

**TO: PLANHOLDERS**

The contract documents for the referenced project are clarified and amended as follows:

**MODIFICATIONS/CLARIFICATIONS:**

1. **MODIFY** Instructions to Bidders SECTION 14 AWARD OF AGREEMENT; DELETE 2<sup>nd</sup> Paragraph that is underlined and replace with:

“It is the intent of the City to award the bid in two phases: Phase I shall be Schedule A and Phase II shall be Schedule B and Schedule C, as shown on the bid schedule and Drawings. Schedule A shall be awarded first; Schedule B and possibly Schedule C (if Additive Alternative 1 is awarded) shall be awarded and added to the Agreement by change order if funding becomes available, but no later than March 1, 2021. By submitting a bid, Bidder agrees to honor their Schedule B and C bid price with no adjustment of any kind. While the City anticipates receipt of funds for Phase II, Phase II will not be awarded if funding does not become available from the FAA.”

**MODIFICATIONS/CONSTRUCTION SPECIFICATIONS:**

2. **ADD** SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS.
3. **REPLACE** SECTION 32 12 16 – ASPHALT PAVING with attached SECTION 32 12 16 – ASPHALT PAVING revised per ADDENDUM 1.
4. **MODIFY** SECTION 33 34 00 ONSITE WASTEWATER DISPOSAL, PART 2 PRODUCTS, 2.1 PIPE AND FITTINGS, B. Insulated Pipe, 1; **DELETE** Section (a) that reads:
  - a. “SDR 26 HDPE pipe, AWWA C906, manufactured from PE4710 compounds that meet or exceed ASTM D3350 Cell Classification 445574.”

And **REPLACE** with the following Section (a) that reads:

- a. “SDR 17 HDPE pipe, AWWA C906, manufactured from PE4710 compounds that meet or exceed ASTM D3350 Cell Classification 445574.”

**DRAWINGS:**

1. **REPLACE** Sheet C1.04 with the attached drawing sheet C1.04 revised on August 14, 2020, which modified the grading coordinate point table.

**RESPONSES TO BIDDERS' QUESTIONS:**

1. Question: Would the City accept a DOT approved Type II, Class A or B job mix formula in lieu of the Class E muni of Anchorage specified?

Response: See revised SECTION 32 12 16 revised per ADDENDUM 1.

2. Question: Was looking at the Kenai Mun. Airport KMA, Sand storage bldg. project. Division 074213, or 074113 Insulated metal panels. You have listed a 4 inch thick corrugated panel. You have Kingspan listed as approved mfg's, but not as Basis of Design. I would like to submit our Designwall series ribbed panel for the project. Here is link. All data sheets, specifications, etc. are included in this link. <https://www.kingspan.com/us/en-us/product-groups/architectural-panel-facade-systems/benchmark-architectural-wall-panels/designwall-r-series>

Would also like to ask if we could get a list of installers you have solicited for this install? Would like to be able to get product numbers to all those individuals.

Response: Substitution requests will only be evaluated after Notice of Award. A list of installers is not available.

3. Question: Section 01 73 00 – 3.7.A references Section 01 91 13 “General Commissioning Requirements;” however, this section could not be located in the project documents. Please clarify if commissioning is required and if so, please provide specifications.

Response: See added SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

4. Question: Article 7 of the General Conditions do not indicate Builder's Risk insurance is required. Please confirm.

Response: Section 7.2 of Article 7 within the General Conditions indicates the insurance coverage required by Contractor. The Contractor may at their own discretion provide additional insurance coverage.

5. Question: Section 33 10 00 Water Utility, 2.1 Pipe and Fittings.

A. Calls for 26 Mil coating on copper pipe. Will the City require protective coating on the 1" copper waterline or will standard k copper be sufficient?

G. Calls for anodes. Will the City require anodes to be installed?

Response: No change. Bid shall include protective coating on the 1" copper waterline and shall include the installation of anodes.

6. Question: Section 33 10 00 Water Utility, 3.2 Flushing and testing.

A. Calls for disinfecting and submitting test results (1.3 submittals B.1). Will the city require disinfection and third party testing of the 1" service line for bacteria?

C. calls for hydrostatic testing of the 1" services line to 150 PSI. Will the City require hydrostatic testing of the 1" service line or will a visual inspection for leaks be adequate?

**Invitation to Bid  
KENAI MUNICIPAL AIRPORT  
SAND STORAGE BUILDING**

**Addendum No. 1  
August 19, 2020**

Response: No change. Disinfection and testing of the 1" service line is required. Hydrostatic testing of the 1" service line is required.

**Where any requirements of the Invitation to Bid are in conflict with an item in an Addendum, the Addendum shall govern.**

**All other terms and conditions of the Invitation to Bid shall remain unchanged and in full force and effect.**

END OF ADDENDUM NO.1

## **SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

1. General requirements for coordinating and scheduling commissioning.
2. Commissioning meetings.
3. Commissioning reports.
4. Use of test equipment, instrumentation, and tools for commissioning.
5. Construction checklists, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
6. Commissioning tests and commissioning test demonstration.
7. Adjusting, verifying, and documenting identified systems and assemblies.

- B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submittal procedures requirements for commissioning.
2. Section 01 77 00 "Closeout Procedures" for certificate of Construction Phase Commissioning Completion submittal requirements.

#### **1.3 DEFINITIONS**

- A. Acceptance Criteria: Threshold of acceptable work quality or performance specified for a commissioning activity, including, but not limited to, construction checklists, performance tests, performance test demonstrations, commissioning tests and commissioning test demonstrations.
- B. Commissioning: A quality-focused process for verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, and tested to comply with Owner's Project Requirements. The requirements specified here are limited to the construction phase commissioning activities.
- C. Construction Phase Commissioning Completion: The stage of completion and acceptance of commissioning when resolution of deficient conditions and issues discovered during commissioning and retesting until acceptable results are obtained has been accomplished. Owner will establish in writing the date Construction Phase Commissioning Completion is achieved. See Section 01 77 00 "Closeout Procedures" for certificate of Construction Phase Commissioning Completion submittal requirements.

## **Kenai Municipal Airport Sand Storage Building**

---

1. Commissioning is complete when the work specified in this Section and related Sections has been completed and accepted, including, but not limited to, the following:
  - a. Completion of tests and acceptance of test results.
  - b. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
  - c. Completion and acceptance of submittals and reports.
- D. Owner's Witness: Project Representative, Owner's Project Manager, or Architect-designated witness authorized to authenticate test demonstration data and to sign completed test data forms.
- E. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.
- F. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.

### **1.4 COMPENSATION**

- A. Should Architect, Project Representative other Project Representative, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, compensate Owner for such additional services and expenses.
  1. Failure to provide timely notice of commissioning activities schedule changes.
  2. Failure to meet acceptance criteria for test demonstrations.

### **1.5 COMMISSIONING TEAM**

- A. Members Appointed by Contractor(s):
  1. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning.
  2. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning.
  3. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning.
  4. Appointed team members shall have the authority to act on behalf of the entity they represent.
- B. Members Appointed by Owner:
  1. Project Representative, facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning.

## **Kenai Municipal Airport Sand Storage Building**

---

2. Architect, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning.

### **1.6 INFORMATIONAL SUBMITTALS**

- A. Comply with requirements in Section 01 33 00 "Submittal Procedures" for submittal procedures general requirements for commissioning.
- B. Commissioning Plan Information:
  1. List of Contractor-appointed commissioning team members to include specific personnel and subcontractors to the performance of the various commissioning requirements.
  2. Schedule of commissioning activities, integrated with the construction schedule.
  3. Contractor personnel and subcontractors to participate in each test.
  4. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.
- C. Commissioning schedule.
- D. Two-week look-ahead schedules.
- E. Commissioning Coordinator Letter of Authority:
  1. Within 10 days after approval of Commissioning Coordinator qualifications, submit a letter of authority for Commissioning Coordinator, signed by a principal of Contractor's firm. Letter shall authorize Commissioning Coordinator to do the following:
    - a. Make inspections required for commissioning.
    - b. Coordinate, schedule, and manage commissioning of Contractor, subcontractors, and suppliers.
    - c. Obtain documentation required for commissioning from Contractor, subcontractors, and suppliers.
    - d. Report issues, delayed resolution of issues, schedule conflicts, and lack of cooperation or expertise on the part of members of the commissioning team.
- F. Commissioning Coordinator Qualification Data: For entity coordinating Contractor's commissioning activities to demonstrate their capabilities and experience.
  1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- G. List test instrumentation, equipment, and monitoring devices. Include the following information:

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

1. Make, model, serial number, and application for each instrument, equipment, and monitoring device.
2. Brief description of intended use.
3. Calibration record showing the following:
  - a. Calibration agency, including name and contact information.
  - b. Last date of calibration.
  - c. Range of values for which calibration is valid.
  - d. Certification of accuracy.
  - e. N.I.S.T. traceability certification for calibration equipment.
  - f. Due date of the next calibration.

#### **H. Test Reports:**

1. Pre-Startup Report: Prior to start up of equipment or a system, submit signed, completed construction checklists.
2. Test Data Reports: At the end of each day in which tests are conducted, submit test data for tests performed.
3. Commissioning Issues Reports: Daily, at the end of each day in which tests are conducted, submit commissioning issue reports for tests for which acceptable results were not achieved.
4. Weekly Progress Report: Weekly, at the end of each week in which tests are conducted, submit a progress report.
5. Data Trend Logs: Submit data trend logs at the end of the trend log period.
6. System Alarm Logs: Daily, at the start of days following a day in which tests were performed, submit print-out of log of alarms that occurred since the last log was printed.

#### **I. Construction Checklists:**

1. Material checks.
2. Installation checks.
3. Startup procedures, where required.

## **1.7 CLOSEOUT SUBMITTALS**

#### **A. Commissioning Report:**

1. At Construction Phase Commissioning Completion, include the following:
  - a. Pre-startup reports.

- b. Approved test procedures.
  - c. Test data forms, completed and signed.
  - d. Progress reports.
  - e. Commissioning issues report log.
  - f. Commissioning issues reports showing resolution of issues.
  - g. Correspondence or other documents related to resolution of issues.
  - h. Other reports required by commissioning.
  - i. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction Phase Commissioning Completion.
  - j. Report shall include commissioning work of Contractor.
- B. Request for Certificate of Construction Phase Commissioning Completion.
- C. Operation and Maintenance Data: For proprietary test equipment, instrumentation, and tools to include in operation and maintenance manuals.

## **PART 2 PRODUCTS**

### **2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS**

- A. Test equipment and instrumentation required to perform the commissioning shall remain the property of Contractor unless otherwise indicated.
- B. Test equipment and instrumentation required to perform commissioning shall comply with the following criteria:
- 1. Be manufactured for the purpose of testing and measuring tests for which they are being used and have an accuracy to test and measure system performance within the tolerances required to determine acceptable performance.
  - 2. Calibrated and certified.
    - a. Calibration performed and documented by a qualified calibration agency according to national standards applicable to the tools and instrumentation being calibrated. Calibration shall be current according to national standards or within test equipment and instrumentation manufacturer's recommended intervals, whichever is more frequent, but not less than within six months of initial use on Project. Calibration tags permanently affixed.
    - b. Repair and recalibrate test equipment and instrumentation if dismantled, dropped, or damaged since last calibrated.
  - 3. Maintain test equipment and instrumentation.

4. Use test equipment and instrumentation only for testing or monitoring Work for which they are designed.

## **2.2 PROPRIETARY TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS**

- A. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate or perform work on its equipment.
  1. Identify proprietary test equipment, instrumentation, and tools required in the test equipment identification list submittal.
  2. Proprietary test equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

## **2.3 REPORT FORMAT AND ORGANIZATION**

### **A. General Format and Organization:**

1. Bind report in three-ring binders.
2. Label the front cover and spine of each binder with the report title, volume number, project name, Contractor's name, and date of report.
3. Record report on compact disk.
4. Electronic Data: Portable document format (PDF); a single file with outline-organized bookmarks for major and minor tabs and tab contents itemized for specific reports.

### **B. Commissioning Report:**

1. Include a table of contents and an index to each test.
2. Include major tabs for each Specification Section.
3. Include minor tabs for each test.
4. Within each minor tab, include the following:
  - a. Test specification.
  - b. Pre-startup reports.
  - c. Approved test procedures.
  - d. Test data forms, completed and signed.
  - e. Commissioning issue reports, showing resolution of issues, and documentation related to resolution of issues pertaining to a single test. Group data forms, commissioning issue reports showing resolution of issues, and documentation related to resolution of issues for each test repetition together within the minor tab, in reverse chronological order (most recent on top).

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Review preliminary construction checklists and preliminary test procedures and data forms.

### **3.2 CONSTRUCTION CHECKLISTS**

- A. Construction checklists cannot modify or conflict with the Contract Documents.
- B. Create construction checklists based on actual systems and equipment to be included in Project.
- C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment, if applicable.
  - 1. Services connection requirements, including configuration, size, location, and other pertinent characteristics.
  - 2. Included optional features.
  - 3. Delivery Receipt Check: Inspect and record physical condition of materials and equipment on delivery to Project site, including agreement with approved submittals, cleanliness and lack of damage.
  - 4. Installation Checks:
    - a. Location according to Drawings and approved Shop Drawings.
    - b. Configuration.
    - c. Compliance with manufacturers' written installation instructions.
    - d. Attachment to structure.
    - e. Access clearance to allow for maintenance, service, repair, removal, and replacement without the need to disassemble or remove other equipment or building elements. Access coordinated with other building elements and equipment, including, but not limited to, ceiling and wall access panels, in a manner consistent with OSHA fall-protection regulations and safe work practices.
    - f. Utility connections are of the correct characteristics, as applicable.
    - g. Correct labeling and identification.
    - h. Startup Checks: Verify readiness of equipment to be energized. Include manufacturer's standard startup procedures and forms.
- D. Startup: Perform and document initial operation of equipment to prove that it is installed properly and operates as intended according to manufacturer's standard startup procedures, minimum.
- E. Performance Tests:

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

1. Static Tests: As specified elsewhere, including, but not limited to, duct and pipe leakage tests, insulation-resistance tests, and water-penetration tests.
2. Component Performance Tests: Tests evaluate the performance of an input or output of components under a full range of operating conditions.
3. Equipment and Assembly Performance Tests: Test and evaluate performance of equipment and assemblies under a full range of operating conditions and loads.
4. System Performance Tests: Test and evaluate performance of systems under a full range of operating conditions and loads.
5. Intersystem Performance Tests: Test and evaluate the interface of different systems under a full range of operating conditions and loads.

### **3.3 GENERAL EXECUTION REQUIREMENTS**

- A. Schedule and coordinate commissioning with the construction schedule.
- B. Perform activities identified in construction checklists, including tests, and document results of actions as construction proceeds.
- C. Perform test demonstrations for Project Representative. Unless otherwise indicated, demonstrate tests for 100 percent of work to which the test applies. In some instances, demonstration of a random sample of other than 100 percent of the results of a test is specified.
- D. Report test data and commissioning issue resolutions.
- E. Schedule personnel to participate in and perform Commissioning-Process Work.
- F. Installing contractors' commissioning responsibilities include, but are not limited to, the following:
  1. Operating the equipment and systems they install during tests.
  2. In addition, installing contractors may be required to assist in tests of equipment and systems with which their work interfaces.

### **3.4 COMMISSIONING COORDINATOR RESPONSIBILITIES**

- A. Management and Coordination: Manage, schedule, and coordinate commissioning, including, but not limited to, the following:
  1. Coordinate with subcontractors on their commissioning responsibilities and activities.
  2. Obtain, assemble, and submit commissioning documentation.
  3. Conduct periodic on-site commissioning meetings.
  4. Develop and maintain the commissioning schedule. Integrate commissioning schedule into the construction schedule. Update schedule at specified intervals.
  5. Review and comment on preliminary test procedures and data forms.
  6. Report inconsistencies and issues in system operations.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

7. Verify that tests have been completed and results comply with acceptance criteria, and that equipment and systems are ready before scheduling test demonstrations.
8. Direct and coordinate test demonstrations.
9. Coordinate witnessing of test demonstrations by Project Representative.
10. Coordinate and manage training. Be present during training sessions to direct video recording, present training and direct the training presentations of others.
11. Prepare and submit specified commissioning reports.
12. Track commissioning issues until resolution and retesting is successfully completed.
13. Retain original records of Commissioning-Process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.
14. Assemble and submit commissioning report.

### **3.5 COMMISSIONING TESTING**

- A. Quality Control: Construction checklists, including tests, are quality-control tools designed to improve the functional quality of Project. Test demonstrations evaluate the effectiveness of Contractor's quality-control process.
- B. Project Representative will be present to witness commissioning work requiring the signature of the Project Representative, including, but not limited to, test demonstrations. Owner's project manager will coordinate attendance by Project Representative with Contractor's published commissioning schedule. Project Representative will provide no labor or materials in the commissioning work. The only function of Project Representative will be to observe and comment on the progress and results of commissioning.
- C. Construction Checklists:
  1. Complete construction checklists as Work is completed.
  2. Distribute construction checklists to installing contractors before they start work.
  3. Installers:
    - a. Verify installation using approved construction checklists as Work proceeds.
    - b. Complete and sign construction checklists daily for work performed during the preceding day.
  4. Provide Project Representative access to construction checklists.
- D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

- E. Pre-Startup Audit: Prior to executing startup procedures, review completed installation checks to determine readiness for startup and operation. Report conditions, which, if left uncorrected, adversely impact the ability of systems or equipment to operate satisfactorily or to comply with acceptance criteria. Prepare pre-startup report for each system.
- F. Test Procedures and Test Data Forms:
  - 1. Test procedures shall define the step-by-step procedures to be used to execute tests and test demonstrations.
  - 2. Test procedures shall be specific to the make, model, and application of the equipment and systems being tested.
  - 3. Completed test data forms are the official records of the results of tests.
  - 4. Contractor shall develop test procedures and test data forms for performance tests and commissioning tests after approval of Product Data, Shop Drawings, and preliminary operation and maintenance manual in accordance with the manufacturer's instructions.
- G. Performance of Tests:
  - 1. Perform and complete each step of the approved test procedures in the order listed.
  - 2. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.
  - 3. Record test results that are not within the range of acceptable results on commissioning issue report forms in addition to recording the results on approved test procedures and data forms according to the "Commissioning Compliance Issues" Paragraph in this Article.
  - 4. On completion of a test, sign the completed test procedure and data form. Tests for which test procedures and data forms are incomplete, not signed, or which indicate performance that does not comply with acceptance criteria will be rejected. Tests for which test procedures and data forms are rejected shall be repeated and results re-submitted.
- H. Performance of Test Demonstration:
  - 1. Perform test demonstrations on a sample of tests after test data submittals are approved.
  - 2. Notify Project Representative at least three days in advance of each test demonstration.
  - 3. Perform and complete each step of the approved test procedures in the order listed.
  - 4. Record data observed during performance of test demonstrations on approved data forms at the time of demonstration and when the results are observed.
  - 5. Provide full access to Project Representative to directly observe the performance of all aspects of system response during the test demonstration. On completion of a test demonstration, sign the completed data form and obtain signature of Project Representative at the time of the test to authenticate the reported results.

## **Kenai Municipal Airport Sand Storage Building**

---

6. Test demonstration data forms not signed by Contractor and Project Representative at the time of the completion of the procedure will be rejected. Test demonstrations for which data forms are rejected shall be repeated and results shall be resubmitted.
    - a. Exception for Failure of Project Representative to Attend: Failure of Project Representative to be present for agreed-on schedule of test demonstration shall not delay Contractor. If Project Representative fails to attend a scheduled test, Contractor shall proceed with the scheduled test. On completion, Contractor shall sign the data form for Contractor and for Project Representative, and shall note the absence of Project Representative at the scheduled time and place.
  7. False load test requirements are specified in related sections.
    - a. Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves, and other necessary equipment and connections required to apply the specified load to the system. False load system shall be capable of steady-state operation and modulation at the level of load specified. Equipment and systems permanently installed in this work shall not be used to create the false load without Architect's written approval.
- I. Commissioning Compliance Issues:
1. Test results that are not within the range of acceptable results are commissioning compliance issues.
  2. Track and report commissioning compliance issues until resolution and retesting are successfully completed.
  3. If a test demonstration fails, determine the cause of failure. Direct timely resolution of issue and then repeat the demonstration. If a test demonstration must be repeated due to failure caused by Contractor work or materials, reimburse Owner for billed costs for the participation in the repeated demonstration.
  4. Test Results: If a test demonstration fails to meet the acceptance criteria, perform the following:
    - a. Complete a commissioning compliance issue report form promptly on discovery of test results that do not comply with acceptance criteria.
    - b. Submit commissioning compliance issue report form within 24 hours of the test.
    - c. Determine the cause of the failure.
    - d. Establish responsibility for corrective action if the failure is due to conditions found to be Contractor's responsibility.
  5. Commissioning Compliance Issue Report: Provide a commissioning compliance issue report for each issue. Do not report multiple issues on the same commissioning compliance issue report.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

- a. Exception: If an entire class of devices is determined to exhibit the identical issue, they may be reported on a single commissioning compliance issue report. (For example, if all return-air damper actuators that are specified to fail to the open position are found to fail to the closed position, they may be reported on a single commissioning issue report. If a single commissioning issue report is used for multiple commissioning compliance issues, each device shall be identified in the report, and the total number of devices at issue shall be identified.
  - b. Complete and submit Part 1 of the commissioning compliance issue report immediately when the condition is observed.
  - c. Record the commissioning compliance issue report number and describe the deficient condition on the data form.
  - d. Resolve commissioning compliance issues promptly. Complete and submit Part 2 of the commissioning compliance issue report when issues are resolved.
6. Diagnose and correct failed test demonstrations as follows:
  - a. Perform diagnostic tests and activities required to determine the fundamental cause of issues observed.
  - b. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
  - c. Record the results of each step of the diagnostic procedure.
  - d. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
  - e. Determine and record corrective measures.
  - f. Include diagnosis of fundamental cause of issues in commissioning compliance issue report.
7. Retest:
  - a. Schedule and repeat the complete test procedure for each test demonstration for which acceptable results are not achieved. Obtain signature of Project Representative on retest data forms. Repeat test demonstration until acceptable results are achieved. Except for issues that are determined to result from design errors or omissions, or other conditions beyond Contractor's responsibility, compensate Owner for direct costs incurred as the result of repeated test demonstrations to achieve acceptable results.
  - b. For each repeated test demonstration, submit a new test data form, marked "Retest."
8. Do not correct commissioning compliance issues during test demonstrations.

- a. Exceptions will be allowed if the cause of the issue is obvious and resolution can be completed in less than 15 minutes. If corrections are made under this exception, note the deficient conditions on the test data form and issue a commissioning compliance issue report. A new test data form, marked "Re-test," shall be initiated after the resolution has been completed.

### **3.6 COMMISSIONING MEETINGS**

- A. Schedule and conduct commissioning meetings.

### **3.7 SEQUENCING**

- A. Sequencing of Commissioning Verification Activities: For a particular material, item of equipment, assembly, or system, perform the following in the order listed unless otherwise indicated:
  - 1. Construction Checklists:
    - a. Material checks.
    - b. Installation checks.
    - c. Start up, as appropriate. Some startup may depend on component performance. Such startup may follow component performance tests on which the startup depends.
    - d. Performance Tests:
      - 1) Static tests, as appropriate.
      - 2) Component performance tests. Some component performance tests may depend on completion of startup. Such component performance tests may follow startup.
      - 3) Equipment and assembly performance tests.
      - 4) System performance tests.
      - 5) Intersystem performance tests.
  - 2. Commissioning tests.
- B. Before performing commissioning tests, verify that materials, equipment, assemblies, and systems are delivered, installed, started, and adjusted to perform according to construction checklists.
- C. Verify readiness of materials, equipment, assemblies, and systems by performing tests prior to performing test demonstrations. Notify Architect if acceptable results cannot be achieved due to conditions beyond Contractor's control or responsibility.
- D. Commence tests as soon as installation checks for materials, equipment, assemblies, or systems are satisfactorily completed. Tests of a particular system may proceed prior to completion of other systems, provided the incomplete work does not interfere with successful execution of test.

### **3.8 SCHEDULING**

- A. Commence commissioning as early in the construction period as possible.

## **Kenai Municipal Airport Sand Storage Building**

---

- B. Commissioning Schedule: Integrate commissioning into Contractor's construction schedule.
  - 1. Include detailed commissioning activities in monthly updated Contractor's construction schedule and short interval schedule submittals.
  - 2. Schedule the start date and duration for the following commissioning activities:
    - a. Submittals.
    - b. Preliminary operation and maintenance manual submittals.
    - c. Installation checks.
    - d. Startup, where required.
    - e. Performance tests.
    - f. Performance test demonstrations.
    - g. Commissioning tests.
    - h. Commissioning test demonstrations.
  - 3. Schedule shall include a line item for each installation check, startup, and test activity specific to the equipment or systems involved.
  - 4. Determine milestones and prerequisites for commissioning. Show commissioning milestones, prerequisites, and dependencies in monthly updated critical-path-method construction schedule and short interval schedule submittals.
- C. Two-Week Look-Ahead Commissioning Schedule:
  - 1. Two weeks prior to the beginning of tests, submit a detailed two-week look-ahead schedule. Thereafter, submit updated two-week look-ahead schedules weekly for the duration of commissioning.
  - 2. Two-week look-ahead schedules shall identify the date, time, beginning location, Contractor personnel required, and anticipated duration for each startup or test activity.
  - 3. Use two-week look-ahead schedules to notify and coordinate participation of Project Representatives.
- D. Project Representative Coordination:
  - 1. Coordinate Project Representative participation via Architect.
  - 2. Notify Architect of commissioning schedule changes at least two work days in advance for activities requiring the participation of Project Representative.

### **3.9 COMMISSIONING REPORTS**

- A. Test Reports:

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:
  - a. Equipment Model Verification: Compare contract requirements, approved submittals, and provided equipment. Note inconsistencies.
  - b. Preinstallation Physical Condition Checks: Observe physical condition of equipment prior to installation. Note conditions including, but not limited to, physical damage, corrosion, water damage, or other contamination or dirt.
  - c. Preinstallation Component Verification Checks: Verify components supplied with the equipment, preinstalled or field installed, are correctly installed and functional. Verify external components required for proper operation of equipment correctly installed and functional. Note missing, improperly configured, improperly installed, or nonfunctional components.
  - d. Summary of Installation Compliance Issues and Corrective Actions: Identify installation compliance issues and the corrective actions for each. Verify that issues noted have been corrected.
  - e. Evaluation of System Readiness for Startup: For each item of equipment for each system for which startup is anticipated, document in summary form acceptable to Owner completion of equipment model verification, preinstallation physical condition checks, preinstallation component verification checks, and completion of corrective actions for installation compliance issues.
2. Test data reports include the following:
  - a. "As-tested" system configuration. Complete record of conditions under which the test was performed, including, but not limited to, the status of equipment, systems, and assemblies; temporary adjustments and settings; and ambient conditions.
  - b. Data and observations, including, but not limited to, data trend logs, recorded during the tests.
  - c. Signatures of individuals performing and witnessing tests.
  - d. Data trend logs accumulated overnight from the previous day of testing.
3. Commissioning Compliance Issues Reports: Report as commissioning compliance issues results of tests and test demonstrations that do not comply with acceptance criteria. Report only one issue per commissioning compliance issue report. Use sequentially numbered facsimiles of commissioning compliance issue report form included in this Section, or other form approved by Owner. Distribute commissioning compliance issue reports to parties responsible for taking corrective action. Identify the following:
  - a. Commissioning compliance issue report number. Assign unique, sequential numbers to individual commissioning compliance issue reports when they are created, to be used for tracking.
  - b. Action distribution list.
  - c. Report date.

## **Kenai Municipal Airport Sand Storage Building**

---

- d. Test number and description.
  - e. Equipment identification and location.
  - f. Briefly describe observations about the performance associated with failure to achieve acceptable results. Identify the cause of failure if apparent.
  - g. Diagnostic procedure or plan to determine the cause (include in initial submittal)
  - h. Diagnosis of fundamental cause of issues as specified below (include in re-submittal).
  - i. Fundamental cause of unacceptable performance as determined by diagnostic tests and activities.
  - j. When issues have been resolved, update and resubmit the commissioning issue report forms by completing Part 2. Identify resolution taken and the dates and initials of the persons making the entries.
  - k. Schedule for retesting.
4. Weekly progress reports include information for tests conducted since the preceding report and the following:
- a. Completed data forms.
  - b. Equipment or system tested, including test number, system or equipment tag number and location, and notation about the apparent acceptability of results.
  - c. Activities scheduled but not conducted per schedule.
  - d. Commissioning compliance issue report log.
  - e. Schedule changes for remaining Commissioning-Process Work, if any.
5. Data trend logs shall be initiated and running prior to the time scheduled for the test demonstration.
- a. Trend log data format shall be multiple data series graphs. Where multiple data series are trend logged concurrently, present the data on a common horizontal time axis. Individual data series may be presented on a segmented vertical axis to avoid interference of one data series with another, and to accommodate different axis scale values. Graphs shall be sufficiently clear to interpret data within the accuracy required by the acceptance criteria.
  - b. Attach to the data form printed trend log data collected during the test or test demonstration.
  - c. Record, print out, and attach to the data form operator activity during the time the trend log is running. During the time the trend log is running, operator intervention not directed by the test procedure invalidates the test results.

## **Kenai Municipal Airport Sand Storage Building**

---

6. System Alarm Logs: Record and print out a log of alarms that occurred since the last log was printed. Evaluate alarms to determine if the previous day's work resulted in any conditions that are not considered "normal operation."
  - a. Conditions that are not considered "normal operation" shall be reported on a commissioning issue report attached to the alarm log. Resolve as necessary. The intent of this requirement is to discover control system points or sequences left in manual or disabled conditions, equipment left disconnected, set points left with abnormal values, or similar conditions that may have resulted from failure to fully restore systems to normal, automatic control after test completion.

### **3.10 CERTIFICATE OF CONSTRUCTION PHASE COMMISSIONING COMPLETION**

- A. When Contractor considers that construction phase commissioning, or a portion thereof which Owner agrees to accept separately, is complete, Contractor shall prepare and submit to Owner and Commissioning Authority through Architect a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Contractor's responsibility to complete commissioning.
- B. On receipt of Contractor's list, Commissioning Authority will make an inspection to determine whether the construction phase commissioning or designated portion thereof is complete. If Commissioning Authority's inspection discloses items, whether included on Contractor's list, which is not sufficiently complete as defined in "Construction Phase Commissioning Completion" Paragraph in the "Definitions" Article, Contractor shall, before issuance of the Certificate of Construction Phase Completion, complete or correct such items on notification by Commissioning Authority. In such case, Contractor shall then submit a request for another inspection by Commissioning Authority to determine construction phase commissioning completion.
- C. Contractor shall promptly correct deficient conditions and issues discovered during commissioning. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation for Architect's and Commissioning Authority's services and expenses made necessary thereby, shall be at Contractor's expense.
- D. When construction phase commissioning or designated portion is complete, Commissioning Authority will prepare a Certificate of Construction Phase Commissioning that shall establish the date of completion of construction phase commissioning. Certificate of Construction Phase Commissioning Completion shall be submitted prior to requesting inspection for determining date of Substantial Completion.

**END OF SECTION 01 91 13**

## **SECTION 32 12 16 - ASPHALT PAVING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

A. Section includes:

1. Hot-mix asphalt paving and patching.
2. Removal, disposal and replacement of existing asphaltic surfacing, including aggregate base course and existing traffic markings, as indicated on the Drawings.

B. Related Requirements:

1. Section 31 20 00 – Earthwork

#### **1.2 REFERENCES**

- |    |              |  |
|----|--------------|--|
| A. | AASHTO M 320 | Standard Specification for Performance-Graded Asphalt Binder             |
| B. | AASHTO M 29  | Standard Specification for Fine Aggregate for Bituminous Paving Mixtures |
| C. | ASTM D 3665  | Standard Practice for Random Sampling of Construction Materials          |

#### **1.3 ACTION SUBMITTALS**

A. Product Data:

1. For each type of product indicated. Include technical data and tested physical and performance properties.

B. Hot-mix asphalt mix designs. Certification of approval of each job mix proposed for the Work.

#### **1.4 INFORMATIONAL SUBMITTALS**

A. Material Certificates:

1. Aggregates.
2. Asphalt binder.
3. Joint Sealant.

#### **1.5 PROJECT CONDITIONS**

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coat: Minimum ambient air temperature of 60 degrees Fahrenheit.
2. Asphalt Course: Do not place asphalt concrete when it is raining or when rain is imminent, on a saturated or yielding surface, when the base material is frozen, or when

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

weather conditions prevent proper handling or finishing of the mixture. Minimum surface temperature of 40 degrees Fahrenheit and ambient air temperature is 32 degrees Fahrenheit and not descending.

## **PART 2 PRODUCTS**

### **2.1 AGGREGATES**

#### **A. Hot-Mix Asphalt:**

1. Coarse aggregate is all mineral retained on the No. 4 sieve. The aggregate retained on a No. 4 sieve shall contain at least eighty percent (80%) by weight of crushed pieces having one or more mechanically fractures surfaces.
  - a. Process and crush aggregate that is free from clay balls, organic matter, other deleterious material, and not coated with dirt or other finely divided mineral matter. Aggregate used must consist of sound, tough, durable rock of uniform quality.
  - b. When aggregate grading is such that the material will tend to segregate in stockpile or handling, it shall be supplied in two or more sizes. Each size of aggregate required to produce the combined gradation specified shall be placed in individual stockpiles at the plant site and separated by bulkheads or other means. When it is necessary to blend two or more aggregate sizes, the blending shall be done through separate bins at the cold elevator feeders and not in the stockpile.
2. Fine aggregate is composed of all mineral matter passing the No. 4 sieve. It shall consist of natural and/or manufactured material derived by crushing gravel.
  - a. Fine aggregate shall meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness.
3. Mineral filler shall conform to the requirements of AASHTO M 17. Determine material grading using AASHTO T 37.

### **2.2 ASPHALT MATERIALS**

- A. Asphalt Binder: Asphalt cement or binder shall conform to the requirements of AASHTO M-320 and Certified Performance Grade Asphalt Binder PG 52-28.
- B. Joint Sealant shall be STE-1, undiluted CSS-1, or approved equal.

### **2.3 MIXES**

- A. Hot-Mix Asphalt: Use Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction (2020) Hot Mix Asphalt Type II Class B. Paving mixture shall be composed of aggregate and paving asphalt within the broad band limits set forth in the following table:

**Kenai Municipal Airport**  
**Sand Storage Building**

---

**ASPHALT PAVING MIXTURE**

<b>U.S. Std. Sieve Designation</b>	<b>Cumulative Percent Passing by Weight</b>
1 in	-----
3/4 in	100
1/2 in	75-90
3/8 in	60-84
No. 4	33-70
No 8	19-56
No. 16	10-44
No. 30	7-34
No. 50	5-24
No. 100	4-16
No. 200	4-7
Asphalt Cement*	5.0

\*Minimum Asphalt Content

- B. Job Mix: Submit for approval a job mix formula within the limits specified above. Provide correction factor ignition points generated in accordance with AASHTO T-308. The aggregate gradation of the job mix formula, when plotted upon an aggregate grading chart, shall closely approximate the shape of average gradations for the limits specified. For that portion of the aggregate passing No. 4 sieve, gradings which range from at or near the maximum of one (1) sieve to at or near the minimum of the next sieve will not be permitted. The Engineer may require increased asphalt content up to one half percent (0.5%) above that indicated by Marshall Design Criteria. Upon requiring increased asphalt content, the lower limit of percent voids and the upper limit of percent voids filled shall be waived.
- C. Maximum Permissible Variations: Tolerances to the approved Job Mix Formula shall not exceed the permissible variations presented in the following table. The Job Mix Formula band shall mean the approved Job Mix Formula plus-or-minus ( $\pm$ ) the numeric values for the maximum permissible variations.

<b>Maximum Permissible Variation (Percent by Weight of Total Aggregate)</b>	
<b>Sieve Size</b>	<b>Class B Asphalt</b>
3/4" or largest sieve	99.0 - 100.0
1/2" or first sieve retaining aggregate	$\pm 6.0$
3/8", #4, & #8	$\pm 6.0$
#16	$\pm 5.0$
#s 30 & 50	$\pm 4.0$
#100	$\pm 3.0$
#200	$\pm 2.0$
Asphalt Binder Content, %	$\pm 0.4$
Mat Density, %	92.0 – 100.0

When these permissible variations are applied, the individual sieve shall not exceed the Broad Band limits.

## Kenai Municipal Airport

### Sand Storage Building

---

- D. Maximum temperature shall not vary more than twenty-five degrees (25°) Fahrenheit from the approved Job Mix Formula design.
- E. Test Methods: The job-mix shall be determined according to the Marshall Method, as set forth in the Asphalt Institute Manual series no. 2 (M5-2), Fourth Edition. Upon compaction and testing of the job-mix specimens, the mixture shall conform to the aforementioned specifications within the following limits:

HMA MARSHALL DESIGN REQUIREMENTS

Stability (Marshall), Pounds	1200 minimum
Flow (Marshall), 0.01 inch	8 to 16
Percent Voids in Total Mix	3 to 5
Percent Voids Filled with Asphalt	65 to 78
Dust Asphalt Ratio*	0.6 – 1.4
Percent Voids in Mineral Aggregate	12.0 minimum
Percent Liquid Anti-Strip Additive**	0.3 minimum
Percent RAP	25.0 maximum

\*Dust-Asphalt ratio is the percent of material passing the No. 200 sieve divided by the percent of effective asphalt binder (calculated by weight).

\*\*By weight of asphalt binder

## PART 3 EXECUTION

### 3.1 REMOVE EXISTING AC PAVING

- A. General: Saw cut perimeter of area to be removed and excavate existing pavement section. Remove existing base course and gravel fill where in the opinion of the Project Representative, construction operations have compromised the existing materials. Excavate rectangular or trapezoidal areas, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Whenever possible, cuts shall be made at lane markings. Remove and dispose of excavated material.

### 3.2 SURFACE PREPARATION

- A. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.
- B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

- C. The area to be paved shall be true to line and grade, having a smooth dry, compacted surface prior to the start of paving operations.
- D. Contractor shall notify the Engineer, a minimum of twenty-four (24) hours prior to paving, that the newly constructed existing surface has been prepared in conformance with the Drawings and Specifications and is ready to be paved. Project Representative shall inspect the grade through the use of string line, straightedge, levels, or any other means necessary. Upon determining the grade that has been proposed for paving is in conformance with the Drawings and Specifications, Project Representative will provide written authorization for the Contractor to proceed with the paving. The Contractor shall not initiate paving prior to receiving written authorization to proceed.
- E. The surface of the Base Course, when finished, shall not demonstrate any deviation in excess of 1/2 inch in ten feet (1/2" in 10') parallel with, and at right angles to, the centerline, or more than five-eighths inch (5/8") total from centerline to face of curb of the area to be paved. Any deviation in excess of this amount shall be corrected by loosening, adding, or removing material and reshaping and compacting to satisfy the above requirement.

### **3.3 HOT-MIX ASPHALT PREPARATION**

- A. The asphalt shall be heated at the paving plant to a temperature at which it can be properly handled through the pumping system, but at no time shall the temperature of the asphalt exceed that recommended by the asphalt supplier or manufacturer, or be greater than three hundred twenty five degrees (325°) Fahrenheit or less than two hundred fifty degrees (250°) Fahrenheit.

### **3.4 HOT-MIX ASPHALT PLACEMENT**

- A. Haul trucks used for the transportation of hot mix asphalt from the plant to the Project shall have tight metal bottoms and shall be free from dust, screenings, petroleum oils, volatiles, and other mineral spirits which may affect the mix being hauled. The truck beds shall be cleaned as often as required, but at least once a day. After this operation the truck bed shall be elevated and thoroughly drained; no excess solution shall be permitted.
  - 1. When requested by the Engineer, trucks shall be equipped with covers of canvas, insulated boxes, or other suitable material, and be of sufficient size and weight to protect the load from adverse weather conditions and to maintain the required mix temperatures.
- B. Use asphalt pavers to distribute asphalt concrete. Asphalt pavers shall be self-propelled units provided with a heated vibratory screed. Grade and cross slope shall be controlled through the use of automatic grade and slope control devices. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the asphalt concrete mixture uniformly in front of the screed without segregation and/or tearing.
  - 1. The term "screed" includes any strike off device operated by cutting, crowding, or other action which is effective on mixes at workable temperatures, without tearing, shoving, or gouging, and which produces a finished surface of an even and uniform texture. The screed shall be adjustable as to level and section and shall have provisions for vibration and heat.
  - 2. The screed assembly shall produce a finished surface of the required smoothness, thickness, and texture without tearing, shoving, displacing or segregating the asphalt concrete mixture. Screed extensions used for paving a constant width shall be heated

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

and vibrated. Auger extensions shall be within one and one half feet (1.5') of the screed extension on both sides.

- C. Place the asphalt concrete upon the approved surface, spread, strike off, and adjust surface irregularities. The maximum compacted lift thickness allowed is 3 inches. Use hand tools to spread, rake, and lute asphalt concrete in areas where irregularities or unavoidable obstacles make mechanical spreading and finishing equipment impracticable.
- D. Do not place asphalt concrete abutting curbs or other concrete structures until they have cured for a minimum of 72 hours.
- E. The asphalt concrete shall be placed on the surface at a temperature not less than two hundred fifty degrees (250°) Fahrenheit or greater than three hundred degrees (300°) Fahrenheit. Additionally, the maximum temperature to which the asphalt concrete is heated shall not exceed the supplier's recommendation. The asphalt concrete temperature shall be measured directly behind the paver screed at the time of placement.
- F. Joint temperature shall be at least 150 degrees Fahrenheit. Any joint with a temperature less than 150 degrees Fahrenheit shall be saw cut and tack coated prior to placing asphalt materials.
- G. Longitudinal joints and edges shall be constructed to true line markings. Lines shall be established parallel to the center line for the paver to follow in placing individual lanes. The paver shall be operated and positioned to closely follow the established line. When backing trucks to the finisher, care shall be taken not to jar the paver.
- H. The texture of the unrolled surface shall be checked to determine its uniformity. The adjustment of the screed, tamping, feed screws, hopper feed, etc., shall be checked frequently to assure uniform spreading of the mix. Segregation of the material shall not be permitted. If segregation occurs, the spreading operation shall be immediately suspended until the cause is determined and corrected.
- I. Any irregularities left by the paver shall be corrected by trimming directly behind the machine by use of lutes or covered rakes. Immediately after trimming, the edges of the course shall be thoroughly compacted by tamping. Distortion of the pavement during this operation shall be avoided.
- J. Edges against which additional pavement is to be placed shall be vertically formed to true line. A lute or covered rake shall be used immediately behind the finisher, when required to obtain a true line and vertical edge. Any irregularities in the surface of the pavement course shall be corrected directly behind the paver. Excess material forming high spots shall be removed by a shovel or lute. Indented areas shall be filled with hot mix and smoothed with the back of a shovel pulled over the surface. Fanning of material over such areas shall not be permitted.
- K. On longitudinal joints, the paver shall be positioned so that in spreading, the material overlaps the edge of the lane previously placed by one or two inches (1" or 2") and is sufficiently high to allow for compaction. The coarse aggregate in the material overlapping the joint shall all be raked out into the cold lane as soon as possible behind the paver and broomed up and wasted. In no case shall scattered rocks be rolled into the surface of either lane.
- L. Asphalt concrete mixture which is contaminated or segregated will be rejected.

### **3.5 COMPACTION**

- A. Thoroughly and uniformly compact the asphalt concrete by rolling. The complete pavement shall have a mat density equal to or greater than 96 percent of the maximum density (Marshall

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

Method). The compacted specimens on which the maximum density is determined, shall be produced from a laboratory specimen made from the same days mix, and as close to the lay down temperature as practicable.

1. Rollers shall be self-propelled, reversible, and equipped to maintain clean and straight contact surfaces.
  2. The number, weight, and type of rollers furnished shall be sufficient to obtain the required density and surface requirements while the mix is in a workable condition, but not less than two rollers shall be operated. Rollers shall be operated in a workmanlike manner by the Contractor. There shall be at least one operator for each roller.
  3. Steel Drum Rollers: Steel drum roller may be of two (2) types:
    - a. Two axle static drum rollers, 8 to 22 tons in weight.
    - b. Two axle vibratory drum rollers, 8 to 22 tons in weight.
  4. All rollers shall be equipped with power units of not less than four (4) cylinders and under working conditions shall develop a compression in the rear wheels of two hundred fifty (250) to three hundred fifty (350) pounds per inch of roller width. Rollers shall be in good working condition and be free from backlash, faulty steering mechanism, or worn parts. Rollers shall be equipped with adjustable scrapers to keep the drums clean and with efficient means of keeping the drums/wheels wet to prevent mixes from sticking to the drums. Rollers/Drums shall be free of flat areas, openings or projections which will mar the surface of the pavement.
- B. Immediately after the asphalt mixture has been spread, struck off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling.
- C. The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving.
- D. Initial rolling shall be done with a steel drum roller with the drive roll operating toward the paver, and/or a suitable pneumatic tired roller. Initial rolling shall be completed while the bituminous mat temperature is above two hundred twenty five degrees (225°) Fahrenheit.
- E. Following the initial rolling, at least three coverages of the pavement shall be completed with a steel drum or pneumatic tired roller, while the mat temperature is above one hundred seventy five degrees (175°) Fahrenheit.
- F. Final rolling shall be completed with a steel-drum roller and shall continue until roller marks and further compression are not evident in the pavement and specified density has been achieved.
- G. Unless otherwise directed, rolling shall begin at the sides and proceed longitudinally parallel to the paving joints, each trip overlapping one half the roller width, gradually progressing to the crown/grade break. When paving abutting a previously placed pass, the longitudinal joint should be rolled first followed by the regular rolling procedure.
- H. Any displacement occurring as result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture when required. Care shall be exercised in rolling not to displace the line and grade of the edges of the asphalt mixture.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

- I. To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted.
- J. Along forms, curbs, headers, walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.
- K. Rollers or other vehicles shall not be parked or left standing on pavement that has not cooled sufficiently to prevent indentation by wheels.
- L. The Contractor shall, without charge, provide the Project Representative with test samples of asphalt concrete cored from the completed pavement. All cores shall be six inches (6") in diameter and the core holes shall be patched by the Contractor within twenty-four (24) hours.

### **3.6 JOINTS**

- A. Align joints to grade breaks, as much as practicable. Joints shall be constructed to ensure a continuous bond between old and new sections of the course. All joints shall present the same texture and smoothness as other sections of the course.
- B. Joint density shall be equal to or greater than 92 percent of the maximum specific gravity as determined by ATM 409.
- C. When joining existing pavement and new pavement, the old pavement shall be cut in a neat line with a power driven saw.
- D. Improperly formed joints resulting in surface irregularities shall be removed full depth, replaced with fresh asphalt concrete mixture, and thoroughly compacted. Rolling of joints after the material has cooled below one hundred seventy degrees (170°) Fahrenheit shall not be allowed. All pavement removal shall be precut to a neat line with a power driven saw.
- E. A coat of joint sealant (tack coat) shall be applied on all cold joints and joints at concrete structures (manholes, vaults, etc.) and allowed to break prior to placing fresh asphalt concrete mixture against the joint. This Work shall be completed by Contractor just prior to paving.

### **3.7 REPAIR AND REPLACEMENT**

- A. Asphalt concrete mixture that becomes contaminated with foreign material or is in any way defective as determined by the Project Representative shall be removed. Skin patching will not be permitted. Defective materials shall be removed for the full thickness of the course. The pavement shall be cut so that all edges are vertical, the sides are parallel to the direction of traffic, and the ends are skewed between fifteen and twenty-five degrees (15° and 25°). Edges shall be coated with joint sealant. Fresh asphalt concrete mixture shall be placed in sufficient quantity so that the finished surface will conform to grade and smoothness requirements. The asphalt concrete mixture shall be compacted to the density specified. Any area determined to have an excess or deficiency of asphalt concrete shall be corrected by full depth removal and replacement.

### **3.8 INSTALLATION TOLERANCES**

- A. The final surface shall be of a uniform texture conforming to true grade, and cross sections in accordance with the Drawings.

**3.9 FIELD QUALITY CONTROL**

- A. Provide Quality Control Testing to evaluate that actual products incorporated into the Work and completed construction comply with the requirements of this Section.
- B. The Contractor shall develop a Quality Control Plan. The plan shall address all elements which affect the quality of the pavement including, but not limited to:
  - 1. Mix Design
  - 2. Aggregate Grading
  - 3. Quality of Materials
  - 4. Stockpile Management
  - 5. Proportioning
  - 6. Mixing and Transportation
  - 7. Placing and Finishing
  - 8. Joints
  - 9. Compaction
  - 10. Surface smoothness
- C. Owner may use a testing agency to perform field and laboratory testing to verify compliance with the requirements of this Section.
- D. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to these Specifications and as set forth in the approved Quality Control Plan. The testing program shall include, but not necessarily limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Plan. For each day of paving, the following shall apply.
  - 1. Asphalt Binder Content. A minimum of 2 asphalt binder content tests shall be performed
  - 2. Gradation. Aggregate gradations shall be determined a minimum of twice from mechanical analysis of aggregate according to ATM 408 and ATM 304. When asphalt content is determined by the nuclear method, aggregate gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix or continuous mix plants, and tested according to ATM 304 using actual batch weights to determine the combined aggregate gradation of the mixture.
  - 3. Moisture Content of Aggregate. The moisture content of aggregate used for production shall be determined a minimum of once according to ATM 202.
  - 4. Moisture Content of Mixture. The moisture content of the mixture shall be determined minimum of once according to ATM 407.

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

5. Temperatures. Temperatures shall be checked, at least 4 times, at necessary locations to determine the temperatures of the dryer, the bitumen in the storage tank, the mixture at the plant, and the mixture at the job site.
  6. In-Place Density Monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density according to ATM 411.
  7. Additional Testing. Any additional testing that the Contractor deems necessary to control the process may be performed at the Contractor's option.
  8. Monitoring. The Engineer reserves the right to monitor any or all of the above testing.
- E. When directed by the Engineer, the Contractor shall sample and test any material which appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be according to standard procedures specified.
- F. The Quality Control Plan shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

#### **3.10 ACCEPTANCE**

- A. Pavement will be accepted for payment based on the Engineer's approval of a Job Mix design and the placement and compaction of the asphalt concrete pavement to the specified depth and finished surface requirements and tolerances, and material testing. The Engineer reserves the right to perform any testing required in order to determine acceptance.
- B. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer.
- C. Any area of finished surfacing that is segregated, fails to meet surface tolerance requirements, cools to below 175 °F prior to completing compaction, or is any other way defective shall be removed and replaced with new asphalt concrete pavement. Removal and replacement of defective pavement shall be at no additional cost to the Owner.
- D. Thickness will be evaluated for compliance by the Engineer to the requirements shown on the Plans. Measurements of thickness will be made by the Engineer using the cores extracted from the mat for density measurement.
- E. Smoothness. The finished surfaces of the HMA shall not vary more than 1/4 inch for the surface layer when tested with a 12-foot straightedge.
- F. Grade. The finished surface of the pavement shall not vary from the gradeline elevations and cross sections shown on the Plans by more than 0.05 foot. The finished grade will be determined by running levels at intervals of 50 feet or less longitudinally and transversely to determine the elevation of the completed pavement. The Contractor shall remove the deficient areas

## **Kenai Municipal Airport**

### **Sand Storage Building**

---

and replace with new material, full depth. Skin patching for correcting low areas will not be permitted.

- G. Mat density, aggregate gradation, and asphalt binder content shall meet the minimum requirements specified.

#### **3.11 SAMPLING**

- A. Asphalt Binder Content. Samples taken for the determination of asphalt binder content will be taken from behind the screed prior to initial compaction, or from the windrow, according to Alaska Test Method (ATM) 402 and 403.

If sampling is from behind the screed prior to initial compaction, then provide a WAQTC qualified technician and equipment to take plate samples. Sample in locations determined by the Engineer. Sample in the presence of the Engineer and immediately transfer possession of the sample to the Engineer.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable.

- B. Gradation. Samples taken for the determination of aggregate gradation will be from the same location as specified for the determination of asphalt binder content. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable.
- C. Density. The location(s) for taking core samples is determined by the Engineer's judgment. The Contractor shall provide a minimum of two cut full depth mat core samples and two full depth joint samples with a diameter of 6 inches, within 24 hours of final rolling for density acceptance testing. The samples shall be neatly cut by a core drill at the randomly selected location designated by the Engineer according to the procedures contained in ATM 413. All voids left by sampling shall be backfilled with new asphalt concrete material and compacted within 24 hours of sampling.

Cores for mat density shall not be taken closer than 1-foot from a transverse or longitudinal joint.

- D. Cores. For longitudinal joint density shall be taken directly on the joint, at locations adjacent to cores taken from the mat completing the joint. Cores shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.
- E. Asphalt Binder Grade. Sample asphalt binder at the plant from the supply line in the presence of the Engineer according to ATM 401. The Engineer will take immediate possession of the samples. Take three samples, one for acceptance testing, one for Contractor requested retesting, and one held in reserve for referee testing if requested.

#### **3.12 Testing.**

- A. Asphalt Binder Content. Asphalt binder content will be determined by ATM 405 or ATM 406, by total weight of mix.
- B. Gradation. Cold feed or dry batched aggregate gradations will be tested according to ATM 304 and evaluated for acceptance according to Subsection 3.10. Asphalt concrete mix and core

## **Kenai Municipal Airport**

### **Sand Storage Building**

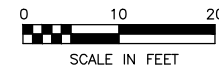
---

- sample gradations will be determined according to ATM 408 from extracted aggregate, or aggregate remaining after the ignition oven ATM 406 has burned off the asphalt binder.
- C. Density. Core samples will be tested according to ATM 410, and evaluated for acceptance.
  - D. Asphalt Binder Grade. Asphalt binder will be tested for conformance to the requirements specified.

#### **3.13 WASTE HANDLING**

- A. Except for material to be recycled, remove excavated materials from Project site and legally dispose of them.

**END OF SECTION 32 12 16**



## Grading Coordinate Point Table

— SEE SHEET C2.02 

1 DITCH / DRAINAGE BASIN GRADING PLAN  
C1.04 SCALE: 1" = 10.0'