate page if necessary)

PREPARED BY: _____ PHONE: _____

DEPARTMENT: _____ DATE: _____

APPROVED BY: _____ DATE: 3/3/2022

AM No. 22-017

22-078P 2022 Road Bond Design Phase 1 - Hidden Hills Road, Lakes Boulevard, Cheri Lake - Karen - King Arthur

Scoring Summary

	Total	Objectives and Services	Relevant Project Experience	Workload and Resources
Supplier	**/ 100 pts**	**/ 45 pts**	**/ 35 pts**	**/ 20 pts**
Lounsbury	86 pts	36 pts	32.67 pts	17.33 pts
The Boutet Company, Inc.	85 pts	42 pts	25.67 pts	17.33 pts
[redacted]	84.33 pts	33 pts	32.67 pts	18.67 pts
[redacted]	69.33 pts	30 pts	23.33 pts	16 pts

SCOPE OF SERVICES

Project Name: Hidden Hills Road Reconstruction
Willow, Alaska

ARTICLE 1
INDEX

1.1 Index of Articles

Following is an index of the Articles included in this Statement of Services and the assigned Task Numbers for the Article Subjects.

Article	Task #		Subject
2			Exhibits
3			Codes, Regulations, Standards and Procedures
4			Administrative Requirements
5			Management
6			Project Location and Description
7			Summary of Contract Services
8		EXC	Reconnaissance Engineering Study
9	1		Environmental Activities
10	2		Surveying for Design
11		NIC	Right of Way Mapping
12	3		Geotechnical Investigations/Recommendations
13	4		Hydrologic and Hydraulic Design
14		NIC	Electrical Design
15		NIC	Traffic and Safety Analysis
16		NIC	Structural Design
17		NIC	Foundation Design
18	5		Design Study Report
19	6		Public Involvement
20		NIC	Erosion and Sediment Control Plan
21	7		Plans, Specifications and Estimates
22	8		Utilities Services
23		NIC	Acquisition and Relocation Services
24	9		Assistance during Bidding
25	10		Assistance with Design Project Closeout
26	11		Assistance during Construction

NIC is abbreviation for Not in Contract. The MSB reserves the right to add (NIC) tasks by amendment. However, it is under no obligation to do so, and reserves the right to complete the services by any other means, including the use of in-house forces.

EXC is abbreviation for Excluded from Contract. No task marked EXC will be included in the Contract.

ARTICLE 2
EXHIBITS

Exhibits	Subject
1	Project Location Map(s)
2	Project Milestones
3	Highway Design Standards and Guidelines
4	General Requirements for Surveying and Mapping Services

ARTICLE 3

CODES, REGULATIONS, STANDARDS AND PROCEDURES

3.1 All studies, reports and design services shall be performed in accordance with applicable codes, regulations and standards; professional practice procedures; commonly recognized construction methods; and the MSB's policies, procedures and practices, including those shown in **Exhibits 3 and 4.** The Contractor shall consider the geographical location of the project as well as other environmental and site-specific constraints when performing services for this project.

3.2 Publications that contain the current highway standards and guidelines are listed in EXHIBIT 3. During the period of this agreement the listed documents may be added to, deleted or revised.

3.3 English units of measurement shall be used throughout development of the project.

ARTICLE 4

ADMINISTRATIVE REQUIREMENTS

4.1 General

The Contractor shall provide services as identified and authorized by sequentially numbered Notices-to-Proceed. The Contractor shall not perform services or incur billable expense except as authorized by a Notice-To-Proceed (NTP).

4.2 Project Staff

All services must be performed by or under the direct supervision of the Department of Public Works. The project staff assigned to this specific project shall be named at a later date.

4.3 Professional Registration

All reports, plans, specification, estimates and similar work products provided by the Contractor shall be prepared by or under the supervision of an Engineer or Land Surveyor currently registered in Alaska.

4.4 Billing Reports

The Contractor shall provide a two-page (typical) report with each monthly billing for months in which services are performed. Billings will be submitted no later than the 15th of each month.

The report shall include:

- Name and address of the firm requesting payment
- Statement number
- Date of invoice
- Period covered by the invoice
- Project name and number
- Purchase order number
- Contract amount or upper limit
- Previous accumulative amount
- Current amount billing
- Total accumulative amount
- Percent complete
- For supplemental agreements, the invoice must show the current supplemental agreement and the revised Contract amount or upper limit.
- Summary of work effort performed for each task during the period covered by the invoice.
- Planned work for the next billing period.
- Final billings must be clearly marked as "FINAL."

Any delayed costs from previous billing periods that are included in the current billing must be clearly explained in the report.

4.5 Correspondence

All correspondence prepared by the Contractor shall bear the Department of Public Works' assigned Project name, numbers, and be addressed to the MSB's Project Manager.

4.6 Documents and Reports

Reports shall be printed with solid black letters that are double spaced on white, 8.5 inch x 11 inch bond or "Xerox Copy" paper. Other size paper may be used for illustrations if they are folded to 8.5 inch x 11 inch size. Original documents and reports shall be printed on one side of the paper only and shall be ready for copying. Original, camera ready, copies of final documents and reports shall be submitted to the Department of Public Works for a check before printing. All final documents and reports shall also be submitted as digital document files for Microsoft Word 2010 or compatible software. Electronic pdf document copies shall be provided. The Contractor shall use "active voice" verb forms when writing documents and reports where feasible.

The project plans, specifications and estimate shall use ADOT&PF format requirements, except where noted below for the MSB's standard drawings.

4.6.1 Copies. When the Contract calls for multiple copies of documents or reports, the copies shall be printed on both sides of the paper. However, the cover and pages with approved illustrations, multicolored graphics, or photographs shall be printed on one side of the page only. All copies - except for originals - shall be comb bound.

4.6.2 Page Numbers. All documents shall be page numbered to allow every major Section, Chapter, Appendix, etc., to begin on a "right hand," odd numbered page.

4.6.3 Covers. The cover of all documents and reports shall include the following information:

a) Name of document or report.
b) Date.
c) Indicate whether draft or final.
d) Project Name.
e) Borough/State Project Numbers:
f) Prepared for the Matanuska-Susitna Borough
g) Prepared by:
h) Map and/or picture of project area.

4.7 Plan Sheets and Documents. The Contractor shall use the latest MSB standard drawings, bid forms and Standard Modifications to the Alaska DOT&PF Standard Specifications for Highway Construction. These documents are available from the MSB Pre-Design and Engineering webpage or from the Project Manager. Small contractor logos are allowed on documents produced for the project. The Contractor logo or company name shall be included in the box above or below the engineer's seal on each plan sheet. Documents produced for the MSB shall include the Contractor's company name and/or logo at the bottom right of the first page, cover sheet or title sheet only. Contractor letterhead shall be allowed only as exhibits in document appendices. The Contractor name shall be in the same font as other lettering on the plan sheet or document, shall be 1/16" or less in height on 11"X17" plan sheets, and shall be in the following format:

PLANS DEVELOPED BY:
COMPANY NAME
COMPANY ADDRESS

4.8 Drafting All drawings shall be submitted as AutoCAD current edition drawing files and plot files unless otherwise specified. Unless otherwise stated, the format and standards for all drawings shall be according to the most current Department of Transportation & Public Facilities (DOT&PF) Central Region English (as a guide) Highway Design Drafting Manual as of the Notice to Proceed for this contract. A standard layering scheme for DOT&PF highway projects shall be used. Failure to adhere to this scheme shall be cause for rejection. The drafting procedures shall be as outlined in the current DOT&PF Highway Design Drafting Manual. See **Exhibit 3**.

4.9 Specifications shall be submitted with solid black letters that are single spaced on white, 8.5 inch x 11 inch bond or "Xerox Copy" paper. They shall be printed on one side of the paper only and shall be ready for copying. Specifications and estimates shall contain no graphics and no photographs except as specifically approved by the MSB. All Specifications shall be developed using Microsoft Word 2010 or compatible software.

4.10 Estimates Develop the Engineer's Estimate in an MS Excel spreadsheet program.

4.11 Quantity Calculations. Quantity calculation information shall contain sufficient information to allow the quantity for each item to be checked by starting at the source document. Reference the source document(s) for each pay item. These Documents shall be referenced to the applicable pay item. Submit in an electronic pdf document and loose leaf, three ring binders. If more than one binder is necessary, number them and include a table of contents in the first binder. Label all binders with the MSB, State, or Federal (as applicable) project numbers and an indication of the contents, both on the spine and on the front cover. Provide dividers to clearly mark the location of specific items within each binder.

4.12 Proofreading. The Contractor shall prepare the report(s), which to the greatest extent possible, free of mathematical, grammar, spelling and typographical errors. The Contractor is responsible for professional proofreading of the report(s) to meet the intent of this requirement.

4.12.1 Quality Assurance Memo. Provide with each submittal a Quality Assurance memo signed by the person in responsible charge for the project and the Contractor's Project Manager, certifying that they have performed a quality control check on the items included in the submittal. A memo template will be provided by the MSB upon request.

4.13 Revisions. The Contractor shall modify work products in response to direction from the MSB. Corrections, adjustments, or modifications necessitated by the review/approval process, but which do not substantially affect the scope, complexity, or character of the services, shall be considered a normal part of the Contractor's services.

4.13.1 Errors and Omissions. Except as described in this Statement of Services, work products shall be essentially complete when submitted to the MSB. Work products having significant errors or omissions will not be accepted until such problems are corrected.

4.13.2 Review Meetings. Following each review, the MSB will provide written comments and may hold a meeting to discuss the issues. The Contractor's personnel who are in-responsible-charge for the work products under review shall attend the meeting and they may be asked to interpret and provide explanations of the content.

4.13.3 Comment Resolution. The Contractor shall provide a written response with subsequent submittals that address all written and oral comments from the MSB and third party reviewers. All changes from previous submittals shall be clearly explained.

4.14 Reproduction and Distribution. When the contract requires only the original or only one copy of a work product to be delivered, the MSB will reproduce and distribute any other copies required. Items delivered for reproduction shall be organized and camera ready for copying and not stapled or otherwise bound.

4.15 Completion Documentation. The original of all documents prepared by the Contractor during project development shall be submitted with the Final PS&E assembly. These documents include all notes, sketches, maps, photographs, survey data, computations (cost computations shall be under separate cover), cross sections, and other materials created to develop, record, or justify services provided for the project. These documents shall identify all assumptions made. The Contractor shall keep a copy of all the development documents until construction is complete.

4.15.1 Documents created to determine pay item quantities shall contain sufficient information to allow the quantity for each pay item to be checked by starting from the source document. These Documents shall be referenced to the applicable pay item.

4.15.2 Documents shall be submitted in an electronic pdf document and loose leaf three ring binders. The binders shall be labeled on the spine with the project name, "Completion Documents", and the binder number. The front of the binders shall also be labeled with this information as well as the MSB, State and Federal (as applicable) project numbers and a brief description of what documents are contained in the binder. The binders shall have dividers that sort the contents by pay item number, report, or another logical category. The binders shall be numbered, and the first binder shall include a table of contents.

ARTICLE 5
MANAGEMENT

Note: This Article shall not be treated as a distinct task. Costs associated with the services described in this Article shall be apportioned among the tasks required to accomplish the requirements of Articles 8 through 29

5.1 Performance Schedule. A Project Schedule is provided in **Exhibit 2**. The Contractor is required to maintain a similar schedule detailing primary project tasks and milestones. This schedule will show the interdependence and duration of the various design activities/contract tasks. The schedule will be the basis for performance measurements throughout the Project development. It will be sequenced in accordance with requirements for project development and have duration estimates in order to complete the project in a timely manner. The schedule will be used to track Contractor progress and billings.

The Contractor agrees to expend all effort necessary to stay on schedule and meet the contract delivery dates. If the Contractor becomes aware of any reason why the project schedule may be delayed, such reason shall be identified in writing to MSB's Project Manager within two working days of discovery.

Provide and maintain a critical path method progress schedule for the project. Use this schedule for coordinating and monitoring all work of the Contract.

5.1.1 Meetings / Reports. The Contractor shall schedule and attend periodic briefing meetings (generally every month) with the MSB Project Manager. Various members of the Contractor's support staff and subcontractor staff shall also attend, if necessary. The Contractor shall be responsible for providing timely information required for the project related services performed by the functional groups within the MSB. The Contractor shall provide "exception reporting" of scheduled activities that are late, suspended, or significantly accelerated. The Contractor shall explain why any activity is off schedule, or likely to become so. The Contractor shall also explain what corrective action(s) are being taken. The Contractor shall keep minutes of all meetings and submit them to the MSB Project Manager within five workdays following each meeting.

5.2 Project Coordination. All coordination and correspondence for the project shall be handled through or with the concurrence of the MSB Project Manager.

5.2.1 DOT&PF or FHWA Communication. All communications with DOT&PF or FHWA regarding this project shall be by the MSB.

5.2.2 MSB Activities. Except as specified otherwise, the MSB's Project Manager will coordinate the Contractor's activities with those of various functional groups within the MSB. These groups may include Planning; Pre-Design & Engineering; Operations & Maintenance; and Purchasing. The Contractor shall be responsible for providing timely information required for the project related services performed by the functional groups within the MSB.

5.2.3 Agency and Public Coordination. The Contractor shall not commit the MSB to any action to be accomplished by the proposed project.

5.2.4 Correspondence. The Contractor shall submit all written material, letters, survey forms, etc., used to communicate information regarding the project to the MSB Project Manager for review and acceptance prior to its distribution. Copies of all outgoing and incoming correspondence shall be provided to the Project Manager at least once a week. All outgoing correspondence shall include the project title and state and federal project numbers.

5.2.5 Release of Information. The release of any project-related information must be approved by the MSB Project Manager.

5.2.6 Right-of-Entry Permits. The MSB will obtain Right-of-Entry authorizations for the Contractor, when required. The Contractor shall provide a minimum of 10 working days advance notice for the Agency to acquire any authorization. Should the authorizations take additional time to obtain, performance schedule(s) may be adjusted accordingly. The Contractor shall not be entitled to any additional compensation for any delay incurred in obtaining Right-of-Entry Permits.

ARTICLE 6

PROJECT LOCATION AND DESCRIPTION

6.1 Project Location and Description. The Contractor shall provide complete bid-ready plans, specifications and an Engineer's estimate for the following project:

6.1.1 The Hidden Hills Reconstruction project will reconstruct the roadway to collector road standards from the Parks Highway to South Caswell Loop. Work will include roadways, drainage, excavation, pavement, signing, and striping. This project may also include work on guardrail, utility adjustments, and/or utility relocations. Improvements at the railroad crossing are expected to be completed in the summer of 2022. The contractor shall coordinate with the Alaska Railroad (ARRC) to ensure accurate plans. Improvements to the anadromous fish streams have been completed; the last fish passage improvement is expected to be constructed in the summer of 2022 (by others).

See Exhibit 1 for the Project Location Map.

ARTICLE 7

SUMMARY OF CONTRACT SERVICES

7.1 General When authorized by a Notice to Proceed. Perform the following services.

Environmental Activities
Surveying
Geotechnical Engineering
Hydrologic & Hydraulic Engineering
Design Study Report
Plans, Specifications and Engineer's Estimate

Public Involvement
Utility Services
Assistance During Bidding
Assistance with Design Project Closeout
Assistance During Construction

7.2 MSB Tasks The MSB anticipates MSB staff will perform the following tasks:

Utilities Agreements

The MSB reserves the right to add these services to the contract by amendment if needed.

ARTICLE 8
RECONAISSANCE ENGINEERING
EXC

ARTICLE 9
ENVIRONMENTAL ACTIVITIES
Task 1

9.1 Engineering Support. Provide engineering support as needed for the preparation of environmental documents and permit applications for the project.

9.2 Permitting Support. Provide engineering and technical support to assist the Contracting Agency in completing all permit applications pertaining to this project. Prepare permit application drawings for submittal and perform calculations as required for each permit. Prepare an attachment for each permit application detailing the project enhancements that have been incorporated into the proposed action.

9.3 Wetlands. Lead staff for this work must have M.S. in Biology, Botany or related field, training from the U.S. Army Corps of Engineers (COE) in the 1987 Wetlands Delineation Manual, and 5 years field experience delineating wetlands and conducting functional assessments in Alaska.

9.3.1 Delineation. Conduct wetland delineations, as required, in accordance with the U.S. Army Corps of Engineers (COE) 1987 Wetlands Delineation Manual and 2007 Regional Supplement to the COE Wetland Delineation Manual, Alaska Region, by personnel who has been formally trained in this method.

9.3.2 Functional Assessments. Prepare functional assessments of wetlands in accordance with established protocols and professional judgment.

9.3.3 Impact Analysis. For all impacted wetlands, address the importance of the wetlands and the severity of the impacts, including the acreage of wetlands involved in the study area. In evaluating the importance of the wetlands, consider the primary functions of the wetlands, the relative importance of these functions to the total wetlands resource in the vicinity, and any other pertinent factors, such as uniqueness, that may contribute to the importance of the wetlands. Include in the analysis a map identifying wetlands types and subtypes in the project vicinity. Wetlands information may include submitting data in a GIS format with accompanying metadata.

9.3.4 Mitigation. Assist the MSB in identifying and evaluating wetland impact mitigation strategies and perform calculations if necessary.

9.4 Environmental Review of Plans. After the permits have been acquired by the MSB, review the design drawings to ensure they are consistent with the permit requirements, and provide a written consistency review.

9.5 Eagle Nest Survey. Conduct site visits to document the location of eagle nests in the project vicinity. Document the results of this task in an Eagle Nest Survey Memo for each visit that includes a map showing the approximate location of each nest.

9.6 Deliverable Items:

Type of Document	Para	Copies	Originals	PDF
Permit Application Support Docs	9.2	1	1	1
Wetland Delineation	9.3	1	1	1
Wetland Functional Assessment	9.3	1	1	1
Wetland Impact Analysis	9.3	1	1	1
Consistency Review	9.4		1	1
Eagle Next Survey Memo	9.5	1	1	1

ARTICLE 10
SURVEYING
Task 2

10.1 General

10.1.1 Comply with the requirements of **Exhibit 4.**

10.1.2 Research all information applicable to the requirements of the project.

10.1.3 Perform all field and office services necessary to collect geospatial data and to reduce the collected data to a form useful for the Contracting Agency.

10.3 Survey Limits and Scope.

See the attached project location map (**Exhibit 1**). The scope shall be as described.

10.4 Survey Deliverables

Deliverables are described in **Exhibit 4** as E4.3.3.7 - A-I, L; E 4.3.4.5 - A-H; E4.3.4.6.2

ARTICLE 11
RIGHT OF WAY MAPPING
NIC

ARTICLE 12
GEOTECHNICAL INVESTIGATIONS
Task 3

12.1 General. The Contractor shall submit a geotechnical exploration plan, conduct a geotechnical investigation and provide geotechnical recommendations and draft and final geotechnical reports. Data used from existing reports shall be shown and the source referenced in the Geotechnical Report. The Contractor shall also summarize geotechnical data provided by the Department of Public Works, if available, for inclusion in the Geotechnical Report. All test hole logs and data obtained from services performed by the Contractor under this Agreement shall be reported in English unit format. Data used from other sources shall be converted to English units if included in the PS&E. All procedures and reports shall conform to the ADOT&PF Engineering Geology and Geotechnical Exploration Procedures Manual.

12.2 Geotechnical Exploration Plan. The Contractor will either be provided with a geotechnical exploration plan, or the Contractor shall submit a geotechnical plan as described in Section 3-2.2.8 of the ADOT&PF Engineering Geology and Geotechnical Exploration Procedures Manual to the Department of Public Works for review and acceptance prior to mobilization for this work. Proposed personnel and equipment, test hole locations and estimated depths, as well as sampling and testing frequencies shall be provided in the exploration plan.

12.3 Drilling Contractor. The Contractor shall be responsible to perform the drilling program as defined in the geotechnical exploration plan and shall obtain Department of Public Works approval prior to the beginning of any drilling activity. It is the Contractor's responsibility to assure the drilling contractor adheres to all the contractor provisions.

12.3.1 Field activities. Field activities may include, but are not limited to, auger drilling, rock core boring, backhoe or excavator pits, peat probes, rock structure mapping, instrumentation installation, and sample retrieval. All field activities shall follow guidelines in the State of Alaska, Department of Transportation and Public Facilities Engineering Geology and Geotechnical Exploration Procedures Manual, September 1992, revised May 1993 and the 1988 AASHTO Manual on Subsurface Investigations.

12.3.2 Representative Samples. Representative Samples of materials collected during field activities shall be tested to determine those material characteristics pertinent to the design and construction of the project.

12.3.3 Geotechnical Investigation Progress Reports. The Contractor shall submit periodic progress reports as the geotechnical investigation proceeds. The frequency of the reports will be predicated on the complexity of the project and will be determined at the Exploration Plan review.

12.4 Geotechnical Investigation. The geotechnical investigation, as described in the exploration plan shall consist of all field activities necessary to evaluate, at a minimum, the following criteria:

a) Usability of project excavation materials and borrow site materials
b) The presence (in an excavation) of materials affecting the rate of excavation, i.e., cobbles, boulders, bedrock or groundwater.
c) The suitability of foundation soils or rock to support an embankment or structure (what settlement/instability might be expected?)
d) Stripping depths
e) Maximum cut slope angles in soil and rock
f) Subcut depths
g) Drainage control
h) Muskeg design
i) Special treatments, e.g. use of geotextiles
j) Estimating factors, e.g. shrinking and swelling
k) The presence and identification of geologic hazards, what risks may be involved, and how risks might be mitigated.

12.5 Geotechnical Recommendations. Following field investigations, the Contractor shall provide recommendations to address the criteria listed above. As design proceeds, modifications to the Geotechnical Recommendations may be required. The Contractor shall implement required changes in a timely manner. The Geotechnical Recommendations shall not be included, appended or otherwise identified in the Geotechnical Report. Geotechnical recommendations become final concurrently with final design.

12.6 Geotechnical Report. The Contractor shall provide a Geotechnical Report which presents data collected during the geotechnical investigation. Information shall include at least the following: project location map, description of the project scope, presentation of the field investigations, station to station descriptions of the earth materials encountered during the field investigation, laboratory test results, and plan and profile sheets with test holes or pits shown in plan and profile views. The report shall be submitted to the Department of Public Works in both draft and final forms.

The draft shall be made available concurrent with the distribution of the Pre-PS&E Review. The final report shall be completed concurrent with the receipt of Authority-to-Advertise the project.

12.7 Deliverable Items

Type of Document	Para	Copies	Originals
Geotechnical Exploration Plan	12.2	1	1
Progress Reports	12.3.3	1	1
Geotechnical Recommendations	12.5	1	1
Geotechnical Report			
Draft	12.6	1	1
Final	12.6	1	1

ARTICLE 13
HYDROLOGIC AND HYDRAULIC DESIGN
Task 4

The Contractor shall provide the Hydraulic and Hydrologic Design required for the project, which may include any or all of the following.

13.1 General. The contractor shall perform hydrologic and hydraulic calculations as needed to design roadway cross culverts, ditches and storm water retention/detention basins as necessary to minimize projects impacts on the existing or natural hydrologic patterns. Hydrologic and hydraulic calculations shall be performed in accordance with the MSB Design Criteria Manual. A summary of the hydrologic conditions and project components designed to accommodate storm water runoff shall be included in the Design Study Report. Hydrologic and hydraulic calculations for culverts, pipes and other storm water system features shall be included in the DSR as an appendix.

The Contractor shall coordinate with the operations and maintenance (O&M) to identify problems that need to be addressed; inspect all existing culverts, storm drain pipes, and manholes and fish passages within the project limits that O&M has problems with, or the consultant believes should be inspected. Determine which of these are expected to be functionally or structurally inadequate during the design year of this project. Determine which culverts, storm drain pipes, and manholes need to be cleaned. Prepare a culvert inspection report with the findings and recommendations, and include it in the DSR as an appendix.

The Contractor shall also determine where erosion is a problem including areas of potential river or streambank erosion. Inspect all ditches and determine which need to be modified and/or cleaned to handle the design discharge required by the Alaska Preconstruction Manual. Determine where existing roads have problems due to surface water or groundwater. Document results with text and visuals as appropriate. Coordinate with the MSB's Project Manager to determine what drainage and erosion control work will be included in the project.

The Contractor shall consider groundwater and wetland impacts when designing project features.

ARTICLE 14
ELECTRICAL DESIGN
NIC

ARTICLE 15
TRAFFIC AND SAFETY ANALYSIS
NIC

ARTICLE 16
STRUCTURAL DESIGN
NIC

ARTICLE 17
FOUNDATION DESIGN
NIC

ARTICLE 18
DESIGN STUDY REPORT
Task 5

18.1 General. Provide a Design Study Report (DSR) that meets the requirements of the Highway Preconstruction Manual and the MSB's Design Criteria Manual. Use the DSR Template provided by the DOT&PF unless otherwise directed by the MSB Project Manager.

18.2 Field Review. Arrange and participate in a field review of the project area with personnel from the MSB. Identify known problems and review the condition of the pavement. Document all information and comments from the review.

18.2.1 The MSB will provide its own transportation for the field review.

18.2.2 Invite representatives from the following, as a minimum from the MSB, to the field review.

a. Project Manager
b. Operations & Maintenance RSA Superintendent
c. Utility Coordinator, if applicable
d. Right-of-Way Agent, if applicable

18.3 ADA Transition Report Data. Conduct an ADA Compliance Investigation. Once the ADA Compliance Investigation is completed, provide information on curb ramp design as needed for a report to the Civil Rights Office. This report shall be included in the DSR.

18.4 Draft DSR. The draft DSR must document the background and purpose of the project, and the approach to be taken with the design. Unless directed by the Project Manager to do so, do not hold up the submittal waiting for appendices to be available.

18.5 Final DSR. Submit the Final DSR, sealed and signed by the supervising registered Engineer. The MSB will route the Final DSR for Final Approval. Additions and revisions may be required at a later date.

18.6 DSR Appendices

18.6.1 Approved design **Exceptions and/or Waivers**

18.6.2 ITS Systems Engineering Analysis, if applicable, provided by the contractor under this section

18.6.3 Approved **Environmental Document,** provided by the Contractor, if applicable

18.6.4 Structural Concepts Memo, Provided by the Contractor, if applicable

18.6.5 Geotechnical Summary and Recommendations, Provided by the Contractor

18.6.6 Culvert Inspection Report, provided by the Contractor

18.6.7 Hydraulic or Hydrologic Report See Article 13

18.6.8 Design Decisions. See Article 21.

18.6.9 Guardrail Inspection and Analysis Memo the Contractor will provide the field inventory and design recommendations, if applicable

18.6.10 Draft Railroad Crossing Checklist For each railroad crossing within the project, provide a Draft Railroad Crossing Certification in accordance with the most recent MSB guidance.

18.6.10.1 Information must be gathered on site for the checklist.

18.6.10.2 The Contracting Agency will provide the railroad crossing checklist **template and instructions** on request.

18.6.11 Final Railroad Crossing Checklist, if applicable.

18.6.12 Traffic Analysis Report, if applicable. See Article 15

18.7 Deliverable Items.

Type of Document	Paragraph	Hard Copies	pdf	'Word' or 'Excel'	Video
Field Review Documentation	18.2	1	1	1	
Design Study Report					
Draft	18.4	1	1	1	
Final	18.5	1	1		
Design Exceptions/Waivers	18.6.1		1		
RR Crossing Checklist(s)					
Draft	18.6.11		1	1	
Final		1	1		

ARTICLE 19
PUBLIC INVOLVEMENT
Task 6

19.1 General. For the purpose of this Agreement, Public Involvement is defined as the total effort, both informal and formal, made by the Contractor and the MSB to keep the public and agencies informed about the project, to ensure that all reasonable alternatives are identified, and that public and agency concerns are considered and addressed.

19.1.1 Guidance. Public involvement shall be conducted in accordance with National Environmental Policy Act (NEPA), Executive Orders 11990, 11988 and 12898, Federal Highway Administration (FHWA) Environmental Impact and Related Procedures (23 CFR Part 771), FHWA TA 6640.8a, Alaska DOT&PF Environmental Procedures Manual, and Alaska DOT&PF Preconstruction Manual.

19.2 Public Involvement Plan. The MSB and the Contractor shall jointly develop a Public Involvement Plan (PIP) setting out a strategy for communicating with the public and local governments about the project. The PIP may include public meetings, workshops, presentations to user groups, and other tools for communication, such as; mailing lists, internet websites and newsletters as discussed below. The PIP will include an anticipated schedule of meetings based on coordination with the MSB.

19.3 Meetings. The Contractor shall plan, set-up, coordinate, conduct and document public meetings included in the PIP and as directed by MSB. The Contractor shall prepare records of all project-related public hearings, public "open house" meetings, field trips, workshops, user group meetings, presentations at community council meetings, and/or presentations at local government meetings.

19.3.1 Public Meetings. At least two open house style public meeting(s) and yearly Transportation Fair meetings shall be included in the PIP. The intent of the meeting(s) is to inform the public of the current design plans and construction timetable and receive public input. The first public meeting shall occur prior to beginning the appraisal and acquisition of right-of-way.

The Contractor shall prepare for public meetings by notifying interested parties of the meeting date, place, and time; advertising the meeting through local media; reserving facilities; providing refreshments; providing comment sheets for written comments; preparing meeting agenda; providing pertinent graphics and visual aids; and is responsible for set-up and removal of information and visuals.

The Contractor shall compile the results of all public meeting(s), to include a summary of oral and written testimony, an analysis of comments received, and any recommendations and support needed to respond to public comments and questions. In addition, the Contractor shall include a written summary of all informational materials made available for public display / presentation at the public meeting(s).

19.3.2 Other Meetings. The Contractor shall anticipate attending and keeping records of meeting(s) and presentations with the local Community Councils and other agencies. The contractor shall be responsible for complying with all aspects of the MSB's project development/review process which may including preparing applications and reports, preparing and delivering submittals, hosting and attending public and Borough meetings, and addressing Borough and public input. Presentations of the project at two (2)

Community Council, Road Service Area (RSA) Board, or other agency meetings, on an as requested basis, by the Contractor should be anticipated.

19.4 Other Public Involvement Activities. The Contractor shall provide additional support, as required, for informal public involvement. This support may include providing written and/or oral responses to requests for information about the project from individuals and/or agencies. Responses to public inquiries or comments shall be approved by the MSB prior to distribution. The Contractor shall not commit the MSB to any unapproved course of action.

19.4.1 Contact and Mailing List. The Contractor shall develop and maintain a current contact and mailing list of all interested organizations and individuals that may be affected by the project. Public officials, community service organizations, local and regional transportation officials, and special interest groups shall be identified by the Contractor for the Project. The list shall include the following types of groups, as applicable:

1. Property Owners
2. Business Owners
3. Chambers of Commerce
4. Civic Clubs and Organizations
5. Private Clubs
6. Homeowners Associations
7. Elected and Appointed Borough Officials
8. Law Enforcement Groups (city and state)
9. Emergency Response Forces (borough, city and state)
10. Elected and Appointed City Officials
11. Elected and Appointed State Officials
12. Elected Members of the U.S. Senate
13. Elected Members of the U.S. House of Representatives
14. National Environmental Clubs/Organizations
15. State Environmental Clubs/Organizations
16. Local Environmental Clubs/Organizations
17. Private Environmental Clubs/Organizations
18. Permitting Agencies
19. Metropolitan Planning Organizations (including Technical and Citizen's Advisory Committees)
20. Regional Planning Councils
21. Minority/Underserved Groups
22. Utility Companies
23. Community Councils
24. Road Service Area (RSA) Boards
25. Railroads
26. Public Transit Agencies
27. Transportation Disadvantaged

The list shall be minimally comprised of property owners/tenants/business owners within an agreed upon boundary. This boundary can be enlarged to fit the impacted area and to avoid dividing a community or missing a significantly impacted group. It is also the Contractor's responsibility to augment this list with tenant or business owner/operator contact information. The list shall be submitted to the MSB's Project Manager for review and approval.

A current copy of this list shall be available to the MSB at all times. Mailing labels shall be provided to the MSB to facilitate distribution of reports and documents. Maintain and update the mailing list for the project as needed through the final design phase. Format of the mailing list will allow transfer onto newsletters and postcards.

19.4.2 Newsletter and Postcards. The Contractor shall, as required, prepare and distribute public information in the form of newsletters, postcards, flyers and e-mails to keep the public informed of the project. The Contractor shall submit draft newsletters and postcards to the MSB for approval prior to each mailing. The Contractor shall anticipate producing two (2) newsletters and two postcards.

19.4.3 Advertisements and Notifications. The Contractor shall, as required, prepare and have

published newspaper and online advertisements for public meetings, for notices of availability of documents for review, and for other events as required by the State and Federal process. The Contractor shall deliver for review and approval drafts of all notices, advertisements and agendas before distribution or publication. The Contractor shall provide the MSB an affidavit of publication of any newspaper advertisement.

19.4.5 Civil Rights. The Contractor shall provide the MSB's Project Manager, for the subject project, with documentation of compliance with Title VI of the Civil Rights Act of 1964 immediately following each project-related public meeting, hearing, presentation, or community involvement activity.

Title VI documents should be displayed at public meetings. These documents are located on the Civil Rights Office website at http://dot.alaska.gov/cvlrts/titlevi.shtml. There should be a Civil Rights Brochure, an ADA & Title VI Policies brochure, and a How to file a complaint brochure available. These brochures should be in English unless there is a request for a translated version.

19.4.6 Public Involvement Report. The Contractor shall prepare a report documenting public involvement through completion of the PIH design phase. The report will include a copy of pertinent comments from the public and any responses. Another report prepared under a future amendment shall document public involvement through completion of the design phase.

19.4.7 Correspondence and Documentation. The Contractor shall submit all original correspondence to the Contracting Agency, as received. The Contractor shall maintain a written log of all correspondence related to the project including telephone calls, letters, and email contacts and shall provide this log to the MSB upon request. The log shall be included in the Public Involvement Report.

19.5 Deliverable Items.

Type of Document	Para	Copies	Originals	PDF
Public Involvement Plan	19.2			
Draft		2	1	0
Final		2	1	1
Public Meeting Records	19.3.1	0	1	1
Other Meeting Records	19.3.2	0	1	1
Contact/Mailing List	19.4.1	1	1 (electronic)	1
Newsletter/Flyers	19.4.2			
Draft		0	1	0
Final		0	1 (electronic)	1
Advertisements/Notifications		B19.4.3		
Draft		2	1	0
Affidavit		0	1	1
Civil Rights	19.4.5	0	1	1
Public Involvement Report	19.4.6	2	1	1
Correspondence Log	19.4.7	0	1	1

ARTICLE 20
EROSION AND SEDIMENT CONTROL PLAN
NIC

ARTICLE 21
PLANS, SPECIFICATIONS AND ENGINEER'S ESTIMATE
Task 7

21.1 General. Provide construction contract documents and other deliverables as described herein. The project design must be a best accommodation of the geographic location and the site-specific constraints, as well as the project values and other constraints as defined by the MSB.

21.2 Reserved.

21.3 Support Data. Throughout the design phase, provide data in support of the MSB activities related to the project design. This includes but is not limited to the following.

21.3.1 Topography Survey Needs Provide a survey figure(s) showing where further topographic survey is required in order to design the project or to determine any necessary or recommended property rights acquisitions or alterations to existing utilities. After the initial list is provided, update it as necessary as the design progresses.

21.3.2 Right of Way Survey Needs Provide a survey figure(s) showing locations and areas where survey confirmation of location of the Right of Way is necessary in order to determine the need for additional property rights acquisition.

21.3.3 Data and Figures required by MSB Support Groups, for example for environmental permitting or Right of Way negotiations.

21.3.4 CAD Files with required disclaimers, for use by utility companies or others, as approved by the Project Manager.

21.3.5 Cross-sections. Include the following in each cross-section: original ground, the roadway template, right of way limits, grid lines, labels for offsets and elevations, and the roadway station for which it is applicable. Plot the cross sections at a standard scale and with no vertical exaggeration. Include on each sheet the project name, project number, date and review submittal. Submit the half size cross sections on 11" by 17" sheets.

21.4 Plan Sheets.

21.4.1 F Sheets – Plan and Profile Sheets. Plan and profile are required for the entire "mainline" improvement.

Create 1"=20' plan (and profile if needed) details where cross culverts are replaced, or where ramp and merging lane reconstruction are being proposed, or where other improvements may otherwise necessitate plan and profile for construction.

Include the pavement striping plan on the F Sheets. Striping details and notes shall be shown on the H – Traffic Sheets. The pavement striping plan is required to show preliminary Passing/No Passing zones. Determining the preliminary Passing/No Passing zones shall be done by examining existing as-built plans.

21.4.2 Utility Plan Sheets, if needed, will be provided by others. Incorporate Utility Plans into the Plan set.

21.4.3 Right of Way Lines shall be shown on the plans.

23.4.4 Traffic Control Plan. When necessary the Contractor shall provide a Traffic Control Plan (TCP) presenting a method for constructing the project and maintaining both vehicular and pedestrian traffic through the roadway corridor. The TCP shall be developed in accordance with the Chapter 14 of the Highway Preconstruction Manual and the Alaska Traffic Manual.

21.5 Specifications. The MSB will provide a current copy of the Standard Modifications, Statewide Special Provisions and Regional Special Provisions to the Standard Specifications for Highway Construction. Combine the Standard Modifications and Special Provisions for the PS&E assemblies

Incorporate Project specifications for Bridge, Utility, and/or other work into the Project Specifications.

Continually update the Specifications per updates to the Statewide Special Provisions and Regional Special Provisions, unless otherwise directed by the MSB Project Manager.

Prepare any project specific special provisions. Whenever possible, use Performance Specifications rather than Method Specifications.

Notify the Project Manager if you discover any potential need for sole source or proprietary items. Do not specify any proprietary items unless at least two are named. If "or equivalent" is used, specify the criteria for judging the equivalence. Do not specify sole source materials unless a sole source procurement authorization is obtained.

21.5.1 Appendices to the Specifications. Provide the following as appendices to the Specifications.

a. Materials Certification List
b. Sign Shop Drawings
c. Permits

21.6 Engineer's Estimate (EE). Develop the EE. Use standard pay items unless there is a specific reason to use special ones. The MSB will provide pay item numbers for items not listed in the Standard Specifications, if needed. Provide estimated unit prices and total estimated costs for all items.

Sign and date the EE.

The Engineer's Estimate must remain confidential until after construction bids are opened.

21.7 Submittal Packages and Reviews. The Project Manager may review the submittal package and require changes, corrections and/or clarifications, and a re-submittal.

21.7.1 Your **Preliminary Design Submittal Package** must consist of plans 30-50% complete, an updated estimate, a full set of cross-sections and any other deliverables specified for delivery with the Preliminary Design in other Articles of this contract.

21.7.1.1 Initial Comment Responses. The MSB will provide written comments on the Preliminary Design submittal. Provide written responses to as many of the comments as practicable, but at least one day before the review meeting. Indicate which comments require further information or coordination.

21.7.1.2 A **Field Review** will be held after the Preliminary Design submittal. The Contractor's Project Manager, Project Engineer, and staff who are in-responsible-charge of relevant design disciplines must attend.

21.7.1.3 A **Preliminary Design Meeting** will be held a few weeks, typically four weeks, after the submittal is received. The Contractor's Project Manager, Project Engineer, and staff who are in-responsible-charge of relevant design disciplines must attend.

21.7.2 Your **Plans-In-Hand Submittal Package** must consist of plans 75% complete, a specifications memo, a brief basic construction schedule, a full set of cross-sections (if available), and an engineer's estimate. Indicate clearly on the plans any locations where additional property rights may be required, and any potential requirements for adjustments or relocations of utility facilities.

21.7.2.1 Initial Comment Responses. The MSB will provide written comments on the Plans-In-Hand submittal. Provide written responses to as many of the comments as practicable but at least one day before the review meeting. Indicate which comments require further information or coordination.

21.7.2.2 A **Plans-In-Hand Review Meeting** will be held a few weeks after the submittal is received. The Contractor's Project Manager, Project Engineer, and staff who are in-responsible-charge of relevant design disciplines must attend.

21.7.3 Your **Pre-PS&E Review Submittal Package** must consist of complete plans, specifications, Special Notice to Bidders, a basic construction schedule, a full set of cross-sections (if available), the engineer's estimate, and the following:

a. A brief report of significant changes made to the assembly after the Plans-In-Hand Review Meeting (if applicable).
b. A written list of comments made by the Plans-In-Hand reviewers, with adjudicated responses.
c. Draft Erosion and Sediment Control Plans, including sheets.
d. Draft traffic control documents as required by the HPCM.
e. A technical memo describing all non-standard features on the project, and the reason(s) for them. (If applicable)

21.7.3.1 Initial Comment Responses. The MSB will provide written comments on the PS&E submittal. Provide written responses to as many of the comments as practicable before the review meeting. Indicate which comments require further information or coordination.

21.7.3.2 A **Pre-PS&E Review Meeting** will be held a few weeks after the submittal is received. The Contractor's Project Manager, Project Engineer, and staff who are in-responsible-charge of relevant design disciplines must attend.

21.7.4 Your **Final PS&E Set Submittal** must consist of the following:

a. Complete, signed and sealed Plans
b. Complete Specifications including Appendices
c. Signed Engineer's Estimate
d. Special Notice to Bidders
e. Draft Bid Form (MSB Standard Bid Form)
f. Full set of cross-sections (if available)
g. Completed Highway Design Checklist
h. Completed Traffic Control documents
i. A brief report of significant changes made to the assembly after the Pre-PS&E Review meeting, but which were not discussed at that meeting. (If applicable)
j. Final responses to all comments made on the design (if updates are required after the Certification Set submittal).
k. Letter describing any unusual design features, and the reasons for them. (If applicable)
l. Quantity Calculations and Highway Design Checklist

21.7.4.1 Revise the Final PS&E set deliverables per Project Manager direction.

21.7.5 Prepare and submit all required documents to the city in accordance with the city's and MSB's Memorandum of Agreement.

21.8 Deliverables

Type of Document	Para	Hard Copies	.PDF	AutoCAD	Word
Curb Ramp Data and Analysis	21.2	1	1		
Topography Survey Needs List/Figure(s)	21.3.1	1	1		
RW Survey Needs List/Figure	21.3.2	1	1		
Data and Figure(s) for Support Groups	21.3.3	1	1		
CAD Files for Support Groups	21.3.4			1	
Cross-Sections	21.3.5	1	1		
Preliminary Design Submittal	21.7.1	2	1		
Preliminary Design Initial Comment Responses	21.7.1.1	5	1		
Plans-In-Hand Review Submittal	21.7.2	2	1		
Plans-In-Hand Initial Comment Responses	21.7.2.1	5	1		
Pre-PS&E Review Submittal	21.7.3	2	1		
Pre-PS&E Review Initial Comment Responses	21.7.3.1	5	1		
Final PS&E Submittal	21.7.4	4	1	1	1
Advertisement Package	21.7.5	2	1		1

ARTICLE 22
UTILITIES SERVICES
Task 8

22.1 General. The Contractor shall prepare the Utility Conflict Report. All formal correspondence shall be routed through the MSB for formatting, signature, and transmittal. The Borough may elect to perform utility coordination and agreements separately, either using MSB staff or a third party. In such cases, the Contractor shall coordinate with parties conducting coordination with the utilities or preparing utility agreements, as needed, in such cases.

22.2 Request Redlines and Utility Questionnaires from all utility companies that have facilities within the project area.

Review redline drawings and compare to utility locations shown on the plans.

22.3 Utility Conflict Report. Provide Draft(s) and Final, including: the existing utilities within the project limits; the conflicts with the proposed work; and the consideration of impacts on construction, relocation costs and Right-of-Way needs. Include the following:

a. Plan Sheets
b. Cross Sections
c. List of utility conflicts
d. Proposed solutions to all utility conflicts
e. Cost estimate for utility relocations

22.3.1 Plan Sheets. Provide the Plan Sheets 11-inch x 17-inch paper and include the following.

a. existing utilities
b. proposed roadway improvements including slope limits
d. existing and proposed Right-of-Way limits
e. existing and proposed drainage features
f. any structures affected by proposed construction

Identify the size and type of existing utilities within the project limits. Base locations of existing utilities on the following in order of preference.

a. field topographic surveys
b. as-built drawings
c. utility system maps.

22.3.2 Cross-Sections. Provide cross-sections plotted on 11" x 17" paper at the following locations.

a. all locations where utility conflicts exist
b. at each pipe crossing

Include the following on the cross-sections.

a. the existing ground
b. the proposed finished ground
c. side slopes
d. proposed Right-of-Way limits
e. existing overhead and underground utilities

Indicate side street and driveway profiles at the appropriate locations.

Use the best available information to establish elevations of buried utilities. If no information is available, estimate the elevations from the utility permit depth requirements and based on utility company standard installation practices.

22.3.3 List of Utility Conflicts. List all conflicts and identify the company that owns the utility in conflict.

22.3.4 Proposed Solutions to all Utility Conflicts. Propose solution(s) to all conflicts and recommend a preferred solution if more than one is proposed. Consider the following when selecting the preferred solution:

a. Relocation costs
b. Additional Right-of-Way needs and cost
c. Alignment, profile or section modifications to resolve utility conflicts
d. Construction impacts
e. Project development timing

22.4 Permit Research For all utilities that require adjustment or relocation, identify which facilities have been permitted and which have not. Review property interest information for justification of relocation reimbursement.

22.5 Prepare notice to relocate and authority to proceed with preliminary engineering for each utility concurrent with Plans-in-Hand Review plans. Each notice shall request a one-line design, right-of-way requirements and a cost estimate to be submitted by the utility within 2 months.

22.6 Recommend the relocation scheme and reimbursement by the MSB based on utility design and negotiate with the utilities for final determination. Determine right-of-way requirements, if any, for utility relocations.

22.7 Provide utility one-line designs and draft special provisions for the Pre-PS&E Review assembly.

22.8 Prepare **authority to proceed (ATP) through final design and estimate letter** to each utility.

22.9 Coordination with Utilities. Conduct coordination activities and provide all information required to develop, and secure approval of, the Utility Relocation Agreements with the utilities under MSB oversight. Include the Project Manager and/or design staff in this coordination at the level as directed by the Project Manager.

Do not commit the MSB to any action without prior written approval of the Project Manager.

Make the Utility Conflict Report, Cross Sections, other reports, and the PS&E assemblies produced for this project available to the utility companies. Provide assistance interpreting these documents and sharing other information about this project to those designing the utility relocations.

22.10 Reserved
22.10.1 Reserved

22.10.2 Reserved

22.11 Prepare **Standard Specifications Section 105, Control of Work** special provisions for inclusion in Plans, Specifications and Estimate package.

22.12 Reviews and Schedule. Unless directed otherwise by the Project Manager, submit deliverables as follows.
a. First Draft Utility Conflict Report with the Local Review Assembly
b. Second Draft Utility Conflict Report with the Plans-In-Hand Review assembly
c. Pre-Final Utility Conflict Report after the Plans-In-Hand Review comments are addressed and any alignment and grade changes are complete
d. Final Utility Conflict Report with the PS&E Review assembly. Indicate which conflicts have been resolved.

22.13 Deliverable Items.

Type of Document	Para	Copies	Originals	PDF
Redline/Questionnaire Requests	22.2 1			
Utility Conflict Report				
Draft 1	22.3 1	1	1	
Draft 2	22.3 1	1	1	1
Final	22.3 1	1		1
Notice Letter/ATP Oneline	22.5 1	1	1	
Relocation Recommendations	22.6 1	1	1	1
PS&E Assembly items	22.7 1	1	1	
ATP Final Design	22.8 1	1	1	

Section 105 Control of Work	22.11	1	1	1
Signed Agreements	22.12	1	1	1

22.14 Provided Items. The MSB will provide the following:
a. Sample Utility Agreement.

ARTICLE 23
ACQUISITION AND RELOCATION SERVICES
NIC

ARTICLE 24
ASSISTANCE DURING BIDDING
Task 9

Assist the MSB as requested during project bidding. Personnel who were in responsible charge for engineering, and other personnel as necessary and appropriate, must be available to interpret and clarify documents prepared during project development and to assist the MSB with preparing any necessary addenda to the bid documents. Do not communicate about this project with any potential bidders.

Type of Document	Hard Copies	.PDF
Addenda (as required)	1	1

ARTICLE 25
ASSISTANCE WITH DESIGN PROJECT CLOSEOUT
Task 10

25.1 Reserved

25.2 As-Awarded CAD files. Within 2 weeks after the bids are opened for the construction contract, provide all CAD files for the project, in accordance with the Central Region Highway Design Project Closeout Guide.

25.3 Completion Documentation. Submit the original of all documents prepared by the Contractor during project development. These documents include all notes, sketches, maps, photographs, survey data, computations, cross sections, meeting and site visit notes, and other materials created to develop, record, or justify services provided for the project. Identify all assumptions made in the documentation. Keep a copy of all the development documents until construction is complete.

25.3.1 Documents created to determine pay item quantities must contain sufficient information to allow the quantity for each pay item to be checked by starting from the source document. Reference these documents to the applicable pay item.

25.3.2 Provide electronic copies of **photographs** on disks or other media approved by the MSB.

25.4 Submit a WORD document of the **as awarded project specifications**.

25.5 Provide a **Public Involvement Report**, describing and documenting all public involvement activities employed on the project.

25.6 Provide **DSR Amendments Information** as required. These may include, but are not limited to:

a. Copies of, and indexes of, project correspondence.
b. The Public Involvement Report
c. Memos or letters documenting design decisions
d. Other updates or changes as necessary

25.7 Deliverables

Type of Document	Para	Hard Copies	Electronic
Reserved	25.1	0	0
As Awarded CAD files	25.2	1	1
General Project Files	25.3	1	1
Electronic Copies of Photographs	25.3.2	1	1
As Awarded Specifications	25.4.3	1	1
Public Involvement Report	25.5	1	1
DSR Amendment Information	25.6	1	1

ARTICLE 26
ASSISTANCE DURING CONSTRUCTION
Task 11

26.1 Provide **assistance** to the MSB as requested during project construction. Personnel who were in responsible charge for engineering, and other personnel as necessary and appropriate, must be available to interpret and clarify documents prepared during project development and bidding; to review and approve shop drawings, materials/catalog submittals, trench stability designs, and other items as necessary; and to assist the MSB with preparing any necessary change order documents.

26.2 All **communication** about this project must be through the MSB. Do not communicate directly with the successful bidder.

26.3 Documents. Within a month after the MSB accepts the constructed project, submit to the MSB the original of all documents prepared or modified when performing the services for this task.

26.4 Record Drawings. The Contractor shall furnish marked-up changes made during the construction period. The Contractor shall incorporate all significant changes marked up by the construction contractor, inspector, project engineer, PM, and/or construction manager into the drawings. The drawings shall be noted "RECORD DRAWINGS" and dated. The Contractor shall prepare record drawings by making changes to the original contract drawings (with amendments posted). A copy of the updated original shall be sent to the appropriate parties for verification. Upon verification, the Contractor will submit the originals to the MSB Project Manager in hard copy and PDF. The Contractor shall deliver the record drawings to the MSB Project Manager within sixty (60) days after receiving the marked-up documents.

Type of Document	Para	Hard Copies	Originals	Electronic
Change Order Documents (as req'd)	26.1	1	1	1
Record Drawings	26.4	1	1	1

EXHIBIT 1
PROJECT LOCATION MAP

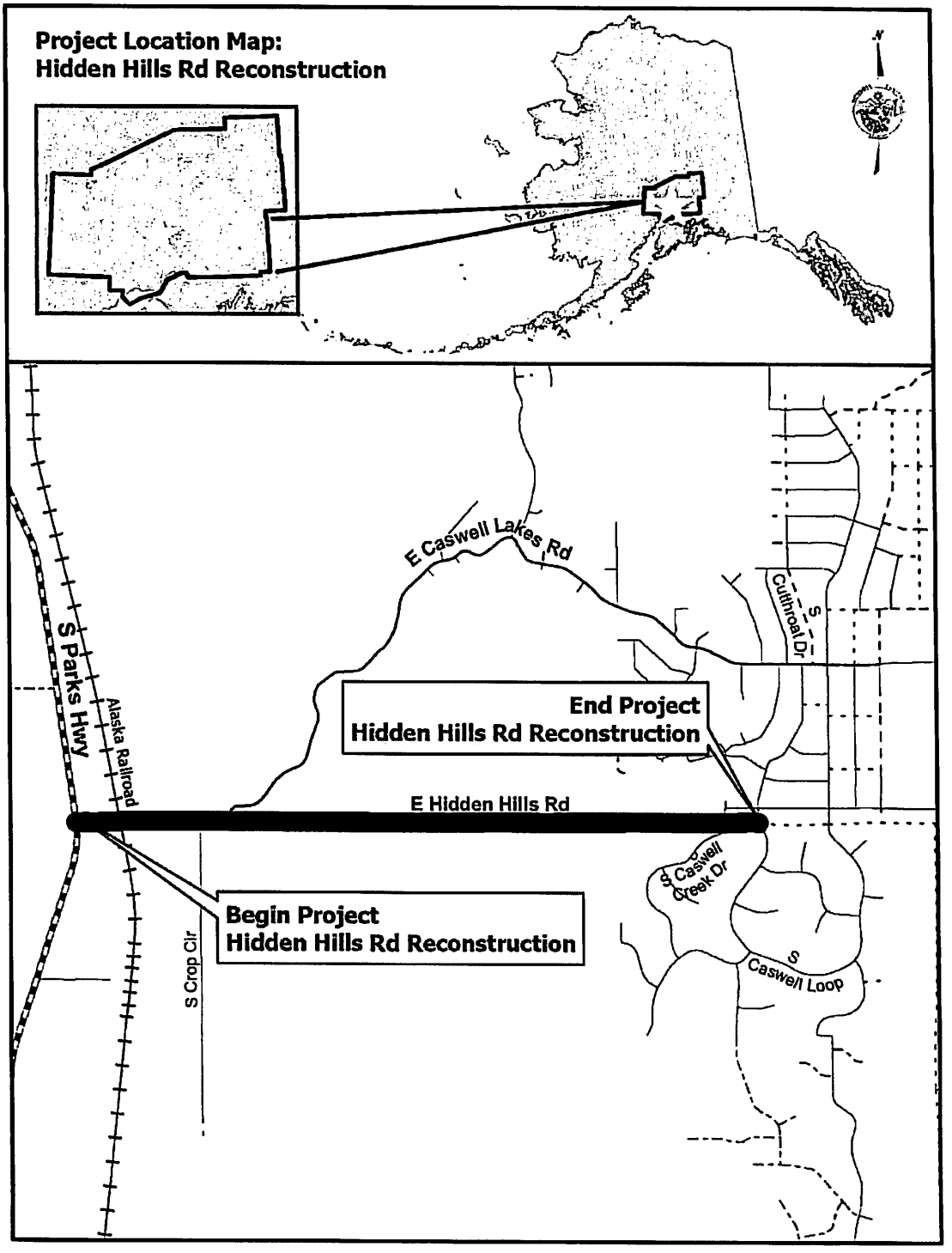

EXHIBIT 2
PROJECT SCHEDULE

Milestones	Date	Deliverables
Project Start	February, 2022	Notice to Proceed
Field Investigations	March-June, 2022	Survey, Geotech, Wetlands Reports, etc.
Preliminary Design	June, 2022	35% Draft Plans
Plans-In-Hand Review	July, 2022	75% Plans, Specifications, and Estimate
Pre-PS&E Review	September, 2022	95% Plans, Specifications, and Estimate
Final PS&E	November, 2022	Final Plans, Specifications, and Estimate
Bid Advertisement	December, 2022	Addenda and Revisions, as needed
Construction Completion	October, 2023	Record Drawings

EXHIBIT 3
HIGHWAY DESIGN STANDARDS AND GUIDELINES

Office of the Federal Register (United States)
- Code of Federal Regulations, Title 23, Highways, Current Edition

AASHTO
- LRFD Bridge Design Specifications, Current Edition with Interim Revisions
- A Policy on Geometric Design of Highways and Streets, 6th Edition, 2011
- Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400), 2001
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013
- Roadside Design Guide, 4th Edition, 2011
- Guide for the Development of Bicycle Facilities, 4th Edition, 2012
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition, 2004
- Roadway Lighting Design Guide, 2005
- A Guide for Achieving Flexibility in Highway Design, 1st Edition, 2004

ASPLS
- Standards of Practice for Professional Land Surveyors, Current Edition

DEC
- Alaska Storm Water Guide, 2011

DOT&PF
- Highway Preconstruction Manual, Current Edition
- Standard Specifications for Highway Construction, 2017 Edition
- Standard Modifications (Supplementary Specifications to the Standard Specifications for Highway Construction), Current Edition
- Standard Special Provisions (Statewide and Regional) to the Standard Specifications for Highway Construction, Current Edition
- Central Region Specifications Provisions – Style Guide, Current Edition
- Standard Drawings, Current Edition
- Central Region Standard Drawings, Current Edition
- Alaska Test Methods, Current Edition
- Environmental Procedures Manual, Current Edition
- Alaska Bridges and Structures Manual, Current Edition
- Alaska Highway Drainage Manual, 2006
- Alaska Flexible Pavement Design Manual, Current Edition
- Alaska Geotechnical Procedures Manual, Current Edition
- Alaska Traffic Manual, consisting of
  - Manual on Uniform Traffic Control Devices, FHWA, 2009 with Current Revisions
  - Alaska Traffic Manual Supplement, 2016
- Construction Surveying Requirements, Current Edition
- Right-of-Way Manual, Current Edition
- Central Region CAD Standards & Drafting Guide, Current Edition
- Alaska Sign Design Specifications, Current Edition
- Central Region Project Closeout Guide, Current Edition
- All Policies and Procedures

FHWA
- FHWA Lighting Handbook, 2012
- Railroad - Highway Grade Crossing Handbook, Revised 2nd Edition, 2007

- Small Town and Rural Multimodal Networks, 2016

FTA
- Manual on Pedestrian and Bicycle Connections to Transit, 2017

IES
- Recommended Practice for Roadway Lighting (RP-8-14), 2014

ITE
- Recommended Design Guidelines to Accommodate Pedestrians and Bicycles at Interchanges, 2016

NACTO
- Urban Street Design Guide, 2013
- Urban Bikeway Design Guide, 2nd Edition, 2014
- Transit Street Design Guide, 2016

TRB
- Highway Capacity Manual, 2010

U.S. Access Board
- Dimensional Tolerances in Construction and for Surface Accessibility, 2011
- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way, 2011
- Accessible Public Rights-of-Way Planning and Design of Alterations, 2007

U.S. Army Corps of Engineers
- Wetlands Delineation Manual, 1987
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0), 2007

U.S. Department of Justice
- ADA Standards for Accessible Design, 2010

U.S. Department of Transportation
- ADA Standards for Transportation Facilities, 2006

Matanuska- Susitna Borough
- Design Criteria Manual, Current Edition
- MSB Pre-Design & Engineering Standard Drawings, Current Edition
- MSB Standrad Modifications (Supplementary Specifications to the Standard Specifications for Highway Construction), Current Edition
- Subdivision Construction Manual, Current Edition

EXHIBIT 4
GENERAL CRITERIA FOR SURVEYING AND MAPPING SERVICES

E4.2.1 Standards. The Contractor shall perform the services to standards called for in the Alaska State Professional Land Surveyors (ASPLS) Standards of Practice, the California Geodetic Control Committee (CGCC) Standards for Band IV surveys, U.S. COE Manual EM-1110-1-10000 for Photogrammetric Mapping, or the DOT&PF Construction Surveying Requirements, as appropriate to the services being performed.

All studies, reports and services shall be performed in accordance with applicable codes, regulations and standards; professional practice procedures; and commonly recognized surveying and mapping methods. The contractor shall package the deliverable in an electronic format using folders. The Contractor shall not begin surveying for design, surveying for right-of way, or right-of-way mapping without specific written authorization from the MSB.

E4.2.2 Considerations. The Contractor shall consider the geographical location of the project as well as other environmental and site specific constraints when performing services. The Contractor shall procure the necessary right of entry permissions when required, including private property, any Native Allotments, and Alaska Railroad property.

E4.2.3 Registration. All survey services shall be conducted by, or under, the direct supervision of a Professional Land Surveyor (PLS) holding current registration in the State of Alaska. A PLS shall be an active, on-site field supervisor of the survey crew. A PLS shall also be directly involved in the preparation of all survey deliverables.

E4.2.4 Field books. The Contractor shall furnish hardbound field books for recording survey information. The books shall become the property of the Contracting Agency after the survey information has been entered and the contract completed. Each book shall be labeled with the project name and an appropriate title, e.g. Horizontal Control, Vertical Control, etc., and shall have an index and comments page. The index page shall reference the contents by page number. A readable PDF copy of the field books is acceptable.

E4.2.4.1 Field notes shall be kept in a neat and orderly fashion. All pages shall be consecutively numbered, showing date, weather, and crew names. All abbreviations used shall be described on the comments page. Sketches are to be used frequently and shall be detailed enough to assist in following the progression of the services. Notes and sketches shall be adequately detailed to convey their intent to a person who is not familiar with the project. Descriptions of all monuments or other points, recovered or set, are to include the data stamped on the monument and the condition of the monument.

E4.2.5 Units. U.S. Customary System of Measurement (foot units) shall be used throughout development of the project. Any metric conversions required shall be based upon the U.S. Survey Foot (3937 feet = 1200 meters exact).

E4.2.6 Drawings, Plats, and Maps shall be prepared in electronic format as specified by the MSB.

E4.2.6.1 Unless otherwise stated, the format and standards for all drawings will be according to the most current DOT/PF Central Region Design Drafting Manual. These standards are available upon request. The plotted scale shall be as specified by the MSB.

E4.2.6.2 Drawings shall be produced and provided in English (U.S. Survey foot units) format. Distances will be shown in horizontal ground foot units. Areas shall be annotated with "Ac." for acres, and "sq. ft." for square feet. Metric units shall not be shown on drawings developed for design work, unless requested to do so by the MSB.

E4.2.6.3 All linework and lettering must be of professional quality and all line widths and lettering sizes must be of such size that all information can be clearly shown without overlap or confusion. All lettering must be a minimum size of 0.1 inch at a full-scale plot. Lettering and linework must be in the appropriate

black drafting ink. AutoCAD style names and fonts shall follow the MSB's specified standards. See the current Design Drafting Manual (B2.6.1)

E4.2.6.4 Linework shall not run through text. Do not break lines at text; mask the linework using color 155 solids. Solids shall be placed on the same layer as the text that the solid lies under.

E4.2.6.5 Drawings are to be accurate models of the data shown, e.g.; a line labeled N 10°00'00" E 104.35' shall be electronically drawn exactly as labeled, a line that is shown to terminate at a monument symbol shall be electronically drawn with no distance between the endpoint of the line and the center of the symbol, etc.

E4.2.6.6 All CAD work within Model Space shall be color by layer. The drawing shall include metadata, to include: control statements, drawing notes, and any other survey related info shown as text within Model space. The drawing shall be purged before submitting. Zoom to extents and remove any extraneous features. Check to ensure that all symbols are the same scale, which should be the plotted scale of the drawing. A standard MSB north arrow, a legend depicting only the symbols and linework used on that sheet, a foot unit bar scale, and standard border will be included on each sheet within the drawing. Do not include any extraneous backup files.

E4.2.6.7 Final Plans, Maps, and Plats shall be submitted electronically and with solid black ink on 22" x 34" original mylar. All final drawings shall be plotted so that the ink is on the front surface of the mylar. Topographic drawings are not required to be plotted.

E4.2.6.8 Drawings not meeting these standards will be rejected. All drawing files shall be submitted electronically to the MSB Project Manager and MSB Surveyor upon completion for review. The contractor shall perform their own internal review of these products before delivery, to see that Department standards have been followed.

E4.2.7 TINs shall be an Autodesk Civil3D Surface or 3D lines with an accompanying LandXML file. Include the TIN boundary as a closed polyline at elevation zero, and the fault lines as 3D polylines. All TINs produced shall be checked by ground based survey methods and by field inspection of contours generated by the TIN.

E4.2.7.1 A TIN certificate shall be submitted, signed, and sealed by the responsible PLS and shall contain the following: 1) the methods used to gather data for production of the TIN(s), 2) the accuracy of the TIN(s), and 3) the checks used to substantiate the accuracy of the TIN(s). All ground based TIN(s) shall be field checked before final submittal, and this shall be stated on the TIN certificate. All TIN(s) shall be checked by a PLS using withheld Topographic points randomly collected throughout the TIN(s) area. A minimum of 50 points shall be collected. Provide a spreadsheet showing the elevation differences from the TIN(s). A sample certification of TIN is available from the MSB's Survey Section.

E4.2.8 Coordinate Files shall be comma-delimited ASCII text files. Data shall be in the sequence Point Number, N, E, Z, and Description. Coordinates shall be given to four decimals for the Northings and Eastings, and two decimals for elevations. Points of unknown elevation shall have a placeholder of -9999 in the Z position. Descriptors are to be case sensitive, e.g.: Rebar5 shall not equal REBAR5. Descriptors for found or set monuments shall follow examples provided by the MSB.

E4.2.8.1 Point Numbering Scheme. The following point numbering scheme shall be used:

Range	Use
1-200	Primary Control Set (main project, line-of-sight traverses)
201-300	Primary GNSS Control

301-400	Aerial Control Panels or Naturals (HV's)
401-550	Secondary Control Points (Spikes/Nails)
551-600	Recovered Published Hz. Control (NGS, NOS, etc.)
601-700	Set or Recovered Vertical Control
701-2000	Fnd Mons/Prop Cors
2,001-5,000	Computed/Protracted Points, Search, Pre/Post Stakeout
5,001-20,000+	Topography Survey Points

The Surveyor shall ensure that point numbers used in this task do not conflict with point numbers used in other survey tasks on this project.

E4.2.9 Electronic Data (drawing files, coordinate files, reports, etc.) shall be submitted on appropriate size and type of digital media.

E4.2.10 Quality Control shall be performed by the Contractor prior to all submittals. Three dimensional backsight checks shall be recorded at the beginning and end of all instrument setups. Three dimensional coordinate checks shall be recorded at the beginning and end of an RTK GNSS work session. These checks shall become part of the submittal, labeled as "Quality Control Checks" within the Control Summary deliverable. The MSB will **reject** submittals that do not substantially conform to the requirements of this statement of services.

E4.2.11 Reviews. Draft documents required under this agreement shall be submitted to the MSB Project Manager and MSB Surveyor for review. The Contractor shall allow three weeks for the return of written comments. The Contractor shall address and respond to these comments to the satisfaction of the MSB prior to submitting the final documents.

E4.2.12 Submittal Delivery. Deliverables shall be submitted to the MSB in accordance with the negotiated schedule.

ARTICLE E4.3
SURVEYING AND MAPPING SERVICES

E.3.1 OVERVIEW

E4.3.1.1 General. The Contractor shall research all information applicable to the requirements of the assigned project and perform all necessary field and office services necessary to collect geospatial data and to reduce the collected data to a form useful for the MSB's project.

E4.3.1.2 Survey Limits and Scope. The survey limits and scope will be defined within each specific project's Request for Proposal.

E4.3.1.3 Survey Services shall be performed in the following sequence unless otherwise directed by the MSB:

a. Research
b. Pre-Work Meeting with MSB
c. Control Survey
d. Aerial Photography/Photogrammetry
e. Topographic/Planimetric Survey

f. Bridge Site(s)/Drainage Survey
g. Special Features
h. Right-of-Way Survey
i. Right-of-Way Mapping
j. Preconstruction Surveying
k. Post Construction Surveying
l. Right of Way Engineering Closeout Services

E4.3.2 Control Surveys

E4.3.2.1 General. Control surveys include establishing horizontal and vertical control points as directed by the MSB. The Contractor shall prepare a Survey Control Diagram (SCD) showing the results of the control survey. The SCD will be a recorded document, and as such, will need to meet certain criteria. All points used or tied as a part of these control surveys shall be included in the project coordinate file and shown on the SCD. SCD guidelines are available from the DOT&PF Survey Section. Prior to performing field surveys for the project, the Contractor shall meet with the MSB's Survey Manager, or their designee, to get existing Department control data and to discuss the control requirements for the project.

E4.3.2.1.1 Basis of Horizontal Control. When the primary control is provided by the MSB, it shall be held as the basis of control for the project. Contact the MSB if the provided control is found to be disturbed or out of tolerance. Any auxiliary control points necessary to augment this control shall be incidental to the task for which it is required. When the primary control is to be performed by the Contractor, the basis of control shall be as directed by the MSB's Survey Section. The local project coordinate system to be used shall be based upon transformation parameters supplied by the MSB.

E4.3.2.1.2 Horizontal Control Standards. All horizontal control survey measurements and references shall be recorded in field books. Electronic data collection can be used to record control data, but is not acceptable as the sole data source for survey measurements. Distances shall be measured and recorded in both feet (nearest 0.01 foot) and meters (nearest 0.001 meter) as a check. Recorded angle sets, at a minimum, will contain 2 direct and 2 reverse measurements of the forward angle right. When the difference between a direct and reverse pointing of an angle pair exceeds six seconds (ten seconds for distances of 150 feet or less), then that angle pair shall be rejected and remeasured. The mean angle right shall be used for all computations. All foresights and backsights shall be of the fixed leg type. Secondary control points may be side-tied in the same manner. Secondary control points shall be, at minimum, a mag-nail in paved areas or a 6-inch spike in unpaved areas.

All traverses performed shall meet or exceed the standards for Third Order Class I, Traverse Surveys as specified in the ASPLS Standards of Practice. All traverses shall be closed; beginning and ending at known points with an allowable linear error of closure of 1:10,000 or better. In no case shall ground traverses run greater than 2 miles between GNSS controlled points. Static GNSS work shall meet current CGCC Standards for Band IV Surveys. Traverse and GNSS network adjustments shall be by simultaneous least squares adjustment methods.

All cadastral, property, or right of way corners controlled with GNSS shall be done using Static GNSS survey methods. These corners are to be considered secondary control and need only to be occupied once, providing there is a minimum of two 20-minute duration vectors from project control computed for the corner position that differ by no more than 0.08 feet horizontally.

The use of Post-Processed Kinematic (PPK) or Real-Time-Kinematic (RTK) GNSS procedures are not allowed for establishing control.

E4.3.2.1.3 Primary Horizontal Control. For Highway Projects or traverses along road corridors, GNSS control points shall be set at approximately 2 mile intervals within the project limits, in areas where they may be easily traversed in and out of. These points shall be used for both the project horizontal and vertical control. A 9/16" dia. stainless steel rod shall be used for these deep monuments.

A minimum 4" dia. well case of length 2.5 feet shall be set around each monument with a protective cap and marker post. These points shall be driven to a maximum of 40 feet or refusal, whichever is less. An acceptable alternative would be to cement a cap into a solid rock outcropping or bedrock, or a dig-in type flared-base monument where conditions warrant.

Additional intervisible traverse points, as needed, shall be set at maximum 1320 foot intervals, and shall consist of a minimum 5/8" x 24" rebar (5/8" x 8" in pavement) with identifying cap. These points shall be located off of the existing paved surface wherever possible, and shall be set at least 0.1 foot below the existing ground surface. No spikes or nails shall be used as the Primary Horizontal Control.

All primary horizontal control points and reference points, found or set, shall be shown on the SCD.

The Contractor shall prepare a narrative horizontal control summary detailing the datum, primary control points used, Basis of Bearings, type of adjustment performed and statistics, problems encountered during the survey, equipment used, etc., which shall include annotated copies of control computations and control adjustments, and a horizontal control statement. For GNSS control surveys, the Contractor shall also provide a RINEX2 format data file of at least 8 hours of GNSS data for at least two control points for at least two different days in the Contractor's control network. **The MSB recommends logging as much data on as many different days as possible to account for any solar disturbances or other unanticipated problems that might occur.**

E4.3.2.1.4 Basis of Vertical Control. When primary vertical control is provided by the MSB, it shall be held as the basis of control for the project. Any auxiliary control points necessary to augment this control shall be incidental to the task for which it is required. When the primary vertical is to be established by the Contractor, the vertical datum shall be determined by the MSB. Note: A tie to MLLW shall be made for all surveys in or adjoining tidally influenced areas unless specifically directed to do otherwise by the MSB.

E4.3.2.1.5 Vertical Control Standards. All vertical control survey measurements shall be recorded in field books. If an electronic digital level is used and the data is recorded electronically the Contractor shall provide annotated copies of the raw and reduced data. All vertical survey circuits shall meet or exceed the standards for third order leveling as specified in the latest printing of the Federal Geodetic Control Committee's Standards and Specifications for Geodetic Control Networks. All vertical control points shall be part of a closed level loop; side-shots are not acceptable. Each loop shall be adjusted and this adjusted elevation used for any further loops. Loop closures and loop-adjusted elevations shall be shown in the field books. The books shall also be used to record descriptions and sketches of vertical control points found or set, condition of found points, and for electronically recorded data the loop information (start point, point(s) controlled, end point, etc.) necessary to interpret the data. Primary vertical control points (BMs and TBMs) shall be controlled by differential leveling. Elevations may be established for secondary control points by closed trigonometric loops, in which case sight distances shall not exceed 750 feet with foresights and backsights of approximately equal lengths, and the line of sight shall clear obstacles by a minimum of 1.5 feet to avoid the effects of adverse refraction. Elevation differences shall be measured and recorded to the nearest 0.01 foot.

E4.3.2.1.6 Primary Vertical Control. For highway projects or projects along road corridors, primary vertical control points shall be established every ½ mile or less. Existing official benchmarks (BMs) shall be used wherever possible, with intermediate temporary benchmarks (TBMs) established between them. These TBMs shall be stable objects such as luminaire and signal pole base bolts, spikes in trees, etc. **Wooden utility poles, scribes in concrete, and traverse points shall not be used for TBMs.** Contact the MSB for direction if no suitable TBM locations exist. Where no permanent official benchmarks exist, the Contractor shall establish a minimum of two **permanent benchmarks** per project site, or one per mile, whichever is the greater number, for use through project construction. Permanent benchmarks shall be at a minimum, 9/16" dia. stainless steel rod driven no more than 40 feet or until refusal into dry ground, encased by a 2.5 foot section of 4" dia. well casing flush with the ground with a rubber cap covering the top of the pipe, or a brass cap cemented into rock outcrops or stable concrete structures, e.g. bridge abutments or building foundations and walls. These points may

also satisfy the requirements for Horizontal control, under section B3.2.1.3. A marker post shall be placed near each permanent benchmark, found or set. Refer to the NOAA Manual NOS NGS 1, Geodetic Benchmarks for recommended guidelines for setting permanent benchmarks.

Primary vertical control points, found or set, shall be described in great detail, identifying the particular physical feature used for the elevation point, and sketches shall be made to aid in this effort. Instructions sufficient to enable someone unfamiliar with the project to find these points shall be recorded; these instructions shall include distances and directions from recognizable terrain features such as major intersections, bridges, buildings, etc. All primary vertical control points, found or set, shall be tied to the project horizontal control and shown on the SCD.

The Contractor shall prepare and provide a narrative vertical control summary detailing the datum, primary control points used, vertical network adjustment data, problems encountered during the survey, equipment used, etc., which shall include an NGS benchmark data sheet if available.

E4.3.2.2 Survey Control Diagram. The Contractor shall prepare a Survey Control Diagram (SCD) for the project showing the relationship between survey monuments set and found in the field. The SCD typically shows all horizontal and vertical control found or set in the course of a survey, as well as all found or set monuments that exist in the roadway. The SCD will be recorded as a Record of Survey in the appropriate Recording District by the MSB once approved. In cases where Right of Way Mapping will not take place as part of a project, the Contractor may be required to show all monument ties on the SCD, as directed by the MSB.

E4.3.2.3 Survey Control Sheet. The Contractor shall prepare a Survey Control Sheet (SCS) for the project showing the relationship between the final project centerline and survey monuments in the field. This differs from a Survey Control Diagram (SCD-see section B3.2.2) in that the SCD does not show the final project centerline. The SCS shall be part of the construction plan set and its principal users will likely be Land Surveyors staking the project centerline prior to and after construction or replacing corners that have been disturbed, MSB surveyors checking that work, and the Project Engineer to ensure that existing monumentation does not get disturbed. Other near-term users may include Land Surveyors who are performing boundary work in the vicinity of the project. The SCS may be recorded as a Record of Survey, but typically is not. **The SCS must not be prepared before the final design centerline is known**, typically after the Pre PS&E Review. Samples are available from the MSB's Survey Section.

E4.3.2.4 Electronic Photographs. To assist in the point identification, verification of markings, condition of monument and accessories, we ask that .jpg digital photographs be gathered of all monuments found, set, or tied. Each corner should have a minimum of three photographs: one readable close-up of the cap, one near distance showing monument condition, and one with an overview of the monument and its surroundings (it helps to have a tripod setup over the point or some other indicator like fiberglass post to find monument in surrounding picture). All original bearing trees and other accessories of record should also be photographed for these corners. The photographs should be indexed by point number, with the point number in the file name to aid identification of the point. Many times a chalkboard or other similar device can be used in the field to identify the point in the photographs by writing the point legal designation and project point number on the board, and placing board in scene of the pictures. Resolution/File Size should be limited to no more than 1Mb per photo, or a resolution of no more than 2048x1356.

E4.3.3 Survey for Design

E4.3.3.1 General. Design Surveys include topographic, hydrographic, photogrammetric, and other geospatial methods of data collection associated with defining the existing ground surface and both natural and man-made features.

E4.3.3.2 Monument Ties. The Contractor shall research, locate, photograph, and verify all monuments within the existing Right-of-Way limits and the proposed construction limits. If the MSB previously

performed a field survey tying monumentation, the existence of these monuments shall be field verified. This will insure that the MSB can comply with the provisions of AS 19.10.260 and AS 34.65.040, and enable an estimate of quantities to be made. Examples would be Rectangular or Centerline monuments. In the event there is no Right of Way survey performed, these corners will need to be surveyed using the methodology described in section B3.2.1.2, so their position can be accurately reestablished.

E4.3.3.3 Remote Sensing. When directed by the MSB, the Contractor shall obtain remotely sensed and associated mapping products. The MSB shall be granted rights to use of the data and associated delivered products, for our project design and other in-house uses, including transmittal to others.

E4.3.3.3.1 Photogrammetry. As an alternative to ground surveying, the Contractor may use controlled aerial photography to provide planimetric and topographic information. Use of photogrammetric data for this project is subject to the MSB's approval. As aerial photography may be used for a variety of analyses, the photography shall be natural color and have sufficient scale and resolution to allow for the preparation of the photogrammetric products, which meet the required accuracies and provide economical acquisition. Aerial photography used for topographic mapping products shall be acquired during leaf-free and snow free conditions. Aerial photography used solely for orthophoto products may be acquired with leaf-on conditions. Existing photography may be substituted for new photography with the approval of the MSB Project Manager. All acquired aerial photography, and all photogrammetric products prepared by the Contractor, shall conform to the guidelines and standards of the US COE Manual EM-1110-1-1000. The Contractor using methods suitable to return the desired mapping accuracies shall control aerial photography used for mapping products. Horizontal and vertical datum for the photogrammetric products shall be on the same datums as that used for the project control. Any photo pre-mark panel points shall be set and controlled for this task, using the same methods and materials as detailed for auxiliary control points presented above for Horizontal and Vertical Control. The Contractor shall determine the number of, location of, and panel size for these points in conjunction with the firm performing the aerial photography. Each photogrammetric control point shall be marked using appropriate panel material. The Contractor shall remove and dispose of all panels set under this contract at the direction of the MSB. The use of the most cost effective techniques that will provide the specified products is encouraged. All photogrammetric products for development of TINs shall meet the format, content, accuracy and certification requirements of Section B3.3.4.1 through B3.3.4.6 unless directed otherwise by the MSB.

If aerial photography is acquired for, or available for use on this project, a digital orthophoto, geo-referenced to the project coordinates, shall be provided to the MSB for use in design. Orthophotos shall be delivered in two formats with the associated world files: uncompressed .TIF, and compressed Mr. Sid image file.

E4.3.3.4 Topographic Survey. Topographic features shall be surveyed using appropriate data collection methods. The Contractor shall provide complete topographic mapping in a single AutoCAD drawing file along with a single TIN upon completion. All points located in these surveys shall be included in the project coordinate file. The Contractor shall:

E4.3.3.4.1 Define the existing ground surface by creating a Triangular Irregular Network (TIN). The TIN shall be capable of accurately generating 1 foot contours in all areas. Hard shots (pavement, concrete, etc.) shall have vertical accuracy of less than 0.1 foot. The TIN shall incorporate fault lines (grade breaks, existing centerlines, edges of pavement, curbs [flowline and top back], sidewalks, shoulders and/or tops of bank, toes of slope/fill, ditches and/or drainages, etc.) and additional shots as necessary to insure that the TIN accurately represents the **existing ground surface**. The TIN shall not represent water surfaces. Sufficient data shall be gathered along driveways and side streets to allow grade matching. Provide TIN verification in the form of the MSB's TIN Certificate. (B2.7)

E4.3.3.4.2 Locate and map all **existing improvements and utilities** (above and below ground) within the survey limits. Mapping of overhead utility wires shall include the apparent low point of the wire sag. Overhead wire crossings shall also be located at the existing and proposed centerlines. Elevations for these points shall be the bottom wire elevation. Locate all attachments (guy wires, pedestals, stand

pipes, load centers, lights, etc.) within the project survey limits. This includes, but is not limited to, power, telephone, fuel lines, water and sewer lines, cable television, edge of pavement, fences, signage, and navaids within the survey limits. Note any historical sites located in this area. Caution shall be used to avoid disturbing any historic remnants. Locate the edge of trees and identify the approximate average height of the trees at the edge. Locate the limits of any apparent contaminated soils and waters within the project area. Tie to any Corp of Engineers flood plain datums. For Airports: Heights of towers, antennas and any other structure that could be considered a hazard to aircraft shall be included. Determine location, finish floor elevations, peak roof elevations and a description of all buildings in and within 100 feet of the surveyed area. Locate the first tier of structures lying outside of the proposed airport boundary and within 200 feet of that boundary.

E4.3.3.4.3 Locate and map all **drainage structures** within the survey limits. Record diameter, length, invert elevations, structure type and condition, high water marks, and apparent flow direction.

E4.3.3.4.4 Locate and map any **other physical feature, natural or man-made**, including any ordinary or mean high water boundaries that could affect the design of the project, as directed by the MSB.

E4.3.3.4.5 After the MSB has reviewed the provided data, the Contractor may need to **extend the TIN & topographic mapping as specified** by the MSB.

E4.3.3.4.6 Locate and tie, both horizontally and vertically, **all proposed and existing geotechnical sample locations.** The Contractor shall stake the baseline or sample locations as directed by the MSB.

E4.3.3.5 Bridge Site/Drainage Survey. The Contractor shall perform drainage surveys in the vicinity of proposed channel crossings or major drainages. All work shall be tied to project horizontal and vertical control. Surveys shall be performed as specified in the Preconstruction or Drainage Manual unless otherwise directed by the MSB. The Contractor shall coordinate with the MSB for site-specific requirements. The data collected for these surveys shall be incorporated into the TIN and topographic files, and all shots taken shall be included in the project coordinate file.

For culverts 36 inches and over in diameter, 4 cross sections upstream and 4 cross sections downstream from the inlet and outlet of said culvert shall be surveyed. The spacing of these cross sections shall typically be equal to the average width of the existing streambed (i.e., 10 feet wide will then have cross sections taken at 10, 20, 30, and 40 feet up stream and downstream). Cross sections shall be taken perpendicular to the existing streambed. Shots shall be taken at: the thalweg, the toe of slope, the edge of existing water, ordinary high water, the top of bank, and one shot past the top of bank. The data collected for these surveys shall be incorporated into the TIN, topographic, and project coordinate files. The Contractor shall perform the following drainage survey work:

E4.3.3.5.1 For bridge sites, the line of **ordinary high water** shall be located. The Contractor shall search for evidence of extreme high water and locate it at the existing structure. These items shall be located both horizontally and vertically. The Contractor shall complete the appropriate sections of the MSB's Bridge Site Survey Form.

E4.3.3.5.2 Prepare a topographic map of each bridge site. The map shall show the ordinary high water elevation (or mean high water in tidally influenced areas) and indicate the edge of water at the time of the survey. All buildings, dikes, rock outcroppings and other physical features shall be noted on the map.

E4.3.3.5.3 Additional data collection for the Hydraulic Report may be required after the design has reached the Local Review stage.

E4.3.3.5.4 Prepare a Bridge Site Report, which is a summary in ASCII format noting pertinent information such as horizontal and vertical control basis, date of survey, bridge number, name of water

body, ordinary high water coordinate point numbers, extreme high water coordinate point numbers, existing structure coordinate point numbers, and note whether body of water is navigable.

E4.3.3.6 Special Features. The Contractor shall collect ground elevation data necessary and stake the location of project specific appurtenances to the roadway (retaining walls, breakwaters, special ditches, turnouts, sound barriers, etc.) as necessary for their design and field review by the MSB.

E4.3.3.7 Deliverable Items. The deliverables shall be organized electronically in folders according to the following list. Only submit what is required for your specific project. Do not submit extra information not required by the MSB. Name the files and folders according to what they represent. Do not use contractor specific job numbers. CAD drawings should be named in such a manner that anyone can tell what it represents without having to open the drawing. An example would be "Sleetmute_Topo.dwg", and not "06-342.dwg". The Contractor shall submit the following items related to their survey to the MSB Project Manager and Surveyor:

Deliverable Description

A. Field Books: The original field books or PDF indexed, reduced, stamped and checked. (EB5.2.4)

B. Point Files: An ASCII coordinate file containing all recovered, computed, and topographic points in the local system (if provided). Electronic format shall be submitted. Elevations that are not valid TIN elevations shall be coded as such in the descriptor. (EB5.2.8)

C. Descriptors: An ASCII file listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. (EB5.2.8)

D. Survey Report and Control Summary: Horizontal and vertical control summaries in ASCII format. The Contractor shall also provide stamped annotated copies of control computations and control adjustments, including a check shot report. (EB5.3.2)

E. Survey Control Diagram (Record of Survey): Electronic CAD and PDF copy. (EB5.3.2.2)

F. Survey Control Sheet(s): Electronic CAD and PDF copy. (EB5.3.2.3)

G. GNSS Data: For GNSS control surveys, the Contractor shall provide RINEX2 GNSS data files of 8 hours length for at least 2 control points, along with any GNSS processing or OPUS reports. (EB5.3.2.1.3)

H. Electronic Pictures: Organized folders containing all of the control, monument ties, and project site photos. Do not use separate folders for each point. If applicable, the point number should be referenced within the image filename. (EB5.3.2.4)

I. TIN: All TIN files with a sealed and signed certificate of accuracy. Quality control check spreadsheet showing the differences from the true values (EB5.2.7).

J. Bridge Site/Drainage Survey mapping: Electronic drawing files and TIN files (EB5.3.3.5.2)

K. Bridge Site Report: Refer to the Preconstruction or Drainage Manual, and or the MSB for possible additional information. (EB5.3.3.5.4)

L. Project Drawing: A single complete and edited AutoCAD drawing file of the entire survey limits, containing topographic mapping (points, surfaces, annotations, metadata), base-mapping, bridge site/drainage surveys. (EB5.3.3.4)

M. Air Photo Report: A report of the photogrammetric control shall be provided including all ground control points, aerial photography camera logs, airborne GNSS control procedures and results, analytical aero triangulation results, current camera calibration reports, and other data associated with control of the aerial photography. (EB5.3.3.3.1)

N. Ortho Photo Mosaic: .tif format files shall be delivered in files less than 250MB in size. A compressed

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image file in Mr. Sid format shall also be included. An index file showing the project area and the areas covered by the individual files shall be included. (EB5.3.3.3.1)

E4.3.4 SURVEYING FOR RIGHT-OF-WAY

E4.3.4.1 General. The Contractor shall perform the following services to the standards in EB5.3.2. Typically the surveying for ROW is performed after horizontal control is established for the project. Any exceptions shall be discussed at the project pre-work meeting.

E4.3.4.1.1 Prior to commencement of the survey, the Contractor shall review any title documents and mapping in the MSB's possession which is considered relevant to the project. The Contractor shall be responsible for researching additional relevant documentation from other sources. These documents include but are not limited to the following:

Bureau of Land Management (BLM) and Department of Natural Resources (DNR) land status plats, BLM township survey plats, Mineral and U.S. Survey plats and field notes, any records of survey, subdivisions, and relevant engineering control surveys, United States Coast and Geodetic Survey (USC&GS)/ National Geodetic Survey (NGS) control diagrams-descriptions, DOT&PF right-of-way records and other easement or boundary documents of record, DOT&PF engineering as-builts, DOT&PF Airport Leasing documents, DNR surveys, and aerial photos, DEC Community Profile Maps, Local or Municipal data.

All research for property corner ties (generally includes local platting authority subdivision plats and right-of-way plats, BLM U.S. Surveys, state land survey plats, waiver documents, deeds, record of surveys and monument records) should be done prior to commencement of searching and tying property and ROW controlling corners.

E4.3.4.1.2 Tie the nearest Public Land Survey System (PLSS) monuments (Section, 1/4 Section and 1/16 Section Corners) left and right of the project Right-of-Way corridor or if existing monuments that represent the legal corner positions do not exist at those locations, sufficient additional rectangular monuments and/or accessories to control the computations of the legal locations of those corners per the relevant BLM *Manual of Surveying Instructions for Public Lands*. Any corner monument in need of rehabilitation or re-monumentation shall first be photographed, and then have rehabilitation accomplished prior to tying the monument location and re-photographing the final condition. The intent of the PLSS monument ties is to define the larger remaining parcel surrounding the existing road Right-of-Way.

Tie all existing centerline monumentation throughout the project limits including two centerline monuments at each end that extend beyond the limits of the project. Additional PLSS monuments shall be recovered to allow section breakdown for property boundary determination as directed by the MSB. Tie adequate centerline monumentation on side streets to determine side street alignment to the project limits. A minimum of two side street centerline monuments shall be tied. If side street centerline monuments are not recovered then sufficient block or lot corners will be tied to define the side streets.

For the initial surveys all property corners within and along the existing ROW and the ROW centerlines should be searched for, documented and tied. In most cases, there will be some non-fronting property corners also required to be tied to setup subdivision blocks, survey boundaries and side-street ROWs. Sufficient control is required to establish the location of all surveys adjoining the ROW, or where acquisitions are planned. The extent of the corners to be tied normally is discussed and clarified during contract negotiations or at the survey pre-work meeting.

E4.3.4.1.3 For projects with PLO ROWs or other ROWs dependent on the physical road location (such as prescriptive claims), tangent as-builts are required. This procedure normally requires the field determination of pavement or unpaved surfaces centerline by physical measurement, and then location

of those points. Points are normally surveyed near each tangent end and a minimum of 3 points on curves The number of shots actually required depends on curve length and degree of curve and should be clarified in writing at the pre-work meeting. The Contractor at the direction of the MSB may also be tasked with developing an alignment and locating existing slope or clearing limits. Please consult the MSB's ROW Staff section for guidance.

E4.3.4.2 Record of Survey. A Record of Survey shall be prepared for recording in the appropriate Recording District for the Right of Way survey. All Right of Way surveying completed above in section B3.4.1 shall be included in the Record of Survey. Consult with the MSB for guidance in the preparation of the Record of Survey.

E4.3.4.3 Annotated Plats and Research Documents. PDF Copies of all of the research documents for the rectangular survey, centerline monuments, ROW monuments and property corners shall be provided, along with annotations of whether the point was searched for and not found, or monument destroyed, or if found it's corresponding project point number. These annotations do not need to be "works of art", and many times are the original paper plat copies, or scans of such, that the field crews had in the field with them. The annotated plats should be indexed in some method (by Section Location, MOA grid, or other logical means), placed in labeled folders organized by the indexing scheme.

E4.3.4.4 Additional Topography for Right-of-Way Acquisition. The Contractor shall collect all topographic information that may affect the cost and/or schedule of defined right-of-way acquisitions for the project, such as culverts, land service or access roads, improvements, apparent contaminated soils or waters, buried fuel tanks, fences and any structures. Septic system, well and building locations are examples of pertinent data, usually outside of the acquisition area, that may affect the value of the right-of-way to be acquired.

E4.3.4.5 Deliverable Items. The deliverables shall be organized electronically in folders according to the following list. Only submit what is required for your specific project. Do not submit extra information not required by the MSB. Name the files and folders according to what they represent. Do not use contractor specific job numbers. CAD drawings should be named in such a manner that anyone can tell what it represents without having to open the drawing. An example would be "Sleetmute_ROW.dwg", and not "06-342.dwg". The Contractor shall submit the following items related to their Survey to the MSB Project Manager and Surveyor:

Deliverable Description

A. Field Books: The original field books or PDF indexed, reduced, stamped and checked. (EB5.2.4)

B. An ASCII coordinate file containing all recovered, computed, and topographic points in the local system (if provided). Electronic format shall be submitted. Elevations that are not valid TIN elevations shall be shown as -9999. (EB5.2.8)

C. An ASCII file listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. This file shall be submitted with the draft coordinate file. (EB5.2.8)

D. Right of Way Survey Report Memo. A brief description of the survey methods, equipment, computations, quality control checks and accuracy estimates.

E. Survey Control Diagram (Record of Survey): Electronic CAD and PDF copy. (EB5.3.2.2)

F. Annotated Plats and Research Documents. (EB5.3.4.3)

G. GNSS Data: For GNSS control surveys, the Contractor shall provide RINEX2 GNSS data files of 8 hours length for at least 2 control points, along with any GNSS processing or OPUS reports. (EB5.3.2.1.3)

H. Electronic Pictures: Organized folders containing all of the control, monument ties, and project site photos. Do not use separate folders for each point. If applicable, the point number should be referenced within the image filename. (EB5.3.2.4)

E4.3.5 Pre & Post Construction Surveys

E4.3.5.1 General. In order to best perpetuate the positions of DOT/PF Project Centerline Monuments, we encourage the use of Static GPS ties to permanent control stations that are set outside project limits, and are expected to last well beyond construction.

E4.3.5.2 Pre-Construction. When directed by the MSB upon completion of the design phase of the project, but prior to advertising for construction, the Contractor, using the previously established project control shall monument the project (PC's, PT's, and no-curve PI's, etc.) using conventional methods. All monuments established shall consist of a minimum 5/8" dia. X 24" rebar (5/8" dia. X 8" in pavement) with a 2" dia. cap, and stake nearby. Once set, all monuments shall be photographed and re-tied to verify their position (B3.2), and a comparison to the design coordinates shall be presented to the MSB in spreadsheet format. This information shall be presented in project staking report.

Static GNSS Control points for this task shall be set at approximately two mile intervals, or closer for a small project, outside of the construction limits, so as to last for the duration of the project. A plan identifying the type of monument to be set for control, and its proposed location, shall be submitted to the MSB prior to the work being performed. Control points from the design survey effort may be used for this effort upon approval.

Monuments that may be disturbed during construction shall be referenced by static GNSS to the off-project control. It shall be the Contractor's responsibility to coordinate with the Agency or Firm developing the Right of Way Mapping to identify these monuments. Two in line conventional reference points, set outside the construction limits, may be used in the cases where static GNSS will not work. Two vectors at a minimum shall establish the position of the monument to be referenced. These two vectors shall differ by no more than 0.08 feet.

This procedure is further explained here:
http://www.dot.state.ak.us/creg/dot-cadastral/Construction_Surveys/Centerline_Referencing_and_Perpetuation_2011.doc.

E4.3.5.3 Post-Construction: When directed by the MSB, and upon completion of the construction phase of the project, the Contractor shall establish and monument the project and a random control line. Monument type and spacing shall be determined in discussions with the MSB. In the case of a project centerline, the points shall be established using the data from the Pre-Construction effort. Right of Way monumentation that was referenced prior to construction shall be field verified that it was not disturbed. A digital photo shall be required as proof. Any disturbed ROW monuments shall be reestablished as part of this effort. This procedure is further explained here http://www.dot.state.ak.us/creg/dot-cadastral/Construction_Surveys/Centerline_Referencing_and_Perpetuation_2011.doc. A final Record of Survey or data incorporation into the project Right of Way Mapping shall be completed that shows any new monumentation set.

E4.3.5.4 Final Record of Survey (Airports). When directed by the MSB, and upon completion of the Construction phase, the Contractor shall complete the final Record of Survey which may include, but is not limited to, the following tasks: FAA Aeronautical Survey, locate all navigational aids, as built the runway using guidelines provided by the Contacting Agency, set or check the airport boundary monumentation, set or check the access road monumentation, tie into older horizontal and vertical datums, and establish threshold coordinates. If land was acquired as part of the project a Right-of-Way Acquisition plat will be developed and recorded in the appropriate recording district.

Deliverable Description

A. Field Books: The original field books or PDF indexed, reduced, stamped and checked.

B. Point Files: An ASCII coordinate file containing all recovered, computed, and topographic points in the local system (if provided). Electronic format shall be submitted. Elevations that are not valid TIN elevations shall be coded as such in the descriptor. (B2.8)

C. Descriptors: An ASCII file listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. (B2.8)

D. Survey Report and Control Summary: Horizontal and vertical control summaries in ASCII format. The Contractor shall also provide stamped annotated copies of control computations and control adjustments, including a check shot report. (B3.2)

E. Record of Survey for centerline and random control, and/or Monument of Record Forms (B3.6.3) if this information is not incorporated with the project Right of Way Mapping closeout effort. (B3.5 or B3.7)

F. Project Staking Report (B3.6.2)

G. GNSS Data: For GNSS control surveys, the Contractor shall provide RINEX2 GNSS data files of 8 hours length for at least 2 control points, along with any GNSS processing or OPUS reports. (B3.2.1.3)

H. Electronic Pictures: Organized folders containing all of the control, monument ties, and project site photos. Do not use separate folders for each point. If applicable, the point number should be referenced within the image filename. (B3.2.4)

I. Right of Way Acquisition plat. (B3.5.6)

J. Airport as-built Record of Survey (B3.6.4)