

# INFORMATIONAL PROPOSAL (For information only, not to be used for bidding)

NEBRASKA DEPARTMENT OF ROADS  
LETTING DATE: February 05, 2015

CALL ORDER: 305                      CONTRACT ID: 3233X

CONTROL NO./SEQ. NO.: 32233 /000 PROJECT NO.: RD-81-3(1055)

TENTATIVE START DATE: 06/15/15                      CONTRACT TIME: 80 WORKING DAYS

LOCATION: US-81, IN NORFOLK & NORTH AND N-59-N-84  
IN COUNTY: CEDAR                      MADISON

BIDDER

GROUP 9 BITUMINOUS

## NOTES

THE TOTAL AMOUNT OF WORK WHICH WILL BE ACCEPTED IN  
THIS LETTING IS LIMITED TO \$\_\_\_\_\_.

THE NUMBER OF \_\_\_\_\_ CONTRACTS WHICH WILL BE  
ACCEPTED IN THIS LETTING IS LIMITED TO \_\_\_\_\_.

## NOTICE TO ALL BIDDERS

To report bid rigging activities, call: 1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report such activities.

The “hotline” is part of the DOT’s continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

## LETTING QUESTIONS

Prior to the letting, any questions pertaining to the Special Provisions or the Plans for this project should be submitted to NDOR in a written format through the Bid Express (BidX) website at <https://www.bidx.com/ne/lettings>. Likewise, NDOR will post answers exclusively to the BidX website. All official answers will be identified as “Authorized by NDOR.” **Questions will not be answered verbally.**

STATE OF NEBRASKA  
DEPARTMENT OF ROADS

Required Provisions Supplemental to the

**Standard Specifications for Highway Construction**

**I. Application**

These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

The contractor shall insert in each of his subcontracts all of the stipulations contained in the Special Provisions and these Required Provisions.

A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

**II. Equal Opportunity**

1. **Selection of Labor**

During the performance of this contract, the contractor shall not discriminate against labor from any other state.

2. **Nebraska Fair Employment Practices Act**

The contractor shall not discriminate against any employee or applicant for employment, to be employed in the performance of this contract with respect to his hire, tenure, terms, conditions, or privileges of employment, because of his race, color, religion, sex or national origin. The contractor agrees to post in a conspicuous place or places a notice to be provided by the State Highway Department which sets forth excerpts of the Act.

3. **Nebraska Equal Pay Act**

The contractor shall not discriminate on the basis of sex by paying wages to employees of one sex at a lesser rate than the rate paid to employees of the opposite sex for comparable work on jobs which have comparable requirements. An abstract of the Act is included on the notice which is provided by the State Highway Department.

April 4, 1995

### III. Employment of Labor

#### 1. General

No person under the age of sixteen (16) years, and no one whose age or physical condition is such as to make his employment dangerous to his health or safety, or to the health and safety of others shall be employed on any project. This paragraph shall not be construed to deny the employment of older people or physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform.

No person currently serving sentence to a penal or correction institution shall be employed on any project.

Except as specifically provided under this section, workers who are qualified by training or experience to be assigned to projects of this character shall not be discriminated against on any grounds whatsoever.

#### 2. Payrolls

Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working on the site of the work.

The contractor's and subcontractor's payroll records shall be available for inspection by authorized representatives of the State Highway Department and authorized representatives of Federal Agencies.

The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payment the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

Every employee on the work covered by this contract shall be permitted to lodge, board and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

April 4, 1995

No individual shall be employed as a laborer on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals. No such rental agreement, or any charges for feed, gasoline, supplies, or repairs on account of such agreement, shall cause any deduction from the wages accruing to any employee except as authorized by the regulations hereinbefore cited.

#### **IV. Safety and Accident Prevention**

In the performance of this contract, the contractor shall comply with all applicable Federal, State and local laws governing safety, health and sanitation. The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions, on his own responsibility or as the contracting officer may determine, reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

#### **V. Subletting or Assigning the Contract**

The contractor shall perform with his own organization contract work amounting to not less than 30 percent of the total contract amount except that any items designated in the contract as "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the total contract amount before computing the amount of work required to be performed by the contractor with his own organization.

Any items that have been selected as "Specialty Items" for the contract are listed as such in the Special Provisions found elsewhere in the contract.

No portion of the contract shall be sublet, assigned, or otherwise disposed of except with the written consent of the contracting officer or his authorized representative. Requests for permission to sublet assign or otherwise dispose of any portion of the contract shall be in writing and accompanied by a showing that the organization which will perform the work is particularly experienced and equipped for such work. The contractor shall give assurance that the minimum wage for labor as stated in his proposal shall apply to labor performed on all work sublet, assigned or otherwise disposed of in any way. Consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract.

April 4, 1995

**SPECIAL PROVISIONS  
FOR  
STATE  
PROJECT NO. RD-81-3(1055)**

**GENERAL CONDITIONS**

Bids for the work contemplated in this proposal form will be received at the office of the Nebraska Department of Roads in Room 104 of the Central Office Building at 1500 Highway 2 at Lincoln, Nebraska, on February 5, 2015, until 1:30 P.M.

- a. Bids submitted by mail should be addressed to the Nebraska Department of Roads, c/o Contract Lettings Section, P.O. Box 94759, Lincoln, NE 68509-4759.
- b. Bids submitted electronically over the internet, shall be submitted using [www.bidx.com](http://www.bidx.com).

The 2007 Edition of the Standard Specifications for Highway Construction, including all amendments and additions thereto effective at the date of the contract, are made a part of these Special Provisions, through reference.

The Required Provisions dated April 4, 1995, are attached to and are a part of this proposal form.

The attention of bidders is directed to the Required Provisions covering subletting or assigning the contract.

The proposal contains a statement that the contractor is complying with, and will continue to comply with, fair labor standards in the pursuit of his business and in the execution of the work contemplated in this proposal.

Fair labor standards shall be construed to mean such a scale of wages and conditions of employment as are paid and maintained by at least fifty per cent of the contractors in the same business or field of endeavor as the contractor filing this proposal.

**STATUS OF UTILITIES**

The following information is current as of December 16, 2014.

Aerial and/or underground utility facilities may exist within this project. The Contractor shall determine to his / her satisfaction the extent of utility conflict for facilities located within the construction areas.

At this time, no utilities have been required to relocate their facilities.

Any utility adjustments or interruption of service for the convenience of the Contractor shall be the sole responsibility of the Contractor.

To arrange for utilities to locate and flag their underground facilities, contact Diggers Hotline of Nebraska at 1-800-331-5666 or dial 811.

Utilities known to be in the vicinity of this project:

- CenturyLink
- City of Norfolk
- Cedar Knox Public Power District
- Black Hills Energy
- Nebraska Public Power District
- Pierce Telephone
- Great Plains Communications
- Source Gas
- Hartelco

Any work necessary will be concurrent with construction.

### STATUS OF RIGHT OF WAY

The right of way for this project has been acquired and physical possession is held by the State of Nebraska and ready for the Contractor's use, except tracts listed below:

**Unacquired Right-of-Way Tracts as follows:**

Tract Number	Status of Tract	Hearing Date
None	None	None

**Right-of-Way Tracts with Pay Items:**

Tract Number	Pay Items
None	None

- No encroachments on the old right of way.
- Acquisition of right of way is not required for this project.

### ENVIRONMENTAL COMMITMENT

Control No.: 32233 Project No.: RD-81-3(1055)

Project Name: In Norfolk & North and N-59 – N-84

Below are the Conservation Conditions that will be required for this project. All conditions and regulations of any permit obtained for this project will be followed by the Contractor.

**(Responsible Party for the measure is found in parentheses)**

#### Conservation Measure for Environmentally Sensitive Areas

The Contractor shall not stage, store, waste or stockpile materials and equipment in undisturbed locations, or in known/potential wetlands and/or known/potential streams that exhibit a clear “bed and Bank” channel. Potential wetland areas consist of any area that is known to pond

water, swampy areas or areas supporting known wetland vegetation or areas where there is a distinct difference in vegetation (at lower elevations) from the surrounding upland areas.  
(Contractor, NDOR District)

- See **Attachment 1** for a list of potential wetlands and/or other potential regulated waters identified from a desktop review of published resources. The above condition pertains to the areas as listed on Attachment 1. If access to any of these areas is required to complete the project construction, the NDOR Construction Project Manager shall coordinate with the Environmental Permits Unit to determine need for field verification and/or permitting requirements prior to disturbance of the area. (Contractor, District Construction)

Contact Person: Patrick Sward, Highway Environmental Biologist, (402) 479-3901

### **General Conservation Conditions**

**Changes in Project Scope.** If there is a change in the project scope, the project limits, or environmental commitments, the NDOR Environmental Section must be contacted to evaluate potential impacts prior to implementation. Environmental commitments are not subject to change without prior written approval from the NDOR Environmental Section.

**Threatened and Endangered Species.** The Contractor shall reference the AGC Endangered Species Guide or the Nebraska Game and Parks Commission website for a reference of federal and state listed species that may occur in the project vicinity prior to starting project construction. These guidance documents can be found at:

- [http://www.agcne.org/services/es\\_guide.htm](http://www.agcne.org/services/es_guide.htm)
- [http://outdoornebraska.ne.gov/wildlife/programs/nongame/Endangered\\_Threatened.asp](http://outdoornebraska.ne.gov/wildlife/programs/nongame/Endangered_Threatened.asp)

If federal or state listed species are observed during construction, stop work and contact the NDOR Environmental Section to determine action required prior to resuming work.

**Refueling.** Refueling will be conducted within the confines of the paved roadway surface or within the boundaries of an approved stockpile/staging site.

**Restricted Activities.** Any project related activities that occur outside of the project limits (includes the paved surface and within 12 inches of the paved surface) must be environmentally cleared/permited with the Nebraska Game and Parks Commission as well as any other appropriate agencies by the Contractor and those clearances/permits shall be submitted to the District Construction Project Manager prior to the start of the above listed project activities. The contractor shall submit a NDOR Plant Site/Stockpile Site Request Identification and Evaluation Form (DR Form 56) and/or a Borrow Site/Waste Site Request Identification and Evaluation Form (DR Form 119) as appropriate, and include information such as an aerial photo showing the proposed activity site, a plan-sheet or drawing showing the location and dimensions of the activity site, ground photos showing the existing conditions at the proposed activity site, etc. The Contractor must receive Notice of Acceptance from NDOR, prior to starting the above listed project activities. These project activities cannot adversely affect state and/or federally listed species or designated critical habitat. Fill cannot be placed in Wetland, Stream or other Waters of the U.S. without authorization.



**Waste/Debris.** Construction waste/debris will be disposed of in areas or a manner which will not adversely affect state and/or federally listed species and/or designated critical habitat.

**Ground Disturbance Activities.** No ground disturbing activities are allowed in association with this project, outside of the footprint of the paved area and the necessary soil disturbance to taper an earth shoulder (would occur within 12 inches of the existing surfaced roadway).

Contact Person: Melissa Marinovich, Highway Environmental Biologist, (402) 479-3546

### **Encountering Unexpected Waste**

If contaminated soils and/or water or hazardous materials are encountered, then all work within the immediate area of the discovered hazardous material shall stop until NDOR/FHWA is notified and a plan to dispose of the Hazardous Materials has been developed. Then NDEQ shall be consulted and a remediation plan shall be developed for this project. The potential exists to have contaminants present resulting from minor spillage during fueling and service associated with construction equipment. Should contamination be found on the project during construction, the NDEQ shall be contacted for consultation and appropriate actions to be taken. The Contractor is required by NDOR's Standard Specification Section 107 (Legal Relations and Responsibilities to the Public) to handle and dispose of contaminated material in accordance with applicable laws. (Contractor)

Contact Person: Wendy Austin, Highway Environmental Biologist, (402) 479-3632

### **Attachment 1**

NDOR Environmental Permits Unit  
M.M. = Mile Marker/Reference Post  
Rt = Right side  
Lt = Left side

#### **Environmentally Sensitive Areas**

Wetlands – DO NOT DISTURB (Toe of Slope to edge of R.O.W.)

M.M. 157+70 Rt/Lt  
M.M. 158+52 to 158+70 Rt  
M.M. 182+94 Rt/Lt  
M.M.187+16 Rt/Lt  
M.M. 189+15 Rt  
M.M.189+71 Rt/Lt  
M.M. 190+64 Rt/Lt  
M.M. 191+21 Rt/Lt  
M.M. 191+46 Rt/Lt  
M.M.192+26 Rt/Lt  
M.M.193+71 to 193+86 Rt  
M.M. 193+84 Rt/Lt  
M.M. 193+99 Rt/Lt  
M.M. 193+99 to 194+10 Lt  
M.M. 194+78 Rt/Lt  
M.M. 194+94 Rt/Lt  
M.M. 195+39 Rt/Lt

**SPECIAL PROSECUTION AND PROGRESS  
(Migratory Birds)  
(A-42-1112)**

The Department of Roads will, to the extent practicable, schedule the letting of projects such that clearing and grubbing can occur outside of the primary nesting season in Nebraska which has been determined to generally occur between April 1 and September 1. Work on structures, such as but not limited to bridges and culverts, should occur outside the primary swallow nesting season, April 15 to September 30, unless approved methods of avoiding nesting have been taken on the bridge and/or culvert structures. The nesting dates above are a guide only, nesting can occur outside of those dates. Work outside of those dates is not exempt from compliance with the Migratory Bird Treaty Act.

The Contractor shall, to the extent possible, schedule work on structures, such as but not limited to bridges and culverts, and clearing and grubbing activities to occur outside the primary nesting season in Nebraska. However, if circumstances dictate that project construction or demolition must be done when nesting migratory birds may be present, a survey of the number of active nests and species of birds shall be conducted by qualified personnel representing the Contractor, and assisted by the Project Manager (PM), NDOR Environmental Section staff, or the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) - Wildlife Services Office. If the survey finds that nests will be impacted by the proposed construction, the Contractor may be responsible for delays.

The following guidance is provided for compliance with the Migratory Bird Treaty Act for construction of NDOR projects:

1. The Contractor shall submit a plan to the NDOR regarding how he intends to accomplish bridge demolition or clearing and grubbing of the project to avoid conflict with nesting migratory birds.
2. The Contractor must submit a temporary erosion control plan tailored to fit the plan for clearing and grubbing.
3. If construction operations result in unavoidable conflict with nesting migratory bird's eggs or young, which will result in "taking" nests and their contents, the Contractor should notify the NDOR Project Manager (PM). The PM shall notify the Environmental Section of Planning and Project Development by telephone at 402-479-4766.
4. The NDOR Environmental Section will then determine if assistance in conducting the survey will be provided by the NDOR Environmental Section (if available) or from the USDA APHIS - Wildlife Services Office and arrange for assistance with the survey of nest numbers, bird species, etc. Results of the survey shall be maintained by the NDOR until project completion.
5. If the nesting survey is required, and the project was awarded prior to the nesting season, and the Contractor did not accomplish clearing/grubbing and/or work on bridge/culvert structures outside the nesting season, the Contractor will

reimburse the Department of Roads for each survey required at \$1,000 per survey. If the project was awarded during the nesting season, and construction activities are such that clearing/grubbing and/or work on bridge/culvert structures must be accomplished prior to any other activity on the project, then there will be no charge assessed for the initial survey. The Contractor is responsible for removing all trees surveyed, that do not contain active nests, and for taking appropriate measures on bridge/culvert structures, within 3 days of the survey. Reimbursement for additional surveys may be charged if the Contractor fails to remove the trees within 3 days of the survey, and requires an additional survey. Survey reimbursement will be determined on a project specific basis, considering the project timeline and associated activities.

6. If an active nest is found during the survey, the Contractor should do everything possible to restructure his activities and leave the nest undisturbed until the young fledge. Fledging could occur within a week, or up to a month, after the survey depending on the species of bird and whether the nest contained eggs or young. Also depending on the species of bird and their sensitivity to disturbance, a buffer of up to 30 feet surrounding the tree with the active nest could be required.
7. If construction cannot be rescheduled to allow the birds to fledge, and it is determined as an unavoidable "take" circumstance, the Contractor shall stop all work within 30 feet of the active nest and coordinate with the Construction Project Manager to determine how to proceed. The Construction Project Manager will then coordinate with the NDOR Environmental Section and they will facilitate coordination with the US Fish and Wildlife Service and the Federal Highway Administration (for projects using Federal-aid) to determine the appropriate way to address the active nest. No work shall occur within 30 feet of the active nest until US Fish and Wildlife Service coordination is complete and the requirements of the Migratory Bird Treaty Act are satisfied.
8. It is the Contractor's responsibility to schedule his work to accommodate the process of conducting a survey(s) and submitting the necessary documentation if avoidance is not practicable. The Contractor shall be responsible for using any legal and practical method to prevent the nesting of birds in order to prevent the need for any survey and prevent the need for additional surveys. It is understood and agreed that the Contractor has considered in the bid all of the pertinent requirements concerning migratory birds (including endangered species) and that no additional compensation, other than time extensions if warranted, will be allowed for any delays or inconvenience resulting in these requirements.

### **STORM WATER DISCHARGES (A-43-0408)**

In compliance with the Federal Water Pollution Control Act, authorization to discharge storm water on this project has been granted under National Pollutant Discharge Elimination System (NPDES) General NPDES Permit Number NER110000 for Storm Water Discharges from Construction Sites to Waters of the State of Nebraska. This permit became effective on January 1, 2008.

Contractors are advised that, under the Construction Storm Water General Permit, ***plant sites, camp sites, storage sites, and borrow or waste sites not shown on the plans may be subject to separate NPDES permit authorization requirements for stormwater discharges from those locations.*** Contractors shall be responsible for verifying the need for NPDES permit coverage with the Nebraska Department of Environmental Quality (NDEQ). When required for these locations, the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

Additionally, asphalt (SIC Code 2951) or concrete (SIC Code 3273) batch plants that are owned by a private contractor and are operated on a contract-for-service basis to perform work for the Contractor completing the project may be subject to NPDES General Permit Number NER000000 for Industrial Storm Water Discharges. While the plant may be required for completion of the project, it is not under the control of the Department (or other project owner); and the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

The NDEQ may be contacted at 402-471-4220 for additional information.

### **REQUIRED SUBCONTRACTOR/SUPPLIER QUOTATIONS LIST (A-43-0307)**

All bidders must provide to the NDOR the identity of all firms who provided quotations on all projects, including both DBEs and non-DBEs. This information must be on a form provided by the NDOR Contracts Office.

If no quotations were received, the bidder must indicate this in the space provided.

Each bidder will be required to submit one list per letting to cover all projects bid.

### **PROPOSAL GUARANTY BID BOND (A-43-0307)**

Paragraphs 1.a. and 1.b. of Subsection 102.15 in the *Standard Specifications* are void and superseded by the following:

- a. OPTION 1 - (Project Specific Paper Bid Bond). The Bid Bond shall be executed on an original Department Bid Bond Form, which may be obtained from the Department. The original Bid Bond shall be delivered to the Department with the bid. A reproduction or a copy of the original form will not be accepted and will cause the bid not to be opened and read.
- b. OPTION 2 - (Annual Bid Bond). The Department at its discretion may allow a bidder to place an "Annual Bid Bond" on file with the Department. This bond would cover all projects the bidder bids for a 12-month period shown in the bond. The bidder must indicate in the bid submittal to the Department that their "Annual Bid Bond" applies to the submitted bid. The original Annual Bid Bond shall be executed on the Department of Roads Bid Bond Form, which may be obtained from the Department. A reproduction or a copy of the original form will not be accepted.

**WORKER VISIBILITY  
(A-43-0507)**

Pursuant to Part 634, Title 23, Code of Federal Regulations, the following modified rule is being implemented:

Effective on January 1, 2008, all workers within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel.

High-visibility safety apparel is defined to mean personal protective safety clothing that:

- 1 - is intended to provide conspicuity during both daytime and nighttime usage, and
- 2 - meets the Performance Class 2 or Class 3 requirements of the ANSI/ISEA 107-2004 publication titled "American National Standards for High-Visibility Safety Apparel and Headwear."

**VALUE ENGINEERING PROPOSALS (VEP)  
(A-43-0807)**

Subsection 104.03 in the *Standard Specifications* is amended to include the following:

14. A VEP will not be accepted if the proposal is prepared by an Engineer or the Engineering Firm who designed the contract plans.

**LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC  
(A-43-0210)**

Paragraph 4.a. of Subsection 107.01 in the *Standard Specifications* is void and superseded by the following:

4. a. Whenever the Contractor violates any governing Federal, State or Local environmental quality regulation and/or is in noncompliance with any environmental commitment, the violating activity must cease immediately until the appropriate remedy can be determined by: the Engineer, the NDOR Environmental Section, the Federal Highway Administration (for projects utilizing Federal-aid) and other agencies, as deemed appropriate. The Engineer, with assistance from the NDOR Environmental Section and the FHWA, will provide a written order confirming the appropriate corrective action to the Contractor. Work can resume to normal conditions once the Engineer determines that the violation or non-compliance has been addressed in accordance with the order for corrective action.

Subsection 107.01 in the *Standard Specifications* is amended to include the following two paragraphs:

5. Should the Contractor encounter any previously unidentified hazardous materials, the Engineer shall be promptly notified. The Contractor shall suspend operations in the area involved until such time that arrangements are made for their proper treatment or removal.
6. The Contractor shall prevent the transfer of invasive plant and animal species. The Contractor shall wash equipment at the Contractor's storage facility prior to entering the construction site. The Contractor shall inspect all construction equipment and remove all attached vegetation and animals prior to leaving the construction site.

**SPECIAL PROSECUTION AND PROGRESS  
(Federal Immigration Verification System)  
(A-43-1209)**

The Contractor shall register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska. The Prime Contractor shall contractually require every subcontractor to register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska.

The Federal Immigration Verification System shall be an electronic verification of the work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program. The Contractor may use an equivalent Federal program designated by the United States Department of Homeland Security or other Federal agency authorized to verify the work eligibility status of a newly hired employee. The equivalent program shall comply with the Immigration Reform and Control Act of 1986.

The Prime Contractor shall furnish a letter to the NDOR Construction Division in Lincoln on company letterhead and signed by an officer of the company stating that documentation is on file certifying that the Contractor and all subcontractors have registered with and used a Federal Immigration Verification System. The Contractor shall maintain all records of registration and use for a period of three years and make records available upon request. The Contractor shall contractually require subcontractors to maintain all records for a period of three years and make records available upon request.

Payment will not be made to the Contractor for using the Federal Immigration Verification System or the maintenance of the records. This work shall be subsidiary to the work being performed.

The Contractor's Certification shall become part of the final records of the Contract. The Department considers this document to have direct bearing to the beginning interest date and may affect the amount of interest earned.

**CONTRACT TIME ALLOWANCE  
(A-43-0911)**

Paragraph 5. of Subsection 108.02 of the *Standard Specifications* is void and superseded by the following:

5. Each week, the Engineer shall post on the Department's website a report of working days or calendar days charged. The Contractor then has 14 days from the day the Engineer's report is posted to provide a written explanation of why he/she does not concur with the working days or calendar days as assessed.

Paragraph 6.b. of Subsection 108.02 of the *Standard Specifications* is amended to include the following:

- (4) If the time allowance for the contract has been established on a calendar day basis, the Contractor is expected to schedule the work and assign whatever resources are necessary to complete the work in the time allowance provided regardless of the weather. Accordingly, regardless of anything to the contrary contained in these *Specifications*, the Department will not consider delays caused by inclement or unseasonable weather as justification for an extension of the contract time allowance unless:
  - i. the weather phenomena alleged to have contributed to or caused the delay is of such magnitude that it results in the Governor issuing a Disaster Declaration, **and**
  - ii. the weather phenomena alleged to have contributed to or caused the delay can clearly be shown to have directly impacted the work on the critical path identified on the Contractor's schedule.

Paragraphs 10.b. and 10.c. of Subsection 108.02 of the *Standard Specifications* are void and superseded by the following:

- b. (1) If the extra work is not in the original contract, time extensions will be granted by determining the actual time necessary to accomplish the extra work.
- (2) If the extra work is the result of the addition of additional quantities of existing contract items, time extensions will be granted by either:
  - (i) determining the actual time necessary to accomplish the extra work; or
  - (ii) determining the additional time to be granted by comparing the value of the additional quantities of work to the total amount of the original contract when measurement of the actual additional time is not possible or practical.
- (3) In either case, only the time necessary to perform the extra work of the additional quantities of existing contract items when the extra work or the additional quantities of existing contract items are deemed to be the current controlling operation will be granted as a time extension.

- c. Increases in quantities of work associated with traffic control items measured by the day will not be considered for extending the contract time allowance. Overruns of traffic control items that are measured by methods other than time may be considered for extending the contract time allowance, but they must be deemed to be a controlling operation when the overrun of quantities occurs.

**PARTIAL PAYMENT  
(A-43-1110)**

Paragraph 2. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- 2. When the value of the work completed during a semi-monthly period exceeds \$10,000, the Contractor will receive semi-monthly progress estimates from which the Department shall make such retentions as may be allowed by the contract, provided that the nature and quality of the completed work are satisfactory and provided further that the progress of the work conforms to the requirements of Subsection 108.07.

Paragraph 3.b. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- b. Under normal circumstances, the Department shall not retain any earnings on a progress estimate. However, the Department reserves the right to retain such amounts as are necessary for material deficiencies, anticipated liquidated damages, unpaid borrow, and for other reasons to protect the Department's interests.

**PARTIAL PAYMENT  
(A-43-0611)**

Paragraph 4. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- 4. a. (1) Upon presentation by the Contractor of receipted bills, billing invoices, or such other documentation sufficient to satisfy the Engineer and verify the Contractor's or subcontractor's actual costs for the materials, payments may also be allowed for acceptable nonperishable materials purchased expressly to be incorporated into the work and delivered in the vicinity of the project or stored in acceptable storage places within Nebraska.
- (2) Materials not delivered and stored in the immediate vicinity of or on the actual project site must be clearly marked to identify the project on which they are to be used, must be segregated from similar materials at the storage site, and cannot be included in a supplier's inventory of material available for sale for other purposes.



- (3) All items eligible for partial payment as stored materials must be available for verification, sampling, and measurement.
- b. The amount to be included in the payment will be determined by the Engineer, but in no case shall it exceed 100 percent of the value of the materials documented. This value may not exceed the appropriate portion of the value of the contract item or items in which such materials are to be incorporated, nor shall the quantity in any case exceed the total estimated quantity required to complete the project.
- c. Payment will not be approved when the documented value of such materials amounts to less than \$1,000.00, when the progress of the work is not in accordance with the requirements set forth in Subsection 108.07, or when the material can reasonably be expected to be incorporated into the work and eligible for payment as completed work on a progress estimate within 15 days of being placed into storage.
- d. Deductions at rates and in amounts which are equal to the payments will be made from estimates as the materials are incorporated into the work.
- e. Payment for the materials shall not in itself constitute acceptance, and any materials which do not conform to the specifications shall be rejected in accordance with Subsection 106.05.
- f. The Contractor shall be responsible for all damages and material losses until the material is incorporated into the work and the work is accepted.
- g. Partial payment will not include payment for fuels, supplies, form lumber, falsework, other materials, or temporary structures of any kind which will not become an integral part of the finished construction.
- h. No partial payments will be made on living or perishable plant materials until planted.

**BUY AMERICA  
(A-43-0212)**

Subsection 106.07 in the *Standard Specifications* is void and superseded by the following:

**106.07 -- Buy America**

1. The Buy America rule requires that steel or iron materials be produced domestically, and only those products which are brought to the construction site and permanently incorporated into the completed project are covered. Construction materials, forms, etc., which remain in place at the Contractor's convenience, but are not required by the contract, are not covered.
2. To further define the coverage, a domestic product is a manufactured steel construction material that was produced in one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States.

3. All manufacturing processes to produce steel or iron materials (i.e., smelting, and any subsequent process which alters the steel or iron material's physical form or shape, or changes its chemical composition) must occur within one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States, to be considered of domestic origin. This includes processes such as casting, rolling, extruding, machining, bending, grinding, drilling, and coating. Coating includes epoxy coating, galvanizing, painting, and any other coating that protects or enhances the value of the material. The manufacturer shall include a statement on the material test report or certification that all material described above except the coating material is a domestic product.
4. Raw materials used in the steel or iron materials may be imported. All manufacturing processes to produce steel or iron materials must occur domestically. Raw materials are materials such as iron ore, limestone, waste products, etc., which are used in the manufacturing process to produce the steel products. Waste products would include scrap; i.e., steel no longer useful in its present form from old automobiles, machinery, pipe, railroad tracks and the like. Also, steel trimmings from mills or product manufacturing are considered waste. Extracting, crushing, and handling the raw materials which is customary to prepare them for transporting are exempt from Buy America. The use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for steel and/or iron materials.
5. Notwithstanding this requirement, a minimum of foreign steel or iron materials will be permitted if its value is less than one-tenth of one percent of the total contract cost or \$2,500, whichever is greater.
6. Upon completion of all work utilizing steel or iron products, the Prime Contractor shall furnish a letter to the State on company letterhead and signed by an officer of the company stating that documentation is on file certifying that all steel or iron materials brought to the construction site and permanently incorporated into the work complied in all respects with the Buy America requirements.

**BORROW, WASTE, STOCKPILE, AND PLANT SITE APPROVAL  
(A-43-0512)**

Subsection 107.02 in the Standard Specifications is amended to include the following:

4. Site Approval:
  - a. When borrow is obtained from a borrow site or waste excavation is placed at sites which are not shown in the contract, or the Contractor plans to use a plant or stockpile site which is not shown in the contract, the Contractor shall be solely responsible for obtaining all necessary site approvals. The Department will provide the procedures necessary to obtain approvals from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Nebraska State Historical Society, Nebraska Game and

Parks Commission, and Nebraska Department of Natural Resources on the NDOR website. The Contractor shall also be responsible for obtaining a Discharge Number from the Nebraska Department of Environmental Quality (NDEQ) that allows work under the current Construction Stormwater Permit. The Contractor shall also be responsible for obtaining any and all other permits required by local governments.

- b. It is anticipated that it may require 60 calendar days or more for the Contractor to obtain the necessary approvals. The Contractor will not be allowed to begin work at borrow or waste sites until the necessary approvals are obtained. No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site unless a review of the time frames concludes that there were conditions beyond the Contractor's control.

Paragraph 7. of Subsection 205.02 in the Standard Specifications is void and superseded by the following:

7. Borrow and Waste Site Approval:
  - a. Borrow and waste site approvals shall be in accordance with Section 107.02.
  - b. Material shall not be removed from borrow sites until preliminary cross sections and representative soil samples have been taken by the Engineer. The Contractor shall notify the Engineer a sufficient time in advance of the opening of any borrow site so that cross sections may be taken.
  - c. Material shall be removed in a manner that will allow accurate final cross sections to be taken for determining the quantity of excavation. The surfaces of the borrow sites shall be bladed and shaped to drain as shown in the contract or as directed by the Engineer.

**SPECIAL PROSECUTION AND PROGRESS  
(Subletting or Assigning of Contract)  
(A-43-0414)**

Subsection 108.01 in the Standard Specifications is void and superseded by the following:

**108.01 – Subletting or Assigning of Contract**

1. a. (1) The Contractor will not be allowed to sublet, assign, sell, transfer, or otherwise dispose of any portion of the contract or any right, title, or interest therein; or to either legally or equitably assign any of the money payable under the contract or the claims without the prior written consent of the Engineer.

- (2) With the Engineer's consent, the Contractor may sublet up to 70 percent of the work.
  - (3) Any items designated in the contract as "specialty items" may be performed by subcontract.
  - (4) The cost of any subcontracted "specialty items" may be deducted from the total contract cost before computing the percentage of work required to be performed by the Contractor.
  - (5) Subcontracts, or transfer of contract, will not release the Contractor of any liability under the contract and bonds.
- b. Certain items of work may be performed without a subcontract. A list of items not requiring a subcontract is available from the Engineer.
2. The performance of any work by a subcontractor before the date of authorization by the Department shall subject both the Contractor and subcontractor to the imposition of appropriate sanctions by the Department.
  3. a. The Contractor's request to sublet work shall be made electronically to the NDR Construction Engineer using project management software identified by the Department. A signed subcontract agreement shall be on file in the Contractor's office when the request is made. The subcontract agreement must provide that the subcontracted work will be completed according to the terms of the contract. The required and Special Provisions contained in the proposal shall be physically included in any subcontract.
    - b. **On all Federal-aid projects, a scanned copy (.pdf format) of the signed subcontract agreement shall be included with the subcontracting request. (Federal-aid projects can be identified by inclusion in the Proposal of Form FHWA-1273 (REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS)).**
    - c. Scanned copies (.pdf format) of all executed subcontracts, written agreements, and/or lease agreements used to meet DBE goals shall be submitted to the NDR Construction Engineer with the subcontracting request. These copies must show labor cost, material prices, overhead and profit.
  4. a. Second tier subcontracts will be allowed.
    - b. If a DBE firm subcontracts work to another firm, only work subcontracted to another DBE firm can be counted toward meeting a DBE goal.
    - c. All requests for second tier subcontracting shall be submitted to and approved by the Prime Contractor before they are forwarded to the NDR Construction Engineer for approval.
  5. All subcontract documents relating to the contract shall be maintained during the course of the work and preserved for a period of three years thereafter. These documents shall be available for inspection by authorized representatives of

State and Federal agencies. Scanned copies (.pdf format) of the signed subcontract agreements not specifically identified elsewhere in this Subsection shall be furnished to the Department upon request.

6. The Contractor may discuss a proposed subcontract with the Engineer before entering into a signed subcontract agreement, but final approval will not be granted until a formal request and proper certification has been received by the Department.
7. On projects requiring submittal of certified payrolls, all subcontractor payrolls shall be checked by the Contractor before submittal to the Engineer.
8. a. The Prime Contractor, and subcontractors when subletting work to lower tier subcontractors, shall include language which can be identified as a "Prompt Payment Clause" as a part of every subcontract for work and materials.
  - b. (1) The language constituting the "Prompt Payment Clause" will require payment to all first tier subcontractors for all labor and materials --- for work completed to date --- within 20 calendar days of receipt of progress payments from the Department for said work. Similar language in a contract between a subcontractor and a lower-tier subcontractor will require payment to the lower tier subcontractor for all labor and materials --- for work completed to date --- within 10 calendar days of receipt of progress payments from the prime Contractor for said work.
  - (2) The language constituting the "Prompt Payment Clause" will also stipulate the return of retainage within 30 calendar days after the satisfactory completion of the work by the subcontractor as evidenced by inclusion of the work on a progress payment.
  - (3) Additionally, the language constituting the "Prompt Payment Clause" may stipulate the subcontractor's obligation to return to the Contractor or subcontractor, as the case may be, any overpayments which result from adjustments to measured and recorded quantities as part of the preparation of subsequent progress payments or the final records. Overpayments shall be returned to the Prime Contractor or subcontractor, as the case may be, within 20 calendar days of receiving notice of the adjusted quantities and the amount of the overpayment.
- c. The Prime Contractor of subcontractors, as the case may be, may withhold payment only for just cause and shall not withhold, delay, or postpone payment without first receiving written approval from the Department.
- d. (1) The failure by the Prime Contractor to abide by the agreements identified in the "Prompt Payment Clause" without just cause, including the timely return of retainage, is a material breach of this contract which may result in the Department withholding the amount of payment from the prime Contractor that should have been paid to the subcontractor, termination of this contract, or other such remedy as the Department deems necessary.

- (2) Additionally, the failure of any subcontractor to abide by the agreements identified in the "Prompt Payment Clause" without just cause, including the timely return of retainage to lower tier subcontractors, or by failing to return overpayments in a timely manner when the language permitted in Paragraph 8.b.(3) above is included in the subcontract may result in the Department withholding subcontract approval for other work until the overpayments have been returned.
9. a.
  - (1) For Davis Bacon (DBRA)-covered projects and Non-DBRA-covered projects, a Contractor or subcontractor may wish to use another individual owner-operator or trucking company to supplement his or her hauling fleet. (The Department will not recognize multiple individuals claiming to be collectively identified as a single "owner operator.")
  - (2) This supplemental individual or company must either become a subcontractor (first tier or lower tier, as the case may be) or be otherwise documented by the utilizing Contractor or subcontractor by entering into a lease agreement for the trucks and showing the driver (or drivers) from the supplemental company on the Prime Contractor's or subcontractor's payrolls in the manner described below.
  - (3) Payrolls will only be accepted from the Prime Contractor or approved subcontractors.
- b.
  - (1) If the decision is made to subcontract the hauling, the Prime Contractor must first notify the NDOR Construction Office to request subcontract approval. As part of the subcontract approval process --- at any tier --- the proper certificates of insurance must be provided before approval will be granted.
  - (2) Additionally, on DBRA-covered projects, the Prime Contractor must submit payrolls for all subcontractors --- at any tier.
- c.
  - (1) Owner/Operators of trucks hired by a Contractor or subcontractor to supplement his or her hauling fleet are not subject to Davis Bacon wage requirements. However, they must still be shown on a payroll prepared by the Contractor or subcontractor for whom they are working with the notation "owner/operator."
  - (2) Any other employees of the "owner/operator" must appear on the certified payroll in complete detail and must be compensated according to the wage rates established for the project.
- d. In the event a Prime Contractor or subcontractor elects to not subcontract the supplemental driver or drivers but instead chooses to "carry the workers/truckers on their payroll," the following requirements must be met:
  - (1) The Prime Contractor's or subcontractor's certified payroll must contain the names of all workers/truck drivers, and the payroll should identify their supervisors (including "owner-operators").

- (2) Pay checks for the workers/truckers in question must be drawn against the Prime Contractor's or subcontractor's payroll or other account.
- (3) Owner/Operators need only be identified as such on the payroll. Additional drivers, if any, from the "owner-operator's" company must appear on a payroll in complete detail and be compensated according to the wage rates established for the project.
- (4) The Prime Contractor or subcontractor must enter into a lease agreement for the trucks driven by such drivers, and the lease agreement must show that the compensation for the leased equipment is on a time basis and not based on the amount of work accomplished. The lease agreements must be available for inspection by NDOR personnel.
- (5) Any supplemental truckers employed under this arrangement must still carry the minimum automobile liability coverage specified in the contract. It shall be the duty of the Prime Contractor to ensure that the supplemental truckers have such coverage in effect. Evidence of proper insurance must be presented for verification on demand.

### **ELECTRONIC SHOP DRAWINGS (A-43-0215)**

Paragraphs 5,6, and 7 of Subsection 105.02 of the Standard Specifications are void and superseded by the following:

5. a. The Contractor shall provide electronic working drawings in a Portable Document Format (PDF). The PDFs shall be sized to print on an 11x17 inch sheet of paper and have a minimum resolution of 300 dpi. Each sheet of the shop drawings shall have a space provided for an electronic stamp that measures 2.5 inches x 3.5 inches when printed.
  - b. Electronic working drawing files shall be named with the following file naming format:  
  
Control Number\_Brief Description\_Date.pdf  
  
For example: 12345\_FloorDrains\_05Feb2015  
12345\_FloorDrainCoverLetter\_05Feb2015
  - c. The project number, control number, and project location as it appears on the plans shall be shown on the front sheet of each Shop Drawing file. Structure numbers shall be included, if applicable.
6. No electronic working drawings shall be submitted to the Engineer unless they have been checked by the Contractor. The electronic submittal shall be accompanied by a Contractor's letter of approval in a PDF format. This letter shall also be named with the format shown in the example above. The letter of approval shall clearly indicate that the Contractor is responsible for any errors on the working drawings.

7. a. Electronic submittals shall be submitted by email to the following address:  

DOR.ShopDrawings@nebraska.gov
- b. Attachments shall be limited to 25 MB of data per email. Larger files shall be separated and sent in multiple emails.
- c. Electronic working drawings will only be accepted from the Prime Contractor.
8. Any reference to hard copy shop drawings in the contract shall be considered void.

**LIABILITY INSURANCE  
(A-55-0414)**

Subsection 107.13 in the Standard Specifications is void and superseded by the following:

**107.13 – Liability Insurance**

Prior to execution of the contract, the Contractor shall obtain insurance coverage to fully protect it from loss associated with the work, and have at a minimum the insurance described below:

1. General Liability:  
Limits of at least:
  - \$ 1,000,000 per Occurrence
  - \$ 2,000,000 General Aggregate
  - \$ 2,000,000 Completed Operations Aggregate
  - \$ 1,000,000 Personal and Advertising Injury
- a. Contractor shall be responsible for the payment of any deductibles.
- b. Coverage shall be provided by a standard form Commercial General Liability Policy (CG0001 or equivalent) covering bodily injury, property damage including loss of use, and personal injury.
- c. The General Aggregate shall apply on a Per Project Basis.
- d. The State of Nebraska, Department of Roads, shall be named as an Additional Insured on a primary and non-contributory basis including completed operations for three (3) years after final acceptance and payment.
- e. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
- f. Contractual liability coverage shall be on a broad form basis and shall not be amended by any limiting endorsements.
- g. If work is being performed near a railroad track, the 50' railroad right-of-way exclusion must be deleted.



- h. Products and completed operations coverage in the amount provided above shall be maintained for the duration of the work, and shall be further maintained for a minimum period of three years after final acceptance and payment.
  - i. Coverage shall be included for demolition of any building or structure, collapse, explosion, blasting, excavation and damage to property below surface of ground (XCU coverage).
  - j. Policy shall not contain a total or absolute pollution exclusion. Coverage shall be provided for pollution exposures arising from products and completed operations as per standard CG0001 Pollution Exclusion or equivalent. If the standard pollution exclusion as provided by CG0001 has been amended, coverage must be substituted with a separate Pollution Liability policy of \$1.0 million per occurrence and \$2.0 million aggregate. If coverage is provided by a "claims made" form, coverage will be maintained for three years after project completion. Any applicable deductible is the responsibility of the Contractor.
2. Automobile Liability:  
Limits of at least:  
\$ 1,000,000 CSL per Accident
- a. Coverage shall apply to all Owned, Hired, and Non-Owned Autos.
  - b. If work is being performed near a railroad track, the 50-foot railroad right-of-way exclusion must be deleted.
  - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads, shall be added to the policy.
  - d. Automobile liability coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
3. Workers' Compensation:  
Limit: Statutory coverage for the State where the project is located.  
Employer's Liability limits: \$500,000 Each Accident  
\$500,000 Disease – Per Person  
\$500,000 Disease – Policy Limit
- a. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
  - b. Workers' compensation coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
  - c. Where applicable, the Longshore and Harborworkers Compensation Act endorsement shall be attached to the policy.

4. Umbrella/Excess:  
Limits of at least:  
\$1,000,000 per Occurrence
  - a. Policy shall provide liability coverage in excess of the specified Employers Liability, Commercial General Liability and Automobile Liability.
  - b. The State of Nebraska, Department of Roads, shall be an "Additional Insured."
  - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of subrogation in favor of the State of Nebraska, Department of Roads shall be provided.
5. Pollution Liability:
  - a. When "hazardous wastes" or contaminated or polluted materials must be handled and/or moved, the Contractor shall obtain Pollution Liability Coverage with minimum limits of \$1,000,000 per occurrence and \$2,000,000 aggregate.
  - b. If, during the course of construction, hazardous wastes, contaminated or polluted material are discovered on the project, the Contractor shall immediately cease any operation that may disturb these materials, and shall immediately notify the Engineer of all facts related to the discovery of these materials.
  - c. Unforeseen work related to the discovery of hazardous, contaminated or polluted materials on the project, and the extra cost, if any, of pollution liability coverage will be handled as "extra work."
6. Additional Requirements:
  - a. The Contractor shall provide and carry any additional insurance required by the Special Provisions.
  - b. Except as otherwise provided herein, all insurance shall be kept in full force and effect until after the State releases the Contractor from all obligations under the contract.
  - c.
    - (1) If any of the work is sublet, equivalent insurance shall be provided by or on behalf of the subcontractor or subcontractors (at any tier) to cover all operations.
    - (2) Approved trucking subcontractors (at any tier) who are being utilized only for the purpose of hauling materials shall be exempt from the requirements of Paragraphs 1, 4, and 5.
    - (3)
      - (i) When a Contractor or subcontractor chooses to employ a trucker by carrying the driver on his or her payroll and entering into a lease agreement for the truck, the owner-operator of the truck shall be required to comply with the Automobile Liability provisions of Paragraph 2.
      - (ii) Furthermore, it shall be the duty of the Prime Contractor to ensure that the owner-operator of the truck has such insurance in effect. The Prime Contractor shall maintain evidence that any truckers so

utilized (at any tier) are insured to the minimum limits specified and be able to furnish documentation of the same on demand.

- (iii) Failure to ensure that insurance coverage exists and failure to maintain evidence thereof shall be considered a breach of the contract.
- d. Any insurance policy shall be written by an insurance company with a Best's Insurance Guide Rating of A – VII or better.
- e. Prior to execution of the contract, Contractor shall provide the State of Nebraska, Department of Roads evidence of such insurance coverage in effect in the form of an Accord (or equivalent) certificate of insurance executed by a licensed representative of the participating insurer(s). Certificates of insurance shall show the Nebraska Department of Roads as the certificate holders.
- f. For so long as insurance coverage is required under this agreement, the Contractor shall have a duty to notify the Department when the Contractor knows, or has reason to believe, that any insurance coverage required under this agreement will lapse, or may be cancelled or terminated. The Contractor must forward any pertinent notice of cancellation or termination to the Department at the address listed below by mail (return receipt requested), hand-delivery, or facsimile transmission within 2 business days of receipt by Contractor of any such notice from an insurance carrier. Notice shall be sent to:

Nebraska Department of Roads  
Construction Division --- Insurance Section  
1500 Highway 2, P.O. Box 94759  
Lincoln, NE 68509-4759  
Facsimile No. 402-479-4854
- g. Failure of the owner or any other party to review, approve, and/or reject a certificate of insurance in whole or in part does not waive the requirements of this agreement.
- h. The limits of coverage set forth in this document are suggested minimum limits of coverage. The suggested limits of coverage shall not be construed to be a limitation of the liability on the part of the Contractor or any of its subcontractors/tier subcontractors. The carrying of insurance described shall in no way be interpreted as relieving the Contractor, subcontractor, or tier subcontractors of any responsibility or liability under the contract.
- i. If there is a discrepancy of coverage between this document and any other insurance specification for this project, the greater limit or coverage requirement shall prevail.

## CONSTRUCTION DETAILS

### TEMPORARY WATER POLLUTION CONTROL (B-3-1014)

Section 204 in the Standard Specifications is void.

### CONSTRUCTION STORMWATER MANAGEMENT CONTROL (B-3-1014)

#### A. General

1. This Section defines some best management practices (BMPs) for erosion and sediment control measures and construction practices the Contractor shall use to prevent soil erosion and avoid water pollution.
2.
  - a. The Department and the Contractor are co-permittees of the NPDES Construction Storm Water General Permit.
  - b. The Contractor shall comply with all conditions required by the current NPDES Construction Storm Water General Permit.
3. The Contractor shall exercise every reasonable precaution throughout the life of the contract to prevent silting of the waters of the state, the project site, and adjacent property. Construction of drainage facilities, as well as performance of other contract work which will contribute to the control of siltation, shall be carried out in conjunction with earthwork operations or as soon thereafter as is practicable.
4.
  - a. The Contractor shall take sufficient precautions to prevent pollution of the waters of the state, the project site, and adjacent property from construction debris, petroleum products, chemicals, or other harmful materials.  
  
The Contractor shall conduct and schedule the operations to avoid interference with any protected species.
  - b. The Contractor shall comply with all applicable statutes relating to pollution of the waters of the state and fish and game regulations.
5. All construction debris shall be disposed in a manner that it cannot enter any waterway. Excavation shall be deposited as to protect the waters of the state from siltation.
6. All erosion and sediment control measures shall be properly installed and maintained by the Contractor until all permanent drainage facilities have been constructed, and all slopes are sufficiently vegetated to be an effective erosion deterrent; or until tentative acceptance of the work.

7. All erosion and sedimentation resulting from the Contractor's operations and the weather conditions must be corrected by the Contractor.

### **LIMITATION OF OPERATIONS (B-3-1014)**

#### **A. General**

1. The maximum exposed surface area for the Contractor's operations in excavation, borrow, and embankment is 18 acres (72,800 m<sup>2</sup>) plus an equal area of clearing and grubbing/large tree removal. A written request for an increase in the maximum exposed surface area may be approved by the Engineer. This approval will be based on the soil, moisture, seasonal conditions, the Contractor's operation, or other conditions.
2. The Engineer shall have the authority to reduce the maximum exposed surface area when any of the following conditions warrant:
  - a. Soil and moisture conditions are such that erosion is probable.
  - b. Seasonal conditions may force extended delays.
  - c. Proximity to the waters of the state requires more stringent controls.
  - d. Equipment and personnel available on the job is not sufficient to properly maintain erosion and dust control measures.
  - e. Any other environmental condition in the area that may exist which would be affected by erosion from the project.
3. Construction operations in rivers, streams, wetlands, and impoundments shall be restricted to those areas specifically shown in the contract. Rivers, streams, wetlands, and impoundments shall be promptly cleared of all false work, piling, debris, or other obstructions placed therein or caused by the construction operations.
4. Fording and operation of construction equipment within streams and wetlands will not be allowed, unless explicitly allowed in the contract. Streams are defined as any area between the high banks, regardless of the flow conditions.

## **CONSTRUCTION METHODS (B-3-1014)**

### **A. General**

1. The Contractor shall conduct all construction activities and install temporary erosion control measures, as necessary, to control sediment and avoid soil erosion during construction.
2. The Contractor shall incorporate all permanent erosion control features into the project at the earliest practicable time.
3. Construction stormwater management control measures for Contractor obtained work areas located outside the right-of-way, such as borrow site operations, haul roads, plant sites, staging sites, waste sites, equipment storage sites, etc. are the sole responsibility of the Contractor. All construction stormwater management control measures for these areas are at the Contractor's expense. The Contractor is responsible for securing all required permits for use of these sites.
4. The construction stormwater management procedures contained herein shall be coordinated with any permanent erosion control measures specified elsewhere in the contract to the extent practical to assure economical, effective, and continuous erosion and sediment control throughout the construction period.
5. The Contractor shall be responsible to limit erosion and prevent siltation into the waters of the state during the construction period, as well as during the times that work may be suspended.
6.
  - a. All erosion and sediment control items shall be installed by personnel who are knowledgeable in the principles and practice of various BMP installations.
  - b. The installation of all erosion and sediment control items shall be done under the direct supervision of the Contractor's employee who has successfully completed training provided by the Department and has been certified as an Erosion and Sediment Control Inspector (Inspector). The Contractor's Inspector shall be present at each site during installation to direct and inspect all erosion and sediment control BMP installations.
    - i. The NDOR Erosion and Sediment Control Inspector Certification is obtained by completing an Erosion and Sediment Control Inspector Training Course provided by the Nebraska Department of Roads and passing the examination that accompanies the training.
  - c. The Contractor shall notify the Engineer of all employees, who have been certified as Inspectors, who will be on the project to direct and inspect all erosion and sediment control BMP installations.

- d. No payment will be made for any erosion and sediment control item unless a Contractor's Inspector was present to directly supervise and inspect the work.
- e. No payment will be made for any erosion and sediment control item that is not properly installed. All erosion and sediment control items shall be installed as per the contract.

**ENVIRONMENTAL COMMITMENT DOCUMENT  
(B-3-1014)**

**A. Environmental Commitment Document**

- 1. a. An Environmental Commitment Document will be created by the Department to identify all project specific environmental commitments and will be included in the Contract.
- b. The Department will provide information for the following, when applicable:
  - i. Storm Water Pollution Prevention Plan (SWPPP)
  - ii. U.S. Army Corps of Engineers (USACE) Section 404 Permit
  - iii. Nebraska Department of Environmental Quality 401 Water Quality Certification
  - iv. State Title 117 Waters (USACE Non-Jurisdictional)
  - v. Floodplain Permit
  - vi. Historic Clearance
  - vii. Endangered Species Act Clearance
  - viii. Nebraska Nongame and Endangered Species Conservation Act Clearance
  - ix. National Environmental Policy Act Compliance
  - x. NPDES Construction Stormwater Permit (within Right-of-Way limits, only)
  - xi. Conservation Measures
  - xii. Migratory Bird Treaty Act
  - xiii. Bald and Golden Eagle Protection Act Compliance
  - xiv. Other pertinent issues
- c. The Contractor shall provide information for the following, when applicable:
  - i. Temporary Erosion Control Plan
  - ii. Spill Prevention and Control Plan
  - iii. Migratory Bird Treaty Act Compliance Plan
  - iv. Name and telephone number of the Contractor's representative responsible for the Environmental Commitments
  - v. Name and telephone number of the employees that are NDOR-Certified Erosion and Sediment Control Inspectors
  - vi. Critical Path Construction Schedule
  - vii. Other items as defined elsewhere in the contract

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP)  
(B-3-1014)**

**A. General**

1. A SWPPP is required for projects that construction activities will cause a land disturbance of one (1) acre or more. The Department will prepare the SWPPP for the areas within the Right-of-Way, temporary easements and permanent easements.
2. For projects not requiring a SWPPP, the Contractor shall comply with the requirements of Environmental Commitment Document, Paragraph 1.b. of this Special Provision, as applicable.
3. Contractor obtained work areas, located on private property, are not included in the NDOR Project SWPPP.

**B. Temporary Erosion Control Plan**

1. The Contractor shall prepare and submit the Temporary Erosion Control Plan prior to the start of any work. The Contractor shall not begin work until the Temporary Erosion Control Plan has been submitted to the Engineer and appropriate erosion control measures are in place. Payment for any work on the contract will be withheld if erosion control measures are not in place or properly maintained.
2. The Temporary Erosion Control Plan will be reviewed at project progress meetings. All active Contractors shall have their Inspectors present and work in cooperation to determine any necessary changes. Necessary changes will be documented on the Temporary Erosion Control Plan by the Engineer.
3. Payment for preparing the Temporary Erosion Control Plan, inspections and meeting reviews are subsidiary to items that direct payment is made.

**C. Spill Prevention and Control Plan**

1. All project activities shall be addressed in the Spill Prevention and Control Plan. The Contractor shall prepare and submit the plan to the Engineer and install all appropriate spill prevention and control measures prior to the start of any work.
2. The Spill Prevention and Control Plan shall clearly state measures to prevent, contain, document and clean up a spill. It shall state measures for disposal of the contaminated material, disposal documentation and incident review to train personnel to prevent spills from reoccurring.
3. Spill Prevention and Control Plans are applicable to construction sites where hazardous materials are stored, used and/or generated onsite. Hazardous



materials include, but not limited to: hazardous wastes, pesticides, paints, cleaners, petroleum products, fertilizers, solvents and porta-potty wastes.

4. Direct payment will not be made for the Spill Prevention and Control Plan.

**D. Migratory Bird Treaty Act Compliance Plan**

1. The Contractor shall not begin work until a Migratory Bird Treaty Act Compliance Plan has been submitted to the Engineer and appropriate nesting migratory bird avoidance measures are in place.
2. a. The Contractor shall clearly state the necessary measures they intend to use to avoid a "Take" of nesting migratory birds in the Migratory Bird Treaty Act Compliance Plan. Measures may include but are not limited to:
  - i. Clearing and grubbing prior to April 1<sup>st</sup> or after September 1<sup>st</sup>
  - ii. Tree removal prior to April 1<sup>st</sup> or after September 1<sup>st</sup>
  - iii. Clearing empty nests on structures prior to April 1<sup>st</sup>
  - iv. Maintaining clear structures until commencement and throughout the duration of work on structures
  - v. Netting structures to prevent nesting
  - vi. Commitment to perform surveys according to protocol
  - vii. Hire a biologist to survey areas to be disturbed prior to commencement of work during the nesting season
  - viii. Submittal of required bird survey reports
  - ix. Training of Contractor Personnel to insure compliance
3. a. The Migratory Bird Treaty Act Compliance Plan is applicable to the entire project site to avoid the "Take" of migratory birds protected under the Migratory Bird Treaty Act.  
  
b. "Take" is defined as: pursuit, hunt, shoot, wound, kill, trap, capture, collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.
4. The Migratory Bird Treaty Act Compliance Plan shall adhere to the NDOR's Avian Protection Plan located at:  
<http://www.transportation.nebraska.gov/environment/guides/avian-protection-plan.pdf>

Direct payment will not be made for the Migratory Bird Treaty Act Compliance Plan.

**E. SWPPP Inspection**

1. The Contractor shall accompany the Engineer on inspections in accordance with the NPDES Construction Storm Water General Permit.

2. The SWPPP will be maintained and updated by the Engineer as work progresses and site conditions change to accurately describe the BMPs that are currently in place.
3. The Contractor's participation in SWPPP inspections, maintenance and updates shall begin on the first day construction activities cause land disturbance and end on the date of project completion as evidenced as the completion date in the District Engineer's Letter of Tentative Acceptance.
4.
  - a. The Contractor's Inspector shall be responsible for ensuring that all BMPs are installed in accordance with the contract or the manufacturers' recommendations. The Contractor's Inspector shall be capable of reading and interpreting these documents.
  - b. The Contractor's Inspector shall be familiar with product and structural BMPs. The Contractor's Inspector shall inspect, assess, and supervise the maintenance of erosion and sediment control BMPs to ensure compliance with the NPDES Construction Storm Water General Permit while preserving BMP functionality.
5. Payment for project inspection is subsidiary to items that direct payment is made.

**ENVIRONMENTAL COMMITMENT ENFORCEMENT  
(B-3-1014)**

**A. General**

1. This specification establishes payment and disincentive assessment for the Contractor's performance in complying with Contract Environmental Commitments.
2. Deficiencies are described but not limited to:
  - a. Failure to install pollution prevention control BMPs as work progresses or as described in the SWPPP.
  - b. Failure to maintain existing pollution prevention control BMPs.
  - c. Failure to remove non-functioning pollution prevention control BMPs.
  - d. Failure to comply with USACE Section 404 Permit requirements.
  - e. Failure to comply with NPDES Construction Storm Water General Permit requirements.
  - f. Failure to comply with all applicable statutes relating to pollution of the waters of the state.
  - g. Exceeding the maximum exposed surface area for excavation of 18 Acres without written request for permission and written approval.

- h. Failure to comply with wildlife species specific conservation conditions.
- i. Failure to comply with the Contract.
- j. Failure to comply with the Engineers directives.

**B. SWPPP Deficiency Notification**

1. The Engineer will document and direct the Contractor to correct deficiencies.
2.
  - a. The Contractor shall commence correcting deficiencies, provide adequate equipment and personnel, and diligently pursue correcting deficiencies without cessation until all deficiencies have been corrected.
  - b. The count of Working Days and/or Calendar Days will continue during the time period that corrective work is being performed.
  - c. Delays to the project as a result of the Contractor conducting corrective actions for the Contract Environmental Commitments will not constitute a valid reason for an extension of the contract time allowance.
3. Deficiencies shall be corrected within seven (7) calendar days of notification or within an approved extension. When deficiencies are not corrected within seven (7) calendar days or within an approved extension, the Engineer will make a disincentive assessment to the contract as stated herein.
4.
  - a. If soil, weather, or other conditions prevent the Contractor from completing the corrective actions within seven (7) calendar days, the Contractor shall notify the Engineer in writing. The Contractor's letter shall state the reasons preventing corrective action within the time allowed. The Contractor shall propose a written Corrective Action Plan within 48 hours. Corrective work shall continue while the Corrective Action Plan is developed. The Contractor's Corrective Action Plan must contain a course of action and a time frame for completion. If the reasons and the Corrective Action Plan are acceptable, the Engineer may extend the time in which to complete the corrective work.
  - b. The Contractor will be allowed to proceed with the plan as proposed without incurring a disincentive assessment. If all corrective work is completed within the time allowance shown in the Notification or within an approved extension, a disincentive assessment will not be imposed upon the Contractor.
  - c. Storm events or soil and weather conditions occurring on other projects, which interfere with a Contractor completing corrective actions on the project within seven (7) calendar days, will not be justification for a time extension to complete the corrective work.
5. If all corrective work identified in the Notification has not been completed at the end of the seventh (7<sup>th</sup>) calendar day after the Initial Notice Date or within an

approved extension, a Shut-Down Notice will be issued on the eighth (8<sup>th</sup>) calendar day after the Initial Notice Date or on the calendar day following the last day of an approved extension.

6. All operations shall cease as of the date and time cited in the Shut-Down Notice. The Contractor shall work, exclusively, on the deficiencies until all have been corrected or as directed by the Engineer. Upon issuance of the Shut-Down Notice, a disincentive of \$500.00 per deficiency per calendar day will be assessed thru the day the corrective work is completed, inclusive.
7. The Engineer may require the Contractor to provide a written Procedures Plan that describes the process to prevent reoccurrence of deficiencies. The written Procedures Plan shall be provided within two (2) calendar days of the request. Failure to correct all deficiencies and provide a Procedures Plan may result in payments being withheld until such time that procedures are outlined.
  - a. Payment for preparing a written Procedures Plan is subsidiary to items that direct payment is made.

**C. Storm Event Restoration – Incentive and Disincentive**

1. The Department will pay “Storm Event Restoration - Incentive” when the Contractor completes the restoration work to eliminate the pollution prevention control deficiencies within seven (7) calendar days of Notification or within an approved extension. Multiple deficiencies may be included in one notification. If the restoration work has not been completed within seven (7) calendar days after the Initial Notice or within an approved extension, payment for the item of “Storm Event Restoration - Incentive” will not be made.
2. A storm event is defined as a storm exceeding 0.50 inch of rain in a 24 hour period.
3. The Department will notify the Contractor of pollution prevention control deficiencies.
4.
  - a. Payment for the item of “Storm Event Restoration - Incentive” may not be made when the Contractor is notified to correct pollution prevention devices not installed in accordance with the contract or the manufacturer’s recommended installation instructions.
5. If the restoration work is not completed within seven (7) calendar days or within an approved extension, a disincentive assessment of \$500.00 per deficiency per calendar day will be assessed. The disincentive assessment will begin on the eighth (8<sup>th</sup>) calendar day after the issuance of the Initial Notice Date or on the calendar day following the last day of an approved extension(s) and continue through the day that the restoration work is completed, inclusive.

**D. Method of Measurement**

1.
  - a. “Storm Event Restoration – Incentive” will be measured by the each upon completion of restoration of all deficiencies included in a notification within the allowed time and only one payment per notification is allowed when multiple deficiencies are included on the notification.
  - b. If deficiencies from multiple notifications are restored during the same restoration operation, only one (1) incentive is eligible for payment.
  - c. If multiple notifications are the result of successive storm events and deficiencies are transferred to ensuing notifications, incentive payment is only eligible for the latest notification.
2. “Storm Event Restoration – Disincentive” will be measured by the calendar day in accordance with Paragraph C.5. above.

**E. Basis of Payment**

- |    |  |   |
|----|--|---|
| 1. | <b>Pay Item</b><br>Storm Event Restoration – Incentive<br>Storm Event Restoration – Disincentive | <b>Pay Unit</b><br>Each<br>Calendar Day |
|----|--|---|
2. All equipment, materials, etc. used in the restoration work will be paid for in accordance with Division 800 of the Standard Specifications.
  3. Payment is full compensation for all other incidentals required to complete the restoration work included in the notification within the allowed time.

**F. Environmental Commitments – Contractor Compliance**

1. To provide payment for all plans, inspections, surveys, reports, travel, qualified inspection persons and any other subsidiary activities for the work of implementing threatened and endangered species commitments, temporary erosion control or any other environmental commitments prescribed in the contract.
2. Multiple visits to the project may be required to comply with environmental commitments prescribed in the contract.

**G. Method of Measurement**

1. No measurement is required.

**H. Basis of Payment**

- |    |  |                             |
|----|--|-----------------------------|
| 1. | <b>Pay Item</b><br>Environmental Commitments – Contractor Compliance | <b>Pay Unit</b><br>Lump Sum |
|----|--|-----------------------------|

2. Partial payments will be made as follows:
  - a. The Department will pay 50 percent of the total amount bid for the item Environmental Commitments – Contractor Compliance within seven (7) calendar days after the Notice to Proceed Date.
  - b. Upon completion of 50 percent of the Original Contract Amount, the Department will pay 30 percent of the amount bid for the item Environmental Commitments – Contractor Compliance.
  - c. Upon completion of 75 percent of the Original Contract Amount, the Department will pay the remaining 20 percent of the amount bid for the item Environmental Commitments – Contractor Compliance.
  - d. Failure to comply with any or all of the contract requirements, included for payment under the item of Environmental Commitments – Contractor Compliance, will preclude all payment for the item, including any previous payment.
3. Payment is full compensation for all work prescribed in the contract.

**I. Immediate Action Deficiencies**

1. Deficiencies that pose an imminent threat to the environment are considered an emergency situation. These deficiencies will be identified in the Immediate Action Deficiencies Section of the Environmental Commitment Deficiency Notification Form. The corrective work for Immediate Action Deficiencies shall begin immediately and continue without cessation until completed.
2. The Engineer will issue a shut-down notice. All work on the contract shall cease until the corrective work has been completed. The Engineer may allow the Contractor to continue working in areas unaffected by the Immediate Action Deficiency, provided corrective actions are being actively performed on the deficiency.
3. Immediate Action Deficiencies are not eligible for an incentive payment.
4. The Contractor will be assessed a disincentive assessment of \$1,000.00 per deficiency per calendar day for failure to begin corrective actions or failing to continue to completion as directed by the Engineer or by the regulatory agency with jurisdiction.
5. Examples of Immediate Action Deficiencies include but are not limited to:
  - a. Threatened & Endangered Species habitat protection deficiencies
  - b. USACE Section 404 Permit Noncompliance
  - c. Petroleum Spills/Tank Leakage
  - d. Hazardous Material Spills

**J. Rights Reserved**

1. The Department reserves the right to initiate and perform corrective action on any deficiencies which result from the Contractors' actions, inactions, or for failure to comply with the NPDES Construction Stormwater General Permit, USACE Section 404 Permit, or any other applicable permit.
2. The Contractor shall be liable to the Department for any and all costs incurred by the Department for corrective actions taken by the Department.
3. It is expressly understood that the provisions of this specification shall not relieve the Contractor of their responsibilities nor shall it relieve the Surety of its obligation for and concerning any just claim.
4. The Contractor shall indemnify and save harmless the Department and all of its representatives from any and all actions or claims brought because of the Contractor's actions, inactions, or for failure to comply with the NPDES Construction Storm Water General Permit, USACE Section 404 Permit, or any other applicable permit.

**SAWING PAVEMENT**

Paragraph 5. of Subsection 203.04 in the Standard Specifications is void.

**TYPE B HIGH INTENSITY WARNING LIGHTS  
(D-6-0307)**

All references in the plans to Type B High Intensity Warning Lights shall be considered void. The plans will not be revised to reflect this change.

**TEMPORARY TRAFFIC CONTROL DEVICES  
(Type II Barricades, Reflectorized Drums, 42" (1070 mm) Reflective Cones, and  
Vertical Panels)  
(D-6-1112)**

Paragraph 2.d. of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- d. (1) Reflectorized drums used for traffic warning or channelization shall be constructed of lightweight, flexible, and deformable materials, be a minimum of 36 inches (900 mm) in height, and have a minimum width of 18 inches (450 mm), regardless of orientation. The predominant color of the drum shall be orange.
- (2) Steel drums shall not be used.

- (3) The markings on drums shall be horizontal, shall be circumferential, and shall display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white – fluorescent orange - white. The fluorescent orange sheeting shall meet the luminance requirements of the following table.

<b>FHWA Luminance Factor</b>			
Sheeting Type	Luminance Factor $Y_T$		
	Min	Max	Fluorescence Luminance Factor Limit, $Y_F$
Fluorescent Orange	25	None	15

- e. When approved by the Engineer or shown in the plans, 42" (1070 mm) reflective cones may be used in lieu of Type II Barricades or Reflectorized Drums. 42" (1070 mm) reflective cones shall include a 30-pound (14 kg) rubber base and display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white - fluorescent orange - white. 42" (1070 mm) reflective cones shall not be used for lane-closure tapers or shifts.
- f. Rubber base-mounted 36-inch vertical panels shall not be used for channelization when the speed limit exceeds 40 miles per hour.

Paragraph 2.b. of Subsection 422.04 of the Standard Specifications is void and superseded by the following:

- b. (i) Type II Barricades, Reflectorized Drums, and 42" (1070 mm) Reflective Cones shall be counted as "Barricades, Type II" and measured for payment by the number of calendar days each is in place and positioned as shown in the plans or as directed by the Engineer.
- (ii) Vertical Panels shall be measured for payment as permanent "Sign Days" (by the each) by the number of calendar days each vertical panel unit is in place and positioned as shown in the plans or as directed by the Engineer.

Paragraph 2.c. of Subsection 422.04 of the Standard Specifications is amended to include Reflectorized Drums.

Paragraphs 3. and 4. of Subsection 422.05 of the Standard Specifications are void and superseded by the following:

3. a. The pay item "Barricade, Type II" is used to pay for three items ("Barricades, Type II", "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums").
- b. "Barricades, Type II", which includes "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums", is paid for as an "established" contract unit price item. The established unit price is identified on the "Schedule of Items" shown in the Proposal.
4. Payment for vertical panels includes all posts, brackets, or hardware necessary to install and maintain the vertical panel units.



## **WORK ZONE TRAFFIC CONTROL SIGNS (D-6-1212)**

The Department has adopted the FHWA 2009 Manual of Uniform Traffic Control (MUTCD) and the 2011 Nebraska Supplement to the MUTCD as the official guidance for work zone traffic control signs. Many work zone traffic control signs have been revised, redesigned, or replaced in the 2009 MUTCD (and 2011 Nebraska Supplement). Accordingly, all work zone signs shall comply with the following:

- 1 - All signs, regardless of age, shall meet the design standards of the 2009 MUTCD (and 2011 Nebraska Supplement).

## **ASPHALTIC CONCRETE PAVEMENT SMOOTHNESS (E-5-1110)**

Section 502 in the Standard Specifications is void and superseded by the following:

### **502.01 – General**

1. This specification establishes a standard for asphaltic concrete pavement smoothness, and defines defective pavement smoothness. The intent of the specification is to produce a finished asphaltic concrete pavement driving surface with an International Roughness Index (IRI) no greater than 68 inches per mile for multi-lift roadways and no greater than 74 inches per mile for single-lift roadways. Pavement smoothness will be evaluated as prescribed in this section.
2. When the pay item "Asphalt Pavement Smoothness Testing I/D" is included in the contract, all the requirements of the following sections including the incentive/disincentive provisions shall apply.
3. When the pay item "Asphalt Pavement Smoothness Testing" is included in the contract, the incentive/disincentive provisions of this section do not apply, but the smoothness testing, evaluation, and pavement surface correction shall be performed as prescribed in this provision.
4. When the contract contains no item for smoothness testing, the asphaltic concrete pavement shall be evaluated in accordance with Paragraph 11. of Subsection 503.04.

### **502.02 – Equipment**

1. The Contractor shall furnish a non-contact inertial pavement profiler that meets the requirements of ASTM Standard E 950, verified by the manufacturer. The profiler must be approved by the Nebraska Department of Roads as specified in Section 502.03 of this provision.
2. The non-contact profiler may be a lightweight version or a high speed version.

3. The non-contact profiler shall be equipped with a computerized system that will record, analyze, and print the test data.
4. The non-contact profiler shall produce a printed pavement profile report. The report shall include the following information:
  - a. Project number
  - b. Test date
  - c. Traffic lane
  - d. Test direction
  - e. Test path
  - f. Pass number (1 for initial test; 2, 3, etc. for repeat runs)
  - g. Operator's name
  - h. Project stations
  - i. Data filter values
  - j. IRI values for each test section
  - k. Bump locations for each test section, as determined by California profilograph emulation.
5. The non-contact profiler must also produce and print profilograph emulation results that are consistent with results that would be obtained using a Department-approved California-style profilograph. The profilograph emulation shall be used to determine the locations of correctable bumps and/or dips, as specified in Paragraphs 1.b. and 1.c. of Subsection 502.05 in this provision.
6. Diamond grinding equipment used for surface correction shall be power driven, self-propelled units specifically designed to grind and texture pavements. The cutting head shall be at least 36 inches (0.9 m) wide and consist of many diamond blades with spacers. The Engineer may approve equipment with a narrower width for irregular and confined areas which will not accommodate larger equipment, and for bumps of limited number and area.

#### **502.03 – Certification and Independent Assurance Testing**

1. The Department shall calibrate and certify the Contractor's non-contact profiler annually at a test site established by the Department.
  - a. The non-contact profiler shall be inspected for compliance with general equipment requirements, including data analysis system, guidance system, and overall condition.
  - b. The non-contact profiler shall be calibrated for distance measurement by moving it over the prescribed path of a premeasured test distance to determine its distance calibration factor.
  - c. The non-contact profiler shall be checked for vertical measurement accuracy by performing the height measurement calibration procedure in AASHTO Designation PP 49-03, Certification of Inertial Profiling Systems, Section 6.
  - d. The non-contact profiler shall be checked for overall performance by driving it over the prescribed path of a pre-measured pavement test section at its normal operating speed.

- e. Distance measurement indicated by the non-contact profiler shall be within 0.2% tolerance of the actual pre-measured test section distance. To ensure accurate distance measurement during test runs, the air pressure of the distance measurement tire must always be maintained at the same level used for calibration.
  - f. The IRI reported by the non-contact profiler for the test section shall be within 10.0% tolerance of the IRI reported by a Nebraska Department of Roads non-contact profiler for the same test section.
  - g. A dated and signed decal will be placed on the non-contact profiler to certify its acceptability for use on Nebraska Department of Roads pavement construction projects. The certification expires one year from its issue date.
2. The Department shall certify the Contractor's non-contact profiler operator at least every 5 years. The operator may be certified by presenting certification from another State Highway Agency or by completing certification training conducted by the Nebraska Department of Roads.
  3. The Department shall schedule and perform Independent Assurance tests for the Contractor's non-contact profilers and operators at least once per construction season. Independent Assurance testing shall be conducted at a randomly selected time on an active construction project. The criteria for the test will be similar to those used for certification.

#### **502.04 – Profile Test Procedures**

1. The Contractor shall perform all pavement smoothness specification tests except the 10-foot (3 m) straight edge testing as shown in Paragraph 15. of this Subsection.
2. The Engineer shall furnish a report form to the Contractor identifying all required test sections.
  - a. The pavement surface shall be divided into lane-width segments that end at a bridge, railroad crossing, or other designated termini.
  - b. The lane-width segments shall be further divided into individual 528 feet long test sections in the direction of project stationing. The last test section in a segment is usually shorter than 528 feet.
  - c. If a test section is less than 300 feet long, it shall be combined with the preceding 528 feet long test section for analysis.
3. The Contractor's certified non-contact profiler operator shall perform smoothness specification tests in the Engineer's presence. Smoothness testing shall be performed during normal daylight working hours unless otherwise approved by the Engineer.
4. The asphaltic concrete pavement surface temperature shall be 150 degrees F (65 degrees C) or lower when smoothness tests are performed.

5. The non-contact profiler operator shall perform pavement smoothness measurements in the right-hand or left-hand wheel path of all driving lanes, as directed by the Engineer, including climbing and fly-by lanes. The wheel path is the path followed by the right or left wheels of a truck or car traveling in the center of a traffic lane. It is assumed to be 3 feet from the left or right lane lines. In urban areas, where inlet block-outs or manholes are in the right or left-hand wheel path, the pavement smoothness measurements shall be made in a location determined by the Engineer.
6. The Contractor shall remove all objects and foreign material from the pavement surface before testing, including any extra run-in and run-out lengths required for the non-contact profiler. Unless adequate traffic and personnel control is provided by the Contractor, the non-contact profiler must not be operated in active construction zones congested with construction equipment and/or personnel that could result in collision with the profiler.
7. The non-contact profiler operator shall guide the profiler along the specified wheel path of each traffic lane at a constant speed and directional path throughout the length of pavement being tested. The speed of the non-contact profiler must be within the speed range recommended by the manufacturer. Sudden changes in speed or direction during a test run will disqualify that test, and a new test must be performed. Confined pavement test sections that cannot be properly tested with a non-contact profiler shall be tested with a California-style profilograph approved by the Nebraska Department of Roads.
8. A lateral location indicator shall be used to align the non-contact profiler in the required test path during testing. Pavement edges, longitudinal joints, or longitudinal pavement markings may be used as reference lines.
9. Before testing, the non-contact profiler operator shall perform routine check procedures of the measurement system as recommended by the manufacturer. To ensure consistent distance measurement, the operator shall also check and adjust the distance recording wheel tire pressure several times a day.
10. All station references on the non-contact profiler reports shall be actual project stations. Stations shall be accurately noted on any printed profiles at least every 200 feet. The distance measured by the non-contact profiler shall compare within 0.2 percent of the actual distance tested, as determined using project stationing, for all testing and retesting runs. Test runs that do not compare within 0.2 percent will disqualify that test. New tests must be performed for all disqualified tests, following calibration of the distance measuring system.
11. Immediately after completion of the tests, the non-contact profiler operator and the Engineer shall sign any printed reports and profiles to verify their authenticity. The signed prints then become the property of the Department.
12. The Engineer shall perform or schedule verification tests on at least 10 percent of the lane miles of pavement surface, with a non-contact profiler owned by the Department.

13. If the verification test, Independent Assurance tests, or other observations indicate that the Contractor's procedures and/or results are not acceptable or accurate, the Engineer may do any of the following:
  - a. require the Contractor to calibrate the non-contact profiler and re-run the tests.
  - b. disqualify the Contractor's equipment and/or operator.
  - c. perform the tests for part, or all, of the project with a non-contact profiler owned by the Department, and charge the Contractor \$500.00 per lane mile for all testing done by the Department.
  
14. The following areas of pavement shall be excluded from the IRI requirements, unless otherwise specified in the Special Provisions.
  - a. Pavement on horizontal curves having a centerline radius of curvature of less than 1,000 feet, and pavement within the super elevation transition of such curves.
  - b. Pavement within 50 feet of a transverse joint that separates the pavement from an approach slab to a bridge deck or existing pavement not constructed under the contract.
  - c. Pavement for truck weigh stations or rest areas, acceleration/deceleration lanes, and interchange ramps and loops.
  - d. Pavement within 50 feet of railroad crossings and associated transitions.
  - e. Pavement with a posted speed limit of 45 miles per hour or less.
  - f. Pavement where the Engineer requires the Contractor to open an area prematurely to cross traffic at intersections and driveways.
  - g. Additional exceptions shown on the summary sheet in the plans.
  
15. Excluded pavement sections shall be measured for bumps and dips with either a profilograph, non-contact profiler, or a 10-foot straight edge. If the profilograph or non-contact profiler is used, the deviation shall not exceed 0.40 inch in a 25 ft. span. The deviation of the surface shall not exceed 1/8 inch if a 10-foot straightedge is used.
  
16. The Contractor shall complete all surface profile testing within 7 calendar days or 5 working days (whichever is later) after the completion of the mainline pavement. In addition, the following shall apply:
  - a. The initial (uncorrected) surface of all top-lift asphaltic concrete pavement sections shall be profile tested within 2 working days of being placed.
  - b. The surface of all asphaltic concrete pavement sections that receive corrective work shall be profile tested within 2 working days of the completion of this work.
  - c. The Contractor shall notify the Engineer of their intent to perform profile testing at least 2 calendar days prior to the testing (or as mutually agreed) to allow the Engineer to be present at the time of the testing.

- d. The Contractor shall allow the Engineer to witness all aspects of the profile testing, including traveling in the profiler conveyance vehicle.
- e. The profile test results shall be provided to the Engineer immediately after completion of the testing.

#### **502.05 – Evaluation**

1. The Contractor shall determine an IRI and the number of correctable bumps and dips for each test section, record the information on the report form, and provide a copy of the report to the Engineer.
  - a. The IRI shall be calculated by the non-contact profiler software using the quarter-car simulation. IRI shall be reported in units of inches per mile.
  - b. Correctable bumps shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Bumps will appear as high points on the printed profile, and correspond to high points on the pavement surface. Correctable bumps are vertical deviations on the pavement surface that exceed 0.40 inch in height above a base line span of 25 feet.
  - c. Correctable dips shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Dips will appear as low points on the printed profile, and correspond to low points on the pavement surface. Correctable dips are vertical deviations on the pavement surface that exceed 0.40 inch in depth below a base line span of 25 feet.

#### **502.06 – Pavement Surface Correction**

1. The Contractor shall locate and perform all required pavement surface corrective work, with the approval of, and in the presence of, the Engineer.
2. Corrective work may be required for any bump, dip, or a combination of bumps and dips or other roughness that, in the opinion of the Engineer, produces an objectionable ride. Corrective work shall be accomplished at no cost to the Department.
  - a. When the initial IRI of a test section is 96 in/mi or less, bump and dip correction is the only corrective work allowed for that section.
  - b. When the IRI of a test section exceeds 96 in/mi, corrective work shall be performed.
  - c. The Contractor shall retest all corrected test sections.
3. All bumps, as defined in Paragraph 15. of Subsection 502.04, and Paragraph 1.b. of Subsection 502.05, and all test sections with an IRI exceeding 96 in/mi shall be corrected by diamond grinding.
  - a. Bumps shall be considered corrected when they are at or below the 0.40 inch maximum height.

- b. Sections with an IRI exceeding 96 in/mi shall be considered corrected when the IRI for that section has been reduced to a value of 96 in/mi or less.
4. All dips, as defined in Paragraph 15. of Subsection 502.04, and Paragraph 1.c. of Subsection 502.05, shall be corrected until they are at or below the 0.40 inch (10 mm) maximum depth. All dips shall be corrected by diamond grinding on either or both sides of the dip.
  5. Pavement surface correction by diamond grinding shall be limited so that newly placed asphaltic materials are not reduced in thickness to less than the required plan thickness minus  $\frac{1}{4}$  inch. In the event that (a) bumps, (b) dips, or (c) test sections exceeding 96 in/mi cannot be corrected by diamond grinding to the specified limits without violating these thickness criteria, the Contractor shall have the following options that will be subject to the approval of the Engineer.
    - a. Remove and replace a sufficient length of the surface layer to correct the deficiency, under the following conditions:
      - (1) The Contractor shall furnish replacement material that meets the original specifications for the material removed.
      - (2) Removal and replacement shall be for the full lane width.
      - (3) The thickness of the replacement asphaltic materials shall be a minimum of 3 times the nominal aggregate size of the asphaltic concrete mixture.
    - b. A combination of diamond grinding and removal and replacement methods.
    - c. Elect to leave in place an uncorrected or partially corrected bump, dip, or test section exceeding an IRI of 96 in/mi, for a monetary deduction in accordance with Section 502.09.

#### **502.07 - Traffic Control**

The Contractor shall provide all traffic control for smoothness testing and corrective work at no cost to the Department.

#### **502.08 - Method of Measurement**

1. "Asphalt Pavement Smoothness Testing I/D" and "Asphalt Pavement Smoothness Testing" shall be measured on a lump sum basis.
2.
  - a. When the pay item "Asphalt Pavement Smoothness Testing I/D" is included in the contract, the unit price of the accepted quantity of asphaltic concrete pavement and performance graded binder in the surface layer of each non-contact profiler test section shall be adjusted according to the schedule in Table 502.01, subject to the limitations in Paragraphs 3. and 4. of this Subsection. Pavement sections excluded from this smoothness specification shall not qualify for incentive pay.
  - b. When the pay item "Asphalt Pavement Smoothness Testing" is included in the contract, the incentive/disincentive provisions of this Subsection do not apply.

**Table 502.01a.**

<b>Payment Adjustment Schedule (Multi-Lift Roadways)</b>	
<b>International Roughness Index (IRI) Inches Per Mile</b>	<b>Percent of Contract Prices</b>
0 to 37	107
Greater than 37 to 43	105
Greater than 43 to 49	103
Greater than 49 to 56	102
Greater than 56 to 68	100
Greater than 68 to 74	98
Greater than 74 to 80	96
Greater than 80 to 86	94
Greater than 86 to 93	92
Greater than 93 to 96	90
Greater than 96	Corrective Work Required

**Table 502.01b.**

<b>Payment Adjustment Schedule (Single-Lift Roadways)</b>	
<b>International Roughness Index (IRI) Inches Per Mile</b>	<b>Percent of Contract Prices</b>
0 to 37	107
Greater than 37 to 43	105
Greater than 43 to 49	103
Greater than 49 to 56	102
Greater than 56 to 74	100
Greater than 74 to 80	97
Greater than 80 to 86	95
Greater than 86 to 93	93
Greater than 93 to 96	90
Greater than 96	Corrective Work Required

3. When the initial IRI of a test section is 96 in/mi or less, that value shall determine the percent of incentive pay for the section, unless bump and dip correction performed in that section increases the percent of pay.
4. When the initial IRI of a test section is greater than 96 in/mi, corrective work performed in that section may increase the percent of pay up to the 100 percent level indicated in Table 502.01.



**502.09 – Basis of Payment**

- When the pay item “Asphalt Pavement Smoothness Testing I/D” is included in the contract, the overall pay factor for the accepted quantity of asphaltic concrete and performance graded binder in the surface layer of all non-contact profiler test sections shall be determined according to the formula in Table 502.02.

**Table 502.02a.**

<b>Pay Factor Formula (Multi-Lift Roadways)</b>	
<b><math>PF = \frac{A(1.07) + B(1.05) + C(1.03) + D(1.02) + E(1.00) + F(0.98) + G(0.96) + H(0.94) + I(0.92) + J(0.90)}{A + B + C + D + E + F + G + H + I + J}</math></b>	
Where:	
A	= Length of pavement with an IRI of 0 to 37 in/mi
B	= Length of pavement with an IRI greater than 37 to 43 in/mi
C	= Length of pavement with an IRI greater than 43 to 49 in/mi
D	= Length of pavement with an IRI greater than 49 to 56 in/mi
E	= Length of pavement with an IRI greater than 56 to 68 in/mi
F	= Length of pavement with an IRI greater than 68 to 74 in/mi
G	= Length of pavement with an IRI greater than 74 to 80 in/mi
H	= Length of pavement with an IRI greater than 80 to 86 in/mi
I	= Length of pavement with an IRI greater than 86 to 93 in/mi
J	= Length of pavement with an IRI greater than 93 to 96 in/mi

**Table 502.02b.**

<b>Pay Factor Formula (Single-Lift Roadways)</b>	
<b><math>PF = \frac{A(1.07) + B(1.05) + C(1.03) + D(1.02) + E(1.00) + F(0.97) + G(0.95) + H(0.93) + I(0.90)}{A + B + C + D + E + F + G + H + I}</math></b>	
Where:	
A	= Length of pavement with an IRI of 0 to 37 in/mi
B	= Length of pavement with an IRI greater than 37 to 43 in/mi
C	= Length of pavement with an IRI greater than 43 to 49 in/mi
D	= Length of pavement with an IRI greater than 49 to 56 in/mi
E	= Length of pavement with an IRI greater than 56 to 74 in/mi
F	= Length of pavement with an IRI greater than 74 to 80 in/mi
G	= Length of pavement with an IRI greater than 80 to 86 in/mi
H	= Length of pavement with an IRI greater than 86 to 93 in/mi
I	= Length of pavement with an IRI greater than 93 to 96 in/mi

2. a. The Contractor shall be assessed an additional \$500.00 deduction for each of the following uncorrected or partially corrected smoothness irregularities that are left in place.
  - (1) Bumps
  - (2) Dips
  - (3) Sections with an IRI value exceeding 96 in/mi, but less than 105 in/mi.
- b. The Contractor shall be assessed an additional \$1000.00 deduction for each uncorrected or partially corrected section with an IRI value of 105 in/mi or greater.
3. The work of "Asphalt Pavement Smoothness Testing I/D" and "Asphalt Pavement Smoothness Testing" shall be paid at the lump sum contract unit price. This price shall be full compensation for all smoothness testing as set forth in this specification.

**COLD WEATHER ASPHALTIC CONCRETE PLACEMENT  
(E-8-1214)**

Table 501.02 in the Standard Specifications is void and superseded by the following:

**Table 501.02**

<b>Cold Weather Asphaltic Concrete Placement</b>	
<u>Lift Thickness</u>	<u>Minimum Surface Temperatures*</u>
Less than 2 inches (50 mm)	<u>45°F (7°C)</u>
2 to 3 inches (50 mm to 75 mm)	<u>37°F (3°C)</u>
Greater than 3 inches (75 mm)	<u>35°F (2°C)</u>

\*32°F (0°C) for all lift thicknesses when a Warm Mix Additive is used in accordance with the contract.

**ASPHALTIC CONCRETE  
(E-8-1211)**

Paragraph 2.a.5.(ii) of Subsection 503.03 is void and superseded by the following:

During storage, the PG Binder temperature shall be maintained in accordance with binder supplier recommendations. All plants shall be equipped with a circulating system for PG Binder which is designed to assure proper and continuous circulation during the operating period. Storage tanks shall have sufficient capacity to provide for continuous operation. The tanks shall be situated and constructed to allow the volume of the PG Binder to be safely and accurately determined at any time.

Paragraph 2.a. of Subsection 503.04 is void and superseded by the following:

2. Asphalt Mix Control Strip:

a. At the Contractor's option, the control strip may be waived. The decision to omit the control strip must be communicated to the Engineer prior to the start of production. When the control strip is waived:

- (1) The moving average of four air voids values for the first three asphaltic concrete sublots is not valid and a pay factor of 1.0 shall be applied.
- (2) The first three asphaltic concrete sublots shall be subject to the following removal criteria and removal shall be at no cost to the Department.

Sublot	Removal Criteria
1-1	$V_{a_{1-1}}$ less than 1.5 or greater than 7.0
1-2	$(V_{a_{1-1}} + V_{a_{1-2}}) \div 2$ less than 1.67 or greater than 6.67
1-3	$(V_{a_{1-1}} + V_{a_{1-2}} + V_{a_{1-3}}) \div 3$ less than 1.83 or greater than 6.33

Where:  $V_{a_{1-1}}$  = the single test air voids for Sublot 1-1  
 $V_{a_{1-2}}$  = the single test air voids for Sublot 1-2  
 $V_{a_{1-3}}$  = the single test air voids for Sublot 1-3

- b. On the first production day, a 600 ton (544 Mg) control strip shall be placed and approved before full production begins. The Contractor shall construct the control strip using the approved asphalt mix design with laydown and compaction procedures that are representative for the project.
- c. The Contractor shall take at least 3 control strip mixture samples and record the test results for the mixture properties. The Contractor will also record compaction density values and rolling pattern information. This data will be for information only and shared with the Engineer.

Table 503.02 is void and superseded by the following:

**Table 503.02**

Control Strip Sampling			
Sample No.	Ton (Mg)	Air Voids for SPH	Air Voids for SPR
1	0 to 200 (0-180)	2.5 to 6.0	1.5 to 5.0
2	201 to 400 (181-363)	2.5 to 6.0	1.5 to 5.0
3	401 to 600 (364-544)	2.5 to 6.0	1.5 to 5.0

Paragraph 2.b.(2) of Subsection 503.04 is void and superseded by the following:

- (2) Marshall or Gyratory air voids of each sample shall be calculated using the maximum specific gravity of that sample.

Paragraph 2.b.(4) of Subsection 503.04 is void and superseded by the following:

The control strip will be accepted at 100% pay if all of the following test results are met. If any of the following test results are not met, the control strip will be subject to removal.

- (i) The Dust to Binder ratio is between 0.70 and 1.70.
- (ii) CAA is no more than 5% lower than the minimum specified shown on Table 1028.02 using blended cold feed material or ignition oven test results. FAA is no more than 0.5% lower than the minimum specified using blended cold feed material or no more than 1.0% lower than the minimum specified using ignition oven test results shown on Table 1028.03.
- (iii) Air voids are between 2.5% to 6.0% for SPH and between 1.5% to 5.0% for SPR.

Paragraph 2.h. of Subsection 503.04 is void.

Paragraph 2.j. of Subsection 503.04 is void and superseded by the following:

- j. When a control strip is constructed, the Contractor will use the three individual air void tests within the control strip and apply those individual values to the individual air void test result of the first 750 ton (680 Mg) subplot of Lot 1 to calculate the initial moving average of four and resulting pay factor for the initial 750 ton (680 Mg) subplot.

Paragraphs 5.a.(1) and 5.a.(3) of Subsection 503.04 are void and superseded by the following:

- a. (1) The actual mixing temperature shall be selected by the Contractor, in accordance with binder supplier recommendations, to provide adequate aggregate coating and mixture compaction at laydown.
- a. (3) Never shall the selection of the mixing temperature be such that drainage of the PG Binder from the aggregate will exceed contract specifications.

Paragraphs 10.a. and 10.b. of Subsection 503.04 are void.

Paragraphs 2.a. and 2.b.(1) of Subsection 503.06 are void.

Paragraph 2.b. (2) of Subsection 503.06 is void and superseded by the following;

- (2) For each subplot of Asphaltic Concrete Type SPR, SPS and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type \_\_\_\_\_". Included in a subplot, following approval of the control strip(s), may be any roadway Asphaltic Concrete Type SPR, SPS and SPH which is produced, sampled and tested and approved by the Engineer for use as Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type \_\_\_\_\_ unit price.

When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete sublots.

Paragraphs 5.a., 5.b., and 5.c. of Subsection 503.06 are void and superseded by the following:

5. a. When asphaltic concrete in any lot 3750 tons (3400 Mg) or portion of a lot 3750 tons (3400 Mg) is rejected and removed from the road, payment will not be made for the asphaltic concrete or for the PG Binder contained in the rejected material. The determination of the quantity of PG Binder for which payment will not be made will be based on the percent of PG Binder used in the rejected material.
- b. The order of precedence to determine the PG Binder quantity is:
  - (1) Actual lot 3750 tons (3400 Mg) tests.
  - (2) The average of the day's run.
  - (3) The job-mix formula.

Paragraph 12. of Subsection 503.06 void.

### **TACK COAT (E-8-1214)**

Subsection 504.02 in the Standard Specifications is amended to include the following:

**Table 504.01**

CFS-1, FS-1 Emulsified Asphalt Requirements	
Tests on emulsion:	Specification
Viscosity, Saybolt Furol, T 59, 25°C (77°F), sec.	20 – 100
Sieve Test, % Retained, maximum (note 1)	0.10
Residue by Distillation, %, minimum	57.0
Storage Stability, %, maximum (note 1)	1.0
Tests on distillation residue:	
Penetration, dmm.	40 - 175
Ductility, 25°C (77°F), cm., minimum	40
Solubility in Trichloroethylene, %, minimum	97.5
Note 1: See note "b" of AASHTO M 208 Shall be formulated as either a cationic or anionic, fast-setting emulsion that is suitable for tack coat dilution, and to have an accelerated breaking time in cooler temperature applications.	

Subsection 504.03, Paragraph 3.b. is void and superseded by the following:

- b. Emulsified asphalt shall be diluted in the distributor with potable water at a rate of one part water to one part emulsified asphalt.

Subsection 504.03, Paragraph 3.c. is void and superseded by the following:

- c. The rate of application shall be adequate to bond the new bituminous layer to the existing surface. This shall be from 0.10 to 0.20 Gal/SY (0.45 to 0.90 L/m<sup>2</sup>) when applied to existing or milled surfaces, and from 0.05 to 0.10 Gal/SY (0.23 to 0.45 L/m<sup>2</sup>) when applied to freshly laid asphaltic concrete.

Paragraph 2. of Subsection 504.05 is void and superseded by the following:

- 2. Any amount of tack coat emulsified asphalt which is outside the specified property ranges of Table 504.02, shall be paid for at the contract unit price multiplied by the pay factor determined in Table 504.02. If the resultant Pay Factor for the material indicates rejection as an option, the Engineer will determine if the non-compliant material will be removed.

**Table 504.02**

Tolerances and Pay Factors		
Specified Property	Tolerance	Pay Factor
AASHTO T 59, Prior to Dilution, Residue after Distillation	≥ 56.0%	1.00
	54.0% - 55.9%	0.85
	52.0% - 53.9%	0.70
	< 52.0%	0.40 or Reject
<p>Pay Factors for Tests for ALL other Properties Specified*</p> <p>1.00 for deviation of ± less than or equal to 10%</p> <p>0.75 for a deviation of ± greater than 10% to less than or equal to 25%</p> <p>0.40 or Reject for deviation of ± greater than 25%</p> <p>* When the specification requirement is stated as a percentage, the test result deviation from the specification will be divided by the specification value. The resulting deviation percentage is then applied to the listed criteria.</p> <p>Note: When more than one specified property exceeds specification tolerances, the single largest Pay Factor Reduction will be the one applied.</p>		

Paragraph 3. of Subsection 504.05 is void and superseded by the following:

3. When disputes arise in test results, the Department will select an independent laboratory for referee testing on the remainder of the sample. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing.
  - a. Only the Contractor can initiate dispute resolution, and request referee testing.
  - b. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the Department's, the Contractor will reimburse the Department for the cost of testing. If the independent lab's tests indicate that the material meets specifications or is at a pay deduction less than the Department's, the Department will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the Department's and the independent lab's deductions will be applied.

Paragraph 4. of Subsection 504.05 is void and superseded by the following:

4. Water used to dilute emulsified asphalt is subsidiary to "Tack Coat" and is included in the solution that is placed and measured for payment.

Subsection 504.05 is amended to include the following:

5. Payment is full compensation for all work prescribed in this Section.

### **BITUMINOUS PAVEMENT PATCHING (E-8-1212)**

Paragraphs 1, 2 and 3 of Subsection 516.05 in the Standard Specifications are void and superseded by the following:

1. a. Bituminous Pavement Patching of flexible pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by one of the methods described in Paragraph 1.b. based upon the depth of the patch.
  - b.(1) For patches 16-inches (40cm) deep or less, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type \_\_\_\_" required to complete the patch and repair any faulty subgrade. No equipment rental will be paid for this work, and all equipment used to complete the work shall be subsidiary to the item, "Asphaltic Concrete for Patching, Type \_\_\_\_."
  - b.(2) For patches more than 16 inches (40cm) deep, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type \_\_\_\_" required to complete the patch and repair any

faulty subgrade. Additionally, the hours of equipment rental required to complete the patching and repair in that portion of the patch deeper than 16-inches will be measured by the hour of equipment rental in accordance with Section 919. Only approved equipment needed to patch and excavate the failure is to be rented, and only the time utilized to perform the work in the region deeper than 16-inches (40 cm) is to be measured. Excluded is any equipment needed to haul asphalt to the site.

2. a. Bituminous Pavement Patching of concrete pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by the square yard (square meter) of completed and accepted work regardless of depth. Additionally, the asphaltic concrete used to complete the patch will be measured for payment and included with the roadway tonnage.
- b. Bituminous Pavement Patching of concrete pavement is divided into 3 types (see Table 516.02). The types are based on the size of the individual patches constructed in a single lane. If a damaged area spans 2 or more lanes, then the continuous patch will be counted as multiple patches -- 1 patch per lane.

**Table 516.02**

<b>Asphalt Patch Sizes in Rigid Pavement</b>	
<b>Type</b>	<b>Size</b>
A	5 SY (5 m <sup>2</sup> ) or less
B	Greater than 5 SY to 15 SY (5 m <sup>2</sup> to 12.5 m <sup>2</sup> )
C	Greater than 15 SY (12.5 m <sup>2</sup> )

3. "Asphaltic Concrete, Type \_\_\_\_\_," "Asphaltic Concrete for Patching, Type \_\_\_\_\_," "Asphalt Cement \_\_\_\_\_," and "Hydrated Lime for Asphalt Mixtures" used in either the patching of flexible pavement or concrete pavement will be measured for payment by the ton (megagram) in accordance with Subsection 503.05.

**DROP-OFF/COLD-MILLED TAPERED EDGE  
(E-8-0613)**

Paragraph 7. of Subsection 107.07 is void and superseded by the following.

7. a. The Contractor shall conduct all operations to minimize any drop-offs (abrupt changes in roadway elevation) exposed to traffic.
  - b.(1) Unless otherwise specified in the Contract, drop-offs greater than 2 inches tall at the shoulder edge that are adjacent to the traveled way shall be protected by a wedge of compacted stable material capable of carrying traffic (the wedge being 1 vertical to 3 horizontal or flatter). An edgeline warning stripe shall be placed on the traffic side of the drop-off.
  - (2) The Engineer shall authorize other methods, such as concrete barriers or Type II barricades, to protect drop-offs when conditions do not allow a wedge of compacted, stable material.



- (3) Unless otherwise ordered by the Engineer, drop-offs up to 2 inches (50 mm) may remain exposed with appropriate warning signs alerting motorists to the condition.
- c. Open trenches which span all or part of the traveled way and/or auxiliary lanes shall be no wider than 18 inches (450 mm) and must have a steel-plate cover placed and anchored over them. The plate shall have sufficient strength so as to only allow a maximum vertical deflection of 1/2 inch (12.5 mm). A wedge of suitable material shall create a smooth transition between the pavement and the steel plate. Warning signs shall be used to alert motorists to the presence of the steel plates.

Paragraph 3.b. of Subsection 510.04 is void and superseded by the following.

3. b. The Contractor shall not leave a milled vertical edge greater than 1-inch tall between lanes overnight. One of the following options shall be performed if the milling will result in a vertical grade separation greater than 1 inch (25 mm) between lanes:
- (1) Milling shall be performed in all adjacent traffic lanes on the same day so that at the end of each day, no drop off of over 1 inch (25 mm) remains.
- (2) The milling shall create a tapered edge between the traffic lanes. The tapered edge shall have a slope from 3 [H]: 1 [V] to 4 [H]: 1 [V], not measured more than one foot in width nor extend into the lane more than one foot. Temporary pavement marking shall be placed at the top and contiguous with the tapered edge.
- c. If the Contractor fails to complete the above options, the Contractor shall provide – at no cost to the Department – additional traffic control necessary to maintain traffic on the milled lane (or lanes) as directed by the Engineer. This additional traffic control may require the use of a pilot car, flaggers, lighted flagger station, etc.
- d. Transitions between milled and unmilled in the direction of travel surfaces will be feathered either by milling or with wedges of bituminous material (maximum slope 1 vertical to 12 horizontal).

### **OPTIONAL NOTCHED WEDGE JOINT (E-8-1013)**

#### **Description**

The Contractor has the option of constructing a notched wedge joint. If the Contractor chooses to construct this joint, it shall be built as shown on the plans and to the following requirements:

Paragraph 5.e. of Subsection 503.04 is void if a notched wedge joint is constructed between the adjacent traffic lanes.

This work shall consist of constructing a notched wedge longitudinal joint between adjacent passes of asphaltic concrete lifts over 1" on pavement that will be open to traffic and contains uneven lanes. The notched wedge joint shall consist of a vertical notch 1/2 the thickness of the asphalt lift, and an 8" to 12" uniform taper extending into the adjoining lane (see plan typical).

### **Equipment**

1. The notched wedge joint device shall be a manufactured strike-off device attached to the asphalt paver screed and able to produce the required shape and configuration after compaction, as detailed in the plan typical.
2. The device shall be self-adjusting, spring-loaded, and able to generate a smooth, uniform surface and slope without disrupting the smoothness of the paving mat.
3. The device shall be capable of applying vertical loads by pressure or ballasting methods.
4. The device may or may not have capability of vibration.

### **Construction Method**

1. The notched wedge joint device shall be heated prior to the beginning of laydown either manually or as part of the notched wedge joint device.
2. The notched wedge joint shall be constructed in one pass of the paver. A constant head of asphaltic concrete shall be supplied in front of the notched wedge to provide pre-compaction of the notched wedge joint.
3. The taper of the notched wedge joint will be a minimum of 8" and a maximum of 12".
4. The notched wedge joint shall be used at any longitudinal joint locations situated between two driving lanes. The Contractor also has the option to utilize the notched wedge joint at other longitudinal joint locations.
5. A tack coat shall be applied to the full face of the in-place notched wedge joint, prior to the placement of full lane tack coat application.

### **Method of Measurement**

The construction of a notched wedge joint will not be measured and paid for but will be subsidiary to the associated asphaltic concrete.

## CONCRETE SURFACE MILLING

Subsection 510.04 of the Standard Specifications is amended to include the following:

The Contractor shall use waterblasting equipment operated with sufficient consistent pressure to effectively clean the pavement surface of all dirt, foreign materials, loose surfacing material, and any residue before placement of the asphaltic concrete overlay. Care shall be taken to prevent any debris or construction materials from entering any inlets on the project that lead directly to:

1. waterways,
2. poorly-vegetated ditches, or
3. well-vegetated ditches having less than 200 feet between the conduit outlet and the point of discharge of the ditch into a waterway.

Inlets shall not be blocked or otherwise restricted in such a way to cause water to collect within an active traffic lane.

The concrete must be completely dry before placement of any asphaltic concrete on these areas.

Paragraph 11. of Subsection 510.04 of the Standard Specifications is void and superseded by the following:

The milled concrete material shall be stockpiled at sites provided by the State. There are 2 State provided stockpile sites one located at the junction of US-81 and N-84 and one on N-59 at approximate Reference Post 30 and they shall be used as directed by the Engineer.

The Concrete Repair work shall be performed prior to Concrete Surface Milling

When concrete milling is performed, the milling machinery shall be operated at a speed and rpm and utilize cutting teeth so as not to cause raveling or damage to the surface, including to prevent spalling at contraction joints.

## ULTRATHIN BONDED ASPHALT WEARING COURSE

### Description

1. a. UltraThin Bonded Asphalt Wearing Course is a Contractor-designed mix. UltraThin Bonded Asphalt Wearing Course will be referred to as UTBA in this specification. This project will use PG Binder 64-34 for the Superpave Asphaltic Concrete, Type SLX for the hot mix asphalt that is applied with a spray paver as described in this provision.
- b. The hot mix asphalt shall meet all the requirements of the Superpave Asphaltic Concrete and Standard Specifications.

## Material Characteristics

### Polymer Modified Emulsion Membrane

The anionic or cationic emulsion shall be polymer modified and shall be in accordance with one of the following:

<b>Anionic Polymer Modified Emulsion Membrane (PEM-1)</b>			
<b>Tests on Emulsion</b>	<b>Method</b>	<b>Min.</b>	<b>Max.</b>
Viscosity, Saybolt Furol @ 122 °F(50 °C), s	AASHTO T 59	25	125
Storage Stability Test <sup>a</sup> , (24 hr), %	AASHTO T 59		1
Sieve Test <sup>b</sup> , %	AASHTO T 59		0.3
Residue by Distillation <sup>c</sup> , %	AASHTO T 59	63	
Oil Distillate by Distillation, %	AASHTO T 59		2
Demulsibility, % (35ml, 0.02 N CaCl <sub>2</sub> )	AASHTO T 59	60	
<b>Tests on Residue from Distillation</b>			
Penetration	AASHTO 49	90	150
Elastic Recovery, %	AASHTO 301	60	

<b>Cationic Polymer Modified Emulsion Membrane (CPEM-1)</b>			
<b>Tests on Emulsion</b>	<b>Method</b>	<b>Min.</b>	<b>Max.</b>
Viscosity, Saybolt Furol @ 122 °F(50 °C), s	AASHTO T 59	25	125
Storage Stability Test <sup>a</sup> , (24 hr), %	AASHTO T 59		1
Sieve Test <sup>b</sup> , %	AASHTO T 59		0.3
Residue by Distillation <sup>c</sup> , %	AASHTO T 59	63	
Oil Distillate by Distillation, %	AASHTO T 59		2
Demulsibility, % (35ml, 0.8% dioctyl sodium sulfosuccinate)	AASHTO T 59	60	
<b>Tests on Residue from Distillation</b>			
Penetration	AASHTO 49	90	150
Elastic Recovery, %	AASHTO 301	60	

<sup>a</sup>After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout.

<sup>b</sup>The sieve test will be waived if successful application of the material has been achieved in the field.

<sup>c</sup>AASHTO T 59 shall be modified to include a 350°F ± 10°F (178°C ± 5°C) maximum temperature to be held for a period of 15 minutes.

## Construction Requirements

### 1. Weather Limitations

The UTBA mixture shall not be placed if the air temperature or the temperature of the surface on which the mixture is to be placed is below 50°F, the surface is wet or frozen, or weather conditions prevent the proper handling or finishing of the mixture.

2. Paver

The paver shall be capable of spraying the polymer modified asphalt emulsion membrane, applying the hot mix asphalt overlay and leveling the surface of the mat in a single pass. Wheels or other parts of the paving machine shall not come into contact with the polymer modified emulsion membrane before the hot mix asphalt overlay is applied. The screed shall have the ability to crown the pavement at the center and shall have vertically adjusted extensions to accommodate the desired pavement profile.

3. Surface Preparation

Immediately prior to placing the ultrathin bonded asphalt wearing surface, the roadway surface shall be thoroughly cleaned of all vegetation, loose material, dirt, mud and other objectionable material.

4. Application of membrane

The polymer modified emulsion membrane application shall be applied in accordance with the manufacturer's recommendations. The sprayer shall accurately and continuously monitor the rate of the spray and shall provide a uniform application across the entire width to be overlaid. Limits of the target application rate of the polymer modified emulsion shall be  $0.20 \pm 0.03$  gallons per square yard. The Engineer may make adjustments to the spray rate based on the existing pavement surface conditions and the recommendations of the polymer modified emulsion manufacturer.

5. Application of UltraThin Bonded Asphalt mixture

The UTBA shall be applied at a temperature of 290°F to 330°F and shall be spread over the polymer modified emulsion membrane immediately after application of the membrane. The asphalt mixture shall be placed over the full width of the membrane with a heated vibratory-tamping bar screed.

6. Handwork

For irregular areas where handwork placement is necessary, the hot UTBA mixture shall be placed within five minutes after the application of the polymer modified emulsion.

7. Rolling

Rolling of the UTBA mixture shall consist of no more than three passes immediately following the placement of the mixture with a steel, double-drum, asphalt roller with a minimum weight of 10 tons. All rolling shall be completed before the asphalt mixture temperature has fallen below 195°F. Rollers shall be equipped with a functioning water system and scrapers to prevent adhesion of the fresh mix onto the roller drum. Rolling shall be done in the static mode. Excessive rolling to the extent of aggregate degradation will not be permitted. The Engineer will determine the acceptable extent of fracturing at the edge of the pavement from the rolling operation. New pavement shall not be opened to traffic nor shall any roller sit idle on the pavement until the operations is complete and the material has been cooled below 140°F.

**Method of Measurement**

The UltraThin Bonded Asphalt Wearing Course shall be measured for payment in tons (Tn).

The Performance Graded Binder shall be measured for payment in tons (Tn).

**Basis of Payment**

All work, materials (including the Polymer Modified Emulsion Membrane) and placement shall be considered full compensation for this pay item as described in this provision.

<b>Pay Item</b>	<b>Pay Unit</b>
UltraThin Bonded Asphalt Wearing Course	Ton (Tn)
Performance Graded Binder 64-34	Ton (Tn)

Any bituminous mixture found contaminated by petroleum distillates or other asphalt solvents may be rejected.

**REMOVE ASPHALT SURFACING FROM PAVEMENT**

Section 203 of the Standard Specifications is amended to include the removal of asphalt patches, as directed by the Engineer, from existing concrete pavement surface.

Bituminous material produced from the removal operation shall become the property of the Contractor and removed from the project.

Subsection 203.03 is amended to provide for the measurement of Remove Asphalt Surfacing from Pavement in square yards.

Subsection 203.04 is amended to provide that the removing of asphalt surface shall be paid for at the contract unit price per square yard for the item "Remove Asphalt Surfacing from Pavement".

**SECTION 611 -- SEALING TRANSVERSE AND LONGITUDINAL CRACKS  
(F-15-0714)**

Section 611 in the Standard Specifications is void and superseded by the following:

**611.01 – Description**

1. This work shall consist of preparation and sealing of cracks located in Portland cement concrete roadway.

**611.02 -- Material Requirements**

1. The cracks shall be sealed with a hot-poured type joint sealing filler which conforms to the requirements of Section 1014.

**611.03 -- Construction Methods**

1. Preparation of Cracks:
  - a. New cracks ¼ inch (7 mm) and over in width shall be filled with crack sealing filler. Old cracks shall have existing crack sealing filler or other foreign material removed by sandblasting or other methods that provide a clean and dry surface.
  - b. The location of the cracks to be sealed will be designated by the Engineer.
2. Sealing Cracks:
  - a. The Contractor shall furnish the Engineer the manufacturer's recommendations for mixing, application and temperature restrictions seven days prior to work beginning. These recommendations shall be strictly followed. In no case shall the temperature exceed the maximum recommended by the manufacturer.
  - b. When proper pouring consistency is attained, the cracks shall be filled as shown in the contract through the use of a pressure type applicator equipped with a nozzle which will fit into the cracks.
  - c. The cracks shall be filled as shown in the contract to ¼ inch to 5/8 inch (7 mm to 16 mm) below the pavement surface.
  - d. Material spilled on surfaces of the pavement adjacent to the crack shall be cleaned away by the Contractor at no additional cost to the Department.
  - e. Cracks shall not be sealed until after any corrective work or Diamond Grinding and Texturing Concrete Pavement is completed.

**611.04 -- Method of Measurement**

Sealing cracks will be measured for payment by the linear foot (meter) of cracks sealed, measured to the nearest foot (meter) of sealed cracks, complete, in place and accepted by the Engineer.

**611.05 -- Basis of Payment**

- |    |                                   |  |
|----|-----------------------------------|--|
| 1. | <b>Pay Item</b><br>Sealing Cracks | <b>Pay Unit</b><br>Linear Feet (LF)<br>[Meter (m)] |
|----|-----------------------------------|--|
2. When sealant materials comply with the Specification requirement, crack sealing shall be paid for at the contract unit price per linear foot (meter).
    - a. When testing of on-site materials is outside of the specified property ranges, crack sealing shall be paid for at the contract unit price multiplied by the Pay Factor table below.
    - b. If the material is found to be out of specification, the material shall be rejected if not already used.

- c. If the Pay Factor is less than 1.00 and the material has been incorporated in work which is allowed to remain in place, the pay factor for the material is determined by the table below.

Pay Factor*	Specified Property
1.00	Deviation of up to (+/-) 5.0%
0.95	Deviation of (+/-) 5.1% to 10.0%
0.90	Deviation of (+/-) 10.1% to 15.0%
0.80	Deviation of (+/-) 15.1% to 20.0%
0.70	Deviation of (+/-) 20.1% to 25.0%
0.40 or Reject	Deviation of 25.1% or greater

- \* When the specification requirement is stated as a percentage, the test result deviation from the specification will be divided by the specification value. The resulting deviation percentage is then applied according to the above table.
- \* When more than one specified property exceeds specification tolerances, the largest pay factor reduction will be applied.
- \* Material not meeting a Pass/Fail requirement falls under the Pay Factor of 0.40 or Reject.

- d. Material that exhibits unacceptable field application will be rejected and removed from the NDR Approved Products List. Material already used shall be removed and replaced at no cost to the Department.
3. Dispute Resolution – If there is a dispute on Department testing results, the Contractor must notify the Department in writing within 30 days of being informed of the test results. The Department will select an approved independent laboratory to conduct the required referee testing. Samples for referee testing shall be obtained at the point of delivery. If the independent lab's tests indicate failure results, and pay deductions equal to or greater than the Department's, the Contractor will reimburse the Department for the costs of testing. If the independent lab's tests indicate that the material meets specifications, or is at a pay deduction less than the Department's, the Department will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the Department's and the independent lab's deductions will be applied.
4. Payment is full compensation for all work prescribed in this Section and all sealant manufacturer's requirements.



## **PORTLAND CEMENT CONCRETE PAVEMENT SMOOTHNESS (F-23-1112)**

Section 602 in the Standard Specifications is void and superseded by the following:

### **General**

1. This specification establishes a standard for Portland cement concrete pavement smoothness, and defines defective pavement smoothness. The intent of the specification is to produce a finished Portland cement concrete pavement driving surface with an International Roughness Index (IRI) no greater than 93 inches per mile.
2. Pavement smoothness will be evaluated as prescribed in this section when the pay item "Portland Cement Concrete Pavement Smoothness" is included in the contract.
3. When the pay item "Portland Cement Concrete Pavement Smoothness" is not included in the contract, the Portland cement concrete pavement shall be evaluated in accordance with Paragraph 9.b. of Subsection 603.03.

### **Equipment**

1. The Contractor shall furnish a non-contact inertial pavement profiler that meets the requirements of ASTM Standard E 950, certified by the manufacturer. The profiler must be approved by the Nebraska Department of Roads as specified in Subsection 602.03.
2. The non-contact profiler may be a lightweight version or a high speed version.
3. The non-contact profiler shall be equipped with a computerized system that will record, analyze, and print the test data. The profiler must also be equipped with a large-footprint height sensor specifically designed for surface profile measurements on textured Portland cement concrete surfaces.
4. The non-contact profiler shall produce a printed pavement profile report. The report shall include the following information.
  - a. Project number
  - b. Test date
  - c. Traffic lane
  - d. Test direction
  - e. Test path
  - f. Pass number (1 for initial test; 2, 3, etc. for repeat tests)
  - g. Operator's name
  - h. Project stations
  - i. Data filter values
  - j. IRI values for each test section

- k. Bump and dip locations for each test section, as determined by California profilograph emulation
- l. California profilograph emulation traces (profilograms) for each test section with correctable bumps or dips

### **602.03 – Certification and Independent Assurance Testing**

1. The Department shall calibrate and certify the Contractor's non-contact profiler annually at a test site established by the Department.
  - a. The non-contact profiler shall be inspected for compliance with general equipment requirements, including data analysis system, guidance system, and overall condition.
  - b. The non-contact profiler shall be calibrated for distance measurement by moving it over the prescribed path of a pre-measured test distance to determine its distance calibration factor.
  - c. The non-contact profiler shall be checked for vertical measurement accuracy by performing the height measurement calibration procedure described in Section 6 of AASHTO Designation PP 49-03, Certification of Inertial Profiling Systems.
  - d. The non-contact profiler shall be checked for overall performance by operating it over the prescribed path of a pre-measured pavement test section at its normal operating speed.
  - e. Distance measurement indicated by the non-contact profiler shall be within 0.2% tolerance of the actual pre-measured test section distance. To ensure accurate distance measurement during test runs, the air pressure of the distance measurement tire must always be maintained at the same level used for calibration.
  - f. The IRI reported by the non-contact profiler for the test section shall be within 10.0% tolerance of the IRI reported by a Nebraska Department of Roads non-contact profiler for the same test section.
  - g. A dated and signed decal will be placed on the non-contact profiler to certify its acceptability for use on Nebraska Department of Roads pavement construction projects. The certification expires one year from its issue date.
2. The Department shall certify the Contractor's non-contact profiler operator at least every 5 years. The operator may be certified by presenting certification from another state highway agency or by completing certification training conducted by the Nebraska Department of Roads.
3. The Department shall schedule and perform Independent Assurance tests for the Contractor's non-contact profilers and operators at least once per construction season. Independent Assurance testing shall be conducted at a randomly

selected time on an active construction project. The criteria for the test will be similar to those used for certification.

#### **602.04 – Profile Test Procedures**

1. The Contractor shall perform all pavement smoothness specification tests with a Department certified profiler.
2. The Engineer shall furnish a report form to the Contractor identifying all required test sections.
  - a. The pavement surface shall be divided into lane-width segments that end at a bridge, railroad crossing or other designated termini.
  - b. The lane-width segments shall be further divided into individual 528 feet long test sections, in the direction of project stationing. The last test section in a segment is usually shorter than 528 feet.
  - c. If a test section is less than 300 feet long, it shall be combined with the preceding 528 feet long test section for analysis.
3. The Contractor's certified non-contact profiler operator shall perform smoothness specification tests in the Engineer's presence.
4. Smoothness testing shall be performed during normal daylight working hours unless otherwise approved by the Engineer.
5. The non-contact profiler operator shall perform pavement smoothness measurements in the right-hand or left-hand wheel path of all driving lanes, as directed by the Engineer, including climbing and fly-by lanes. The wheel path is the path followed by the right or left wheels of a truck or car traveling in the center of a traffic lane. It is assumed to be 3 feet from the left or right lane lines. In urban areas, where inlet block-outs or manholes are in the right or left hand wheel path, the pavement smoothness measurements shall be made in a location determined by the Engineer.
6. The Contractor shall remove all objects and foreign material from the pavement surface before testing, including any extra run-in or run-out lengths required for the non-contact profiler. Unless adequate traffic and personnel control is provided by the Contractor, the non-contact profiler must not be operated in active construction zones congested with construction equipment or personnel that could result in collision with the profiler.
7. The non-contact profiler operator shall guide the profiler along the specified wheel path of each traffic lane at a constant speed and directional path throughout the length of pavement being tested. The speed of the non-contact profiler must be within the speed range recommended by the manufacturer. Sudden changes in speed or direction during a test run will disqualify that test, and a new test must be performed.

8. A lateral location indicator shall be used to align the non-contact profiler in the required test path during testing. Pavement edges, longitudinal joints, or longitudinal pavement markings may be used as reference lines.
9. Before testing, the non-contact profiler operator shall perform routine check procedures of the measurement system as recommended by the manufacturer. To ensure consistent distance measurement, the operator shall also check and adjust the distance recording wheel tire pressure several times a day.
10. All station references on the non-contact profiler reports shall be actual project stations. Stations shall be accurately noted on any printed profiles at least every 100 feet. The distance measured by the non-contact profiler shall compare within 0.2 percent of the actual distance tested, as determined using project stationing, for all testing and retesting runs. Test runs that do not compare within 0.2 percent will disqualify that test. New tests must be performed for all disqualified tests, following calibration of the distance measuring system.
11. Immediately after completion of the tests, the non-contact profiler operator and the Engineer shall sign any printed reports and profiles to verify their authenticity. The signed prints then become the property of the Department.
12. The Engineer shall perform or schedule verification tests on at least 10 percent of the lane miles of pavement surface, with a non-contact profiler owned by the Department.
13. If the verification test, Independent Assurance tests, or other observations indicate that the Contractor's procedures or results are not acceptable or accurate, the Engineer may do any of the following.
  - a. Require the Contractor to calibrate the non-contact profiler and re-run the tests.
  - b. Disqualify the Contractor's equipment or operator.
  - c. Perform the tests for part, or all, of the project with a non-contact profiler owned by the Department, and charge the Contractor \$500.00 per lane mile for all testing done by the Department.
14. The following areas of pavement shall be excluded from the IRI requirements, unless otherwise specified in the special provisions.
  - a. Pavement on horizontal curves having a centerline radius of curvature of less than 1,000 feet, and pavement within the superelevation transition of such curves.
  - b. Pavement within 50 feet of a transverse joint that separates the pavement from an approach slab to a bridge deck or existing pavement not constructed under the contract.
  - c. Pavement for truck weigh stations or rest areas, acceleration/deceleration lanes, and interchange ramps and loops.

- d. Pavement within 50 feet of railroad crossings and associated transitions.
  - e. Pavement with a posted speed limit of 45 miles per hour or less.
  - f. Mandated blockouts for access at intersections and driveways including 50 feet on either side.
  - g. Pavement that would require handwork by normal industry practices.
  - h. Additional exceptions shown on the summary sheet in the plans.
15. Excluded pavement sections shall be measured for bumps and dips with either a profilograph, non-contact profiler, or a 10-foot straight edge. If the profilograph or non-contact profiler is used, the bump or dip surface deviation shall not exceed 0.30 inch. The deviation of the surface shall not exceed 1/8 inch, if a 10-foot straightedge is used.

#### **602.05 – Evaluation**

- 1. The Contractor shall determine the IRI and number of correctable bumps and dips for each test section, record the information on the report form, and provide a copy of the report, along with the corresponding printed reports and profiles, to the Engineer.
  - a. The International Roughness Index (IRI) shall be calculated by the non-contact profiler software using the quarter-car simulation. IRI shall be reported in units of inches per mile.
  - b. Correctable bumps shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Bumps will appear as high points on the printed profile, and correspond to high points on the pavement surface. Correctable bumps are vertical deviations on the pavement surface that exceed 0.30 inch in height above a base line span of 25 feet.
  - c. Correctable dips shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Dips will appear as low points on the printed profile, and correspond to low points on the pavement surface. Correctable dips are vertical deviations on the pavement surface that exceed 0.30 inch in depth below a base line span of 25 feet.

**602.06 – Pavement Surface Correction**

1. The Contractor shall locate and perform all required pavement surface corrective work, with the approval of and in the presence of, the Engineer. Corrective work may also be required for any combination of bumps, dips, or other roughness that, in the opinion of the Engineer, produces an objectionable ride. The Contractor may also locate and perform voluntary corrective work as described in Paragraphs 2.b and 2.c of this Subsection.
  - a. Corrective work shall be accomplished by diamond grinding or by removal and replacement, at no cost to the Department.
  - b. Diamond grinding equipment used for surface correction shall be power driven, self-propelled units specifically designed to grind and texture pavements. The cutting head shall be at least 36 inches wide and consist of many diamond blades with spacers. The Engineer may approve equipment with a narrower width for irregular and confined areas which will not accommodate larger equipment and for bumps of limited number and area.
  - c. The Contractor shall re-test all corrected test sections with the non-contact profiler.
2. All bumps and dips, as defined in Subsection 602.05, Paragraphs 1.b and 1.c, shall be corrected until they are at or below the 0.30 inch limit. All dips shall be corrected by diamond grinding on either or both sides of the dip.
  - a. When the initial IRI of a test section is 93 in/mi or less, mandatory bump and dip correction is the only corrective work allowed for that section.
  - b. When the IRI of a test section exceeds 93 in/mi, the Contractor may perform voluntary corrective work in that section, in addition to mandatory bump and dip correction work.
  - c. When the IRI of a test section exceeds 124 in/mi, mandatory corrective work shall be performed to reduce the IRI of that section to a value of 124 in/mi or less. The Contractor may perform voluntary corrective work in that section, in addition to mandatory work.
  - d. Dip correction by diamond grinding shall not reduce the pavement thickness to less than the required plan thickness minus  $\frac{1}{4}$  inch.
3. When pavement removal and replacement is used for correction, the Contractor shall furnish the replacement material and construction at no cost to the Department.
  - a. All replacement material shall meet the original specifications for the material removed.
  - b. Removal and replacement shall be for the full lane width for a distance determined by the Engineer.

- c. Replacement material must meet the same smoothness requirements as the removed pavement.

#### 602.07 - Traffic Control

1. The Contractor shall provide all traffic control for smoothness testing and corrective work at no cost to the Department.

#### 602.08 – Method of Measurement

1. The unit price of the accepted quantity of Portland cement concrete pavement in each profile test section shall be adjusted according to the schedule in Table 602.01, subject to the limitations in Paragraphs 2, 3 and 4 of this Subsection. Pavement sections excluded from this smoothness specification shall not qualify for incentive pay.

**Table 602.01**

<i>Payment Adjustment Schedule</i>	
<b>IRI Inches Per Mile</b>	<b>Percent of Contract Prices</b>
0 to 43	106
Greater than 43 to 56	104
Greater than 56 to 68	102
Greater than 68 to 93	100
Greater than 93 to 99	98
Greater than 99 to 105	96
Greater than 105 to 111	94
Greater than 111 to 117	92
Greater than 117 to 124	90
Greater than 124	Corrective work required

2. When the initial IRI of a test section is 93 in/mi or less, that value shall determine the percent of incentive pay for the section, except that any mandatory correction work performed in that section may increase the percent of pay up to the 106 percent level indicated in Table 602.01.
3. When the initial IRI of a test section is greater than 93 in/mi, mandatory or voluntary corrective work performed in that section may increase the percent of pay up to the 100 percent level indicated in Table 602.01.
4. When the initial IRI of a test section is greater than 124 in/mi, mandatory and voluntary corrective work performed in that section may increase the percent of pay up to the 100 percent level indicated in Table 602.01.

**602.09 – Basis of Payment**

1. The overall pay factor for the accepted quantity of Portland cement concrete pavement in all profile test sections shall be determined according to the formula in Table 602.02.

**Table 602.02****Pay Factor Formula**

$$\text{PF} = \frac{A(1.06) + B(1.04) + C(1.02) + D(1.00) + E(0.98) + F(0.96) + G(0.94) + H(0.92) + I(0.90)}{A + B + C + D + E + F + G + H + I}$$

Where:

- A = Length of pavement with an IRI of 0 to 43 inches per mile.
- B = Length of pavement with an IRI greater than 43 to 56 inches per mile.
- C = Length of pavement with an IRI greater than 56 to 68 inches per mile.
- D = Length of pavement with an IRI greater than 68 to 93 inches per mile.
- E = Length of pavement with an IRI greater than 93 to 99 inches per mile.
- F = Length of pavement with an IRI greater than 99 to 105 inches per mile.
- G = Length of pavement with an IRI greater than 105 to 111 inches per mile.
- H = Length of pavement with an IRI greater than 111 to 117 inches per mile.
- I = Length of pavement with an IRI greater than 117 to 124 inches per mile.

2. The work of smoothness testing shall be paid for at the lump sum contract unit price. This price shall be full compensation for all smoothness testing as set forth in this specification.

**SECTION 612 -- SEALING TRANSVERSE AND  
LONGITUDINAL JOINTS  
(F-24-0714)**

Section 612 in the Standard Specifications is void and superseded by the following:

**612.01 -- Description**

This work shall consist of the preparation and sealing of transverse and longitudinal joints and joints around existing concrete repairs in the concrete roadway.



### **612.02 -- Material Requirements**

1. The joints shall be sealed with hot-pour type joint sealing filler which conforms to the requirements of Section 1014.

### **612.03 -- Construction Methods**

1. Preparation of Joints
  - a. All joints shall be prepared by removing old joint sealing filler or other foreign material by diamond-blade sawing or other suitable method which will produce acceptable results. Details of the joints are shown in the contract. If the method of removing the old joint sealing filler creates a slurry, the joint shall be flushed with water to remove the slurry.
  - b. Immediately prior to sealing, the joints shall be sandblasted to remove any loose joint sealing filler or other foreign material remaining in the joint or adhering to internal surfaces of the joint after the initial preparation. The joints shall be dry and clean at the time of sealing.
2. Sealing Joints
  - a. The Contractor shall furnish the Engineer, the manufacturer's recommendations for mixing, application and temperature restrictions 7 days prior to work beginning. These recommendations shall be strictly followed. For hot pour material, in no case shall the sealing filler temperature exceed the maximum recommended by the manufacturer.
  - b. The joints shall be filled as shown in the contract to ¼ inch to 5/8 inch (3 mm to 6 mm) below the pavement surface. When proper pouring consistency is attained, the joints shall be filled as shown in the contract through the use of a pressure type applicator equipped with a nozzle which will fit into the joints.
  - c. Material spilled on surfaces of the pavement adjacent to the joint or overfilling the joint will be cleaned away by the Contractor at no additional cost to the Department.
  - d. Joints shall not be sealed until after any corrective work or Diamond Grinding and Texturing Concrete Pavement is completed. Formed joint wells that are destroyed shall be re-constructed, and joints of insufficient depth shall be deepened prior to sealing.

### **612.04 -- Method of Measurement**

1. Sealing joints will be measured for payment by the linear foot (meter) of joints sealed, measured to the nearest foot (meter) as sealed, complete, in place and accepted by the Engineer.
2. "Sealing Concrete Repair Joints" is for those existing repairs that do not abut transverse and longitudinal joints. The work "Sealing Concrete Repair Joints" that abut existing

transverse and longitudinal joints is included in the quantity of “Sealing Joints”, as shown in the contract.

**612.05 -- Basis of Payment**

1.	<b>Pay Item</b> Sealing Joints	<b>Pay Unit</b> Linear Foot (LF) [Meter (m)]
	Sealing Concrete Repair Joints	Linear Foot (LF) [Meter (m)]

2. When sealant materials comply with the Specification requirement, joint sealing shall be paid for at the contract unit price per linear foot (meter).
  - a. When testing of on-site materials is outside of the specified property ranges, joint sealing shall be paid for at the contract unit price multiplied by the Pay Factor table below.
  - b. If the material is found to be out of specification, the material shall be rejected if not already used.
  - c. If the pay factor is less than 1.00 and the material has been incorporated in work which is allowed to remain in place, the pay factor for the material is determined by the table below.

Pay Factor*	Specified Property
1.00	Deviation of up to (+/-) 5.0%
0.95	Deviation of (+/-) 5.1% to 10.0%
0.90	Deviation of (+/-) 10.1% to 15.0%
0.80	Deviation of (+/-) 15.1% to 20.0%
0.70	Deviation of (+/-) 20.1% to 25.0%
0.40 or Reject	Deviation of 25.1% or greater

- \* When the specification requirement is stated as a percentage, the test result deviation from the specification will be divided by the specification value. The resulting deviation percentage is then applied according to the above table.
- \* When more than one specified property exceeds specification tolerances, the largest pay factor reduction will be applied.
- \* Material not meeting a Pass/Fail requirement falls under the Pay Factor of 0.40 or reject.

- d. Material that exhibits unacceptable field application will be rejected and removed from the NDR Approved Products List. Material already used shall be removed and replaced at no cost to the Department.

3. Dispute Resolution – If there is a dispute on Department testing results, the Contractor must notify the Department in writing within 30 days of being informed of the test results. The Department will select an approved independent laboratory to conduct the required referee testing. Samples for referee testing shall be obtained at the point of delivery. If the independent lab’s tests indicate failure results, and pay deductions equal to or greater than the Department’s, the Contractor will reimburse the Department for the costs of testing. If the independent lab’s tests indicate that the material meets specifications, or is at a pay deduction less than the Department’s, the Department will assume the cost of testing. When the independent lab’s tests indicate a pay deduction, the lesser of the Department’s and the independent lab’s deductions will be applied.
4. Payment is full compensation for all work prescribed in this Section.

**SECTION 605 -- CONCRETE PAVEMENT REPAIR**

Section 605 of the Standard Specifications is void and superseded by the following:

**605.01 – Description**

1. This work shall consist of repairing Portland cement concrete pavement at the locations shown in the contract or as designated by the Engineer. The work shall include removing deteriorated concrete, disposing of the old concrete, preparation of the repair area, and furnishing, placing, finishing and curing the concrete.
2. Concrete pavement repairs are grouped into 3 types based on the surface area of the patch (see Table 605.01). If a pavement failure extends across more than one lane, each lane will be counted as a separate repair.

**Table 605.01**

<b>PCC Pavement Repair Groups</b>	
<u>Type</u>	<u>Size Square Yards or m<sup>2</sup></u>
A	Less than 5
B	5 to 15
C	More than 15

3. Full width concrete pavement repairs shall be a minimum of 4 feet (1.2 m) in length.
4. Removal of concrete for partial depth pavement repair shall be to the depth necessary to reach sound concrete. The minimum depth of removal shall be 3 inches (75 mm), or as shown in the contract.
5. Full depth pavement repair shall be constructed on a prepared subgrade or foundation course as prescribed in the contract. The thickness of the new concrete pavement will be as shown in the contract, or 2 inches thicker than the adjacent pavement, if not shown in the contract.

## 6. Special Prosecution:

- a. When performing concrete pavement repairs on 2-lane roadways, the Contractor shall have all lanes open to traffic before sunset and at times when the Contractor is not working. Where the pavement has been removed and the Contractor is unable to complete the required patching in time for the concrete to obtain the full curing time required prior to opening the section of the road to traffic, the excavation shall be filled with a commercially available cold-mix bituminous mixture, or other suitable temporary patch material with a durable surface. The Contractor will be required to maintain traffic flow across these patches while they are in service. When it is necessary to use temporary patches, they shall be removed, the excavation cleaned out, and the required permanent patch placed, within 48 hours, unless otherwise directed by the Engineer. The temporary patches will be at no cost to the Department.
- b. When performing concrete pavement repairs on multi-lane highways, the Contractor will be permitted to have one lane closed during repairs. Repairs shall not be left open overnight. Where the pavement has been removed, and the Contractor is unable to complete the required patch before sunset, the Contractor shall fill the excavated area with either: (1) the appropriate patching concrete material for curing overnight, or (2) a suitable material with a durable surface. When it is necessary to use temporary patches, they shall be removed, the excavation cleaned out, and the required permanent patch placed, within 48 hours, unless otherwise directed by the Engineer. The temporary patches will be at no cost to the Department.

**605.02 -- Material Requirements**

1. a. Repairs shall be made with Class PR1-3500 (PR1-25 MPa) or Class PR3-3500 (PR3-25 MPa) Concrete from Sta. 505+30 to Sta. 1024+44.
- b. Repairs shall be made with Class 47B-3500 (47B-25 MPa) or Class 47B-HE-3500 (47B-HE-25 MPa), if the contract allows for lane closures or detours to accommodate the extended curing period at the following locations:

Sta. 113+58 to Sta. 161+36	North Bound
Sta. 113+58 to Sta. 167+30	South Bound

2. All materials shall be furnished by the Contractor and shall conform to the requirements in Table 605.02.

**Table 605.02**

<b>Material Requirements</b>	
<b>Applicable Materials</b>	<b>Section</b>
Portland Cement Concrete.....	1002
Aggregates.....	1033
Fly Ash.....	1008
Curing Compounds (Without Asphalt Overlay) .....	1012
Curing Compounds (With Asphalt Overlay) .....	1013
Joint Sealing Filler.....	1014
Admixtures .....	1007
Water .....	1005
Epoxy Compounds & Adhesives.....	1018

**605.03 – Equipment**

1. A mobile mixer conforming to the requirements of Section 1002 may be used.
2. Adequate hand tools shall be provided, including an internal vibrator.
3. Screeds, either mechanical or hand operated, shall be used to finish the concrete except for small patches and curb repair. The screeds shall be either a vibrating or roller type screed specifically designed for striking off concrete.
4. Internal vibrators shall meet the requirements of Section 601
5. Drills for dowels or tie bars, shall be capable of drilling the appropriate sized hole parallel to the surface of the concrete and the longitudinal centerline within 1/8 inch.

**605.04 -- Construction Methods**

1. Removals General Requirements
  - a. The Contractor shall remove the concrete pavement and curbs if applicable without damaging the adjacent concrete pavement and curbs.
  - b. The Contractor shall remove and dispose of all old pavement, reinforcing steel, and all other materials.
    - (1) The repair section shall be removed with minimum disturbance of the underlying foundation course. Any loosened foundation course material shall be removed and replaced with concrete.
  - c. If reinforcing fabric is encountered, it shall not be replaced.

- d. The Contractor shall cut around the perimeter of the repair area as shown in the contract.
  - (1) All repairs shall be cut so the edges are parallel or perpendicular to the traveled way.
  - (2) Curb repairs shall be cut a minimum of 2 inches (50 mm) in depth with a diamond saw and breaking back the remaining thickness to form vertical edges on the existing concrete.
  - (3) Saw over-cuts shall be kept to a minimum.
- e. The Contractor shall use hand or pneumatic tools to remove the concrete pavement. If the patch is full depth Type C, then a drop hammer may be used to remove the pavement.
- f. When tie bars in longitudinal joints are damaged during concrete removal, they shall be replaced by the Contractor at no additional cost to the Department with reinforcing bars [No. 5 (16 mm in diameter) bars that are 18 inches (450 mm) in length]. The new tie bars shall be installed into holes drilled in the existing concrete and secured in place with a non-shrink grout or epoxy on the NDR Approved Products List.

## 2. Preparation

### a. General

- (1) The repair sections shall be removed to the lines designated by the Engineer, including reinforcement that interferes with the operations.
- (2) Foundation course replacement consists of removing and disposing of foundation course (i.e., bituminous, cement treated, crushed concrete, granular) or subgrade below the concrete pavement, which excludes the additional 2 inch (50 mm) of removal, as shown in the contract. The wheel-type cutter shall be operated to produce minimum disturbance of the foundation course material, with no encroachment of the cut into the concrete of the adjoining lane.
  - (i) When the Engineer determines that the foundation course or subgrade needs replacing, the Contractor shall remove and dispose of the foundation course or subgrade, prepare the subgrade, and replace these materials with concrete of the same type used for the repair. The additional depth of concrete required shall be placed monolithically with the joint repair or pavement repair concrete.
- (3) The Contractor shall compact the subgrade or foundation course under full depth patches to the maximum density achievable.
- (4) A bond breaker shall be used as shown in the contract.
- (5) The subgrade shall be uniformly wetted before placing the concrete.
- (6) Where the repair area is not bordered by existing concrete pavement, a form shall be used as the pavement edge to provide the same surface elevation and edge alignment as the existing pavement. The form shall be supported or braced in position to prevent movement during the placement and finishing of the concrete. Forms for concrete pavement repair shall conform to the requirements of Subsection 603.03.

b. Preparation full depth with dowels or tie bars

- (1) Removal shall extend across the existing joint a minimum of 2 feet (600 mm) into the adjacent panel in doweled concrete.
- (2) Dowel bars or tie bars shall be anchored into the faces of the existing concrete as designated in the contract.
- (3) The dowel bar holes shall be drilled at the same plane  $\pm$  1/8 inch and at the spacing shown in the contract.
- (4) The tie bar holes can be drilled independently.
- (5) The drilled holes shall be thoroughly cleaned with compressed air to remove all dust, dirt, loose material and moisture.
- (6) After cleaning and prior to dowel or tie bar insertion, an application of grout or Type IV, Grade 3 epoxy shall be made at the back of the hole. The grout or epoxy shall be from the Approved Products List. Twist the dowel or tie bar one full turn during insertion to completely surround it with the grout or epoxy. Retention disks shall be placed on the bars as designated in the contract. The furnishing and installation of dowel and tie bars will not be paid for directly but shall be considered subsidiary to the concrete pavement or joint repair work being performed.
- (7) For the new matching transverse joints on repairs that span existing joints, the dowel baskets shall be placed parallel to the joint, and the dowel bars shall be parallel to centerline.

c. Preparation partial depth

- (1) For partial depth repairs, the Contractor shall cut and chip the pavement edges with a 15 pound (6.8 kg) maximum chipping hammer to form reasonably neat vertical surfaces.
- (2) All surfaces, including the bottom, of the partial depth concrete repairs shall be free from loose concrete, sand, and other debris and shall be maintained in a dry and clean condition.
- (3) All surfaces shall be cleaned and dry before the bonding agent is applied.
  - (i) The bonding agent shall be a Type IV, Grade 2 Epoxy Adhesive on the Approved Products List.
  - (iii) The bonding agent shall be applied to all surfaces, including the bottom. The vertical faces of the transverse joints, longitudinal joints, or cracks exposed in the repair shall not be coated with the bonding agent.

3. Placing and Finishing

- a. The Contractor shall furnish and place the concrete. The concrete shall be handled and consolidated so there will be no separation of the aggregate and the mortar.
- b. An internal vibrator shall be used to consolidate the concrete.
- c. A vibrating screed shall be used on a full depth concrete repair, that is 5 feet or wider, to finish the concrete to the final elevation.

- d. The concrete shall be floated with a magnesium bull float and then given a drag finish with wet burlap, carpet, or canvas in a direction parallel to the traffic flow. If the surface is not to receive an overlay or smoothness grinding, it shall be tined to match the existing surface.

4. Joints

- a. The Contractor shall create joints in full depth repairs as shown in the contract.
- b. When pavement and joint repairs will not be overlaid, all sawcuts, transverse joints, and longitudinal joints shall be thoroughly cleaned with compressed air to remove all dust, dirt, loose material and moisture, and sealed with hot pour joint sealant.
- c. Random cracks which develop in the new concrete repair that will not be overlaid with asphaltic concrete shall be routed and sealed.
- d. Joints shall not be sealed until after any corrective work or Diamond Grinding and Texturing Concrete Pavement is completed. Formed joint wells that are destroyed shall be re-constructed, and joints of insufficient depth shall be deepened prior to sealing.

5. Curing

- a. The Contractor shall apply curing compound to all concrete pavement repairs. The cure compound shall be applied immediately after each patch is completed.
  - (1) When pavement and joint repairs are overlaid with asphaltic concrete, the curing method shall be with tack coat. An approved asphalt emulsion or bituminous based compound may be used with approval of the Engineer.
  - (2) White pigmented curing compound shall be used when the repair will be the wearing surface. The application rate shall be 1 Gal/150 SF (0.4 L/m<sup>2</sup>).
- b. Class PR1-3500 (PR1-25) or PR3-3500 (PR3-25) concrete pavement repairs shall be covered with polyethylene film and then insulation board or insulated blankets immediately after the curing compound has been applied.
  - (1) The insulation board and insulated blankets shall have an R-value (thermal resistance) equal to or greater than 5 ft<sup>2</sup>-hr-°F/BTU [1.0 m<sup>2</sup>(°C/W)].
  - (2) Insulation and polyethylene film shall be maintained until concrete reaches opening strength.
- c. Class PR1-3500 (PR1-25 MPa) or PR3-3500 (PR3-25 MPa) concrete pavement repairs shall not be opened to traffic until the compressive strength reaches 3500 psi (25 MPa). This will be determined by use of Maturity Method or cylinders, at the discretion of the Engineer. Table 605.03 is a guide to the minimum time the PR-3500 Concrete will reach a compressive strength of 3,500 psi.



**Table 605.03**

<b>(Class PR1-3500 [25 Mpa] and PR3-3500 [25 Mpa])</b>	
<b>Minimum Ambient Air Temperature [°F (°C)]</b>	<b>(Hours)</b>
Below 41 (5° C)	12
41 – 60 (5°-16°C)	8
Above 60 (16°C)	4

- (1) Concrete shall not be placed when ambient air temperatures are expected to drop below 40 °F (4° C) during the cure period.
  - (2) Class PR3 Concrete shall be used for all concrete repair if the repaired areas must be opened to traffic within 24 hours, except that Class PR1 Concrete may be used provided the minimum required strength can be attained within the allotted time.
  - (3) Strength measurements for the opening and the 24-hour pay strengths of the PR1 and PR3 Concrete may be performed using the Maturity Method or cylinders, at the discretion of the Engineer.
- d. Class 47B-3500 (47B-25 MPa) or Class 47B-HE-3500 (47B-HE-25 MPa) concrete pavement repairs shall not be opened to traffic until the compressive strength reaches 3,500 psi (25 MPa) as determined by the Maturity Method or cylinders, at the discretion of the Engineer. Table 605.04 is a guide to the minimum time the 47B-3500 Concrete will reach a compressive strength of 3,500 psi.
- (1) Concrete shall not be placed when ambient air temperature is expected to drop below 40°F (4°C) during the cure period.

**Table 605.04**

<b>(Class 47B-3500 25 MPa)</b>	
<b>Minimum Ambient Air Temperature [°F (°C)]</b>	<b>(Hours)</b>
Below 41 (5° C)	120
41 – 60 (5°-16°C)	72
Above 60 (16°C)	48

## 6. Smoothness

- a. The pavement elevation of repair areas shall be corrected in a manner that eliminates dips or bumps. Dips and bumps are defined as having a 1/8 inch or greater deviation using an approved 10 foot straightedge. If the repair will be the wearing surface, the correction shall be diamond grinding or replacement. If the repair will be overlaid, the correction shall be milling, diamond grinding or replacement. The condition of the adjacent pavement shall be considered when evaluating the 1/8 inch deviation requirement.

7.
  - a. Disturbed or damaged areas in the existing surfaced shoulder resulting from the repair operation shall be repaired by the Contractor at no additional cost to the Department.
  - b. Damaged areas of the surfaced shoulders shall be removed by sawing.
  - c. The shoulder shall be repaired with the same material as the existing shoulder or as directed by the Engineer.

**605.05 -- Method of Measurement**

1.
  - a. The quantity of each type of concrete pavement repair and joint repair are measured in cubic yards (meters) of pavement replaced in each separate lane.
  - b. Concrete pavement repairs that adjoin full depth repair areas of varying widths in the same traffic lane which are situated such that the removals of the areas may be accomplished concurrently, shall be considered as a single repair. The total area of the adjoining areas shall be combined to determine the repair type as shown in Table 605.01.
  - c. Joint repairs that the final measurement is in excess of 9 feet in length will be paid for as the appropriate pavement repair item.
  - d. The quantity of curb repair is measured in linear feet.
2. "Foundation Course Replacement" will be measured by the cubic yard of foundation course replaced.

**605.06 -- Basis of Payment**

1.	<b>Pay Item</b>	<b>Pay Unit</b>
	Concrete Curb Repair	Linear Foot (LF) [Meter (m)]
	Concrete Pavement, _____ Joint Repair	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
	Concrete Pavement Repair, Type A, Full Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
	Concrete Pavement Repair, Type B, Full Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
	Concrete Pavement Repair, Type C, Full Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
	Concrete Pavement Repair, Type A, Partial Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]

Concrete Pavement Repair, Type B, Partial Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
Concrete Pavement Repair, Type C, Partial Depth	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]
Foundation Course Replacement	Cubic Yard (CY) [Cubic Meter (m <sup>3</sup> )]

2. When the Engineer directs that partial depth concrete pavement repairs be constructed with a thickness greater than what is shown in the contract, an adjustment will be made to provide compensation for the work. The adjustment will be as follows:

$$\text{Adjusted Unit Price} = \text{Bid Price} \times \frac{\text{(Actual Thickness Placed)}}{\text{(Thickness shown in the contract)}}$$

3. a. The 24-hour compressive strength shall be used to determine pay factor deductions for PR concrete in accordance with Table 603.03.
- b. The 28-day compressive strength of each day's production will be determined from cylinder strength tests for 47B Concrete.
- (1) Payment shall be reduced by the amount prescribed in Table 603.03.
- (2) For 47B Concrete, if the 28 day strength fails, the Contractor has the option to take 3 core samples at no additional cost to the Department. The average compressive strength of these cores will be used to determine the actual 28-day compressive strength of each day's production.
- (i) Cores must be taken within 45 days from the date the concrete was poured.
- (ii) The Engineer shall select the site where the cores will be taken.
4. "Foundation Course Replacement" will be paid for at the contract unit price per cubic yard for the item "Foundation Course Replacement". This price shall be full compensation for removing and disposing of the old foundation course, preparation of the subgrade, furnishing and placing the replacement concrete, and for all labor, equipment, tools and incidentals necessary to complete the work.
5. The sealing of all random cracks or joints will not be measured and paid for directly but shall be considered subsidiary to the joint or pavement repair work being performed.
6. Payment is full compensation for all work prescribed in this Section.

## **CROSS STITCHING**

### **Description**

This work shall consist of strengthening the pavement structure by cross stitching the longitudinal joints, as shown in the plans, or designated by the Engineer. The work shall include drilling the holes, placing the new tie bars, and filling the holes with epoxy adhesives. This work shall be done prior to the diamond grinding operation.

### **Location of Drill Holes**

For longitudinal joints the drill holes for the deformed bars shall be placed on alternating sides of the joint at maximum 24 inch centers. A minimum of 2 deformed bars per site shall be placed on the longitudinal joints.

### **Equipment**

The equipment must be approved by the Engineer. The drill used shall be hydraulic or pneumatic, with vacuum removal of drill dust. The drill shall be mounted in a frame which shall hold the drill at a 35 degree angle. The drill shall not be hand held.

### **Material**

Bars shall be No. 5, deformed, of the length "L" required for the depth of the pavement "T" as shown in the plans. The bars shall conform to the requirements of Section 1020 in the 2007 Standard Specifications.

A Grade 3 Epoxy Adhesive shall be from the approved products list and shall be used in accordance with Section 1018 of the Standard Specifications.

### **Construction**

Cross Stitching Concrete Pavement, as illustrated in the plans shall be accomplished by:

- (1) drilling a 1 inch diameter hole at a 35 degree angle from the horizontal which intersects the joint at mid point of the slab;
- (2) the drill hole shall be started at approximately distance "X" from the joint as shown in the table;
- (3) the hole shall be drilled to a depth "D" indicated in the table;
- (4) prior to placing the epoxy material, the drill hole shall be cleaned of all drilling dust;
- (5) the drill hole shall be filled with enough epoxy so that when the bar is placed, the epoxy shall completely cover the bar;
- (6) the deformed bar of length "L" shown in the table shall be installed in the hole and seated;
- (7) the hole shall then be filled with epoxy until it is flush with the surface of the concrete pavement.

### **Method of Measurement and Basis of Payment**

The Engineer will measure each deformed bar installed and complete in place. Payment for "Cross Stitching" at the contract unit price will be full compensation for work prescribed in this specification.

## DIAMOND GRINDING AND TEXTURING CONCRETE PAVEMENT

### Description

This work shall consist of diamond grinding and texturing the driving lanes of the concrete pavement surface for profile improvement. Grinding shall be day lighted 1.5' to 2' from back of curb, as required to prevent any vertical projection in excess of ¼ inch. The grinding quantities are based on the widths, as shown below. The work shall be done according to the plans and these Special Provisions.

<u>STATION</u>	<u>STATION</u>	<u>LENGTH</u>	<u>WIDTH</u>	<u>SQ. YDS.</u>
US-81, North Bound, Driving and Passing Lanes				
113+58	161+36	4,778'	24.5'	13,649.0 *
US-81, South Bound, Driving and Passing Lanes				
113+58	167+30	5,372'	24.5'	14,895.0 *

\* The quantity includes widened areas and tapering 1' on the turn lanes, driveways, outside shoulders and intersections.

### Project Information

The project has 10" non-reinforced portland cement concrete pavement to be ground and was constructed in 1999. The surface is 25' wide with integral curbs and 8' concrete outside shoulders, with joint spacings of 16'-6". The joints are not doweled. Data for the original construction projects is shown below and is for informational purposes only; however, the Contractor is responsible for reviewing the project to verify the accuracy of the information.

#### North Bound and South Bound

Location	In Norfolk
Highway	US-81
Reference Post	158.20 to 159.22
Station	113+58 to 167+30
Class of Concrete:	47B (30% Coarse Aggregate)
Type of Coarse Aggregate:	Limestone
Source of Coarse Aggregate:	Ft. Calhoun
Los Angeles Abrasion (% Wear):	Min. 26, Max. 28, Avg. 27

The minimum, maximum and average joint faulting depths are shown in the following table:

#### JOINT FAULT DEPTH MEASUREMENTS (INCHES)

Location	NORTH BOUND					
	Passing Lane			Driving Lane		
	Min.	Max.	Avg.	Min.	Max.	Avg.
US-81 (158.21 to 159.00) Sta. 113+58 to Sta. 155+34	0.05	0.32	0.17	0.07	0.39	0.23
US-81 (159.00 to 159.11) Sta. 155+34 to Sta. 161+36	0.07	0.20	0.15	0.15	0.42	0.26
Location	SOUTH BOUND					
	Passing Lane			Driving Lane		
	Min.	Max.	Avg.	Min.	Max.	Avg.
US-81 (158.21 to 159.00) Sta. 113+58 to Sta. 155+34	0.02	0.23	0.13	0.10	0.45	0.24
US-81 (159.00 to 159.11) Sta. 155+34 to Sta. 167+30	0.10	0.52	0.26	0.18	0.41	0.30

Below are the proportions for 47B concrete pavement:

Class Of Concrete	Sacks of Cement per Cu.Yd. (Fixed)	Type of Concrete	Lbs. Total Agg.		Ratio Coarse Agg. to Total Agg. (Percent)	Type of Coarse Aggregate
			Min.	Max.		
47B	6.0	Air-Entrained	480	520	30±3	Limestone

#### Equipment

Grinding and texturing shall be done utilizing diamond blades mounted on self-propelled machines designed for grinding and texturing pavements. The cutting head shall be at least 36 inches wide and consist of many diamond blades with spacers. The equipment shall be such that it will not cause strain or damage to the underlying surface of the pavement. Equipment that causes excessive raveling, aggregate fractures, spalls, or disturbance of transverse or longitudinal joints will not be permitted.

#### Diamond Grindings

Grinding shall be done in the longitudinal direction so that grinding begins and ends at lines normal to the pavement centerline within one ground area, but not necessarily at the end of each shift or of a working day.

Grinding for profile improvement shall be continuous, within the area designated on the plans. All grinding shall be to full pavement width and shall include at least 90% of the pavement surface within any 100-foot length of pavement.

Grinding shall leave no vertical projection in excess of ¼ inch on any longitudinal line and at either edge of the portland cement concrete pavement.

This work shall be done only with one lane closed, as shown in the plans. All lanes shall be open during the day and at times when the Contractor is not diamond grinding or performing other work.

All slurry resulting from the grinding operations shall be collected and disposed of in accordance with the Nebraska Department of Environmental Quality General NPDES Permit Number NEG500000.

Concrete pavement repair, joint repair and cross stitching shall be completed in an area before the grinding operation.

### **Smoothness**

See Portland Cement Concrete Pavement Smoothness Special Provision.

### **Method of Measurement**

The quantity of grinding and texturing concrete pavement to be paid for shall be measured in square yards to the nearest 1.0 square yard, completed and accepted by the Engineer.

### **Basis of Payment**

The quantity of completed and accepted work, measured as provided herein, shall be paid for at the contract unit price per square yard for the item "Diamond Grinding and Texturing Concrete Pavement". This price shall be full compensation for furnishing all materials, equipment, labor, supplies, tools and incidentals necessary to complete the work.

## **PERFORMANCE GRADED BINDER**

Section 503 in the Standard Specifications is amended to include Performance Graded Binders.

Section 1029 in the Standard Specifications is void and superseded by the following:

### **I. Description**

The Performance Graded Binder to be used on this project shall be PG Binder 64-34 supplied by a Certified Supplier.

## **II. Certified Supplier**

A supplier must be certified by the Nebraska Department of Roads to be allowed to supply Performance Graded Binder in Nebraska. To be considered certified by the NDR, a supplier must participate in one or more of the following PG Binder groups.

1. AASHTO Materials Reference Laboratory (AMRL)
2. Western Cooperative Testing Group (WCTG)
3. Combined States Binder Group (CSBG)

The supplier must also maintain and follow the requirements of the group or groups in which they participate in, to maintain certification by the Nebraska Department of Roads. In addition, active participation is required to maintain certification by the Department. Active participation will include submitting of round robin sample results, along with meeting other requirements of the group or groups.

A certified supplier may be asked to supply to the Department, past round robin results, laboratory inspection reports, reasons for and investigative reports on out lying results, quality control testing, and/or technician training and proficiency testing reports.

The binder supplier agrees to inspection of their plant or terminal without notice anytime during production or supplying of material to the Department. The inspection may also include the supplier's laboratory.

A certified supplier can voluntarily submit samples of binders proposed for use to the Materials and Research Bituminous Laboratory for quality and verification testing.

## **III. Supplier Certification**

A supplier may request certification by contacting the Nebraska Department of Roads, Materials and Research Division, Flexible Pavement Engineer at (402) 479-3839. A temporary certification may be issued for a period of up to one year. Split sample testing will be required prior to receiving a temporary certification. Split sample testing will be done on all grades of binder that the supplier intends to supply during the temporary certification. The supplier will have up to one year to become certified by participating in and following the requirements of one or more of the approved binder groups.

A supplier may become certified through active participation in other binder certification/round robin groups that are approved by the NDR. The NDR may request from the supplier prior to approval, past or current round robin results, quality control testing, laboratory inspection reports, and/or technician training and proficiency testing reports.

## **IV. Loss of Certification**

Certification will be withdrawn from a supplier for a minimum of 6 months when one or more of the following conditions exist.

1. Inability to consistently supply material meeting specifications as outlined herein.
2. Failure to maintain an acceptable quality control program.



3. The failure to meet one or more of the conditions of being a Certified Supplier as outlined above.

Notification of decertification of a supplier will be submitted in writing by the NDR. Material from a decertified source will not be accepted for use on NDR projects and the NDR districts will be notified of this action.

#### **V. Supplier Recertification**

If a supplier has lost certification and seeks to be recertified, the following steps are required.

1. Fulfill the requirements outlined above for gaining Certified Supplier status.
2. Submit documentation to the Flexible Pavement Engineer explaining why decertification occurred, and the actions that are going to be taken to correct the problems identified in writing by the NDR.

#### **VI. Binder Sampling and Testing:**

1. Lots: Each 3750 tons (3400 Mg) of HMA type produced, or portion thereof, will be a binder lot.
2. A binder lot will include only one PG Binder grade or a blend as allowed in paragraph VI.6.e.
3. A binder lot will only include one supplier of the PG Binder or a blend as allowed in paragraph VI.6.e.
4. Blending of different binder grades and binders from different suppliers will be allowed with restrictions as noted in paragraph VI.6.e. The Engineer must be notified of the intent to blend prior to actual blending.
5. All binders shall be sampled at the rate of at least one sample per lot.
  - a. The sample shall consist of two one-quart (liter) cans and shall be taken by the Contractor's Certified Sampling Technician, with assistance from or under supervision of NDR personnel. The sample shall be taken at the plant from the line between the storage tank and the mixer or from the tank supplying material to the line, at a location at which material sampled is representative of the material in the line to the mixer. One can will be tested for specification compliance, and the other can portion will be saved for check tests and dispute resolution, if needed. The sampling process shall follow procedures of the NDR Materials Sampling Guide.
  - b. Testing. When the tested PG Binder is in compliance, the binder lot will be accepted and both cans of the sample can be discarded. If the tested PG Binder does not comply, then the price of the PG Binder lot represented by the sample shall be adjusted according to Tables 2 and 3.

Overall project average testing requirements and price adjustments will also apply, as stated in Table 4.

- c. In cases where the total HMA type is less than 3750 tons, only one PG Binder lot sample per grade per supplier is required. If the tested PG Binder does not comply, the price of the PG Binder lot shall be adjusted according to Tables 2 and 3.

## **6. Material Requirements**

- a. Performance Graded Binder, as specified in the contract items, shall be in accordance with the PG+ specifications as noted, and AASHTO M320 with the exception of Direct Tension.
- b. Substitution of a PG Binder, which exceeds the upper and lower grade designations from the specified, requires advance notification to, and approval by, the Engineer. The substitution of the PG Binder shall also be identified in the sample identification submittals.
- c. Material Certification - A Material Certification shall be submitted prior to construction, stating the type of modifier being used, and the recommended mixing and compaction temperatures for the Hot Mix Asphalt. The Material Certification must state that acid has not been used. The Material Certification must also state that the material has not been air blown or oxidized.
- d. The Contractor shall receive from the supplier, instructions on the proper storage and handling of each grade and shipment of PG Binder.
- e. Blending of PG Binders at the hot mix plant site will be allowed only when transitioning to an asphalt mixture requiring a different grade of binder, and with the following restrictions:
  - (1) The resultant blend will meet PG+ (modified binders) and/or AASHTO M320 specifications when tested as  $\pm 3^{\circ}$  C of the specified PG Binder. The sample of the blended material 1) will be considered as a lot sample, 2) will be taken during initial production following the blending of the binders, and 3) shall have deductions applied as per Tables 2, 3, and 4 when not meeting specifications. On the blended sample's identification form will be a note explaining the blending conditions and a statement that the sample is a blend of materials. The next lot sample, following the sample representing the blend, will be tested as the specified binder grade for the asphalt mixture being produced and shall meet AASHTO M320 and PG+ (if modified) specifications.
  - (2) Modified Binders - Only blending of the same type of elastomer modifiers listed in VI.6.f.(1) will be allowed.

- f. When modified binders are specified, the following PG+ specifications (Table 1) and AASHTO M320 (with the exception of Direct Tension) will apply:
- (1) The Performance Graded Binder shall be a binder, which incorporates a blend of base asphalt and elastomer modifiers of styrene-butadiene (SB), styrene-butadiene-styrene (SBS) or styrene-butadiene-rubber (SBR). Acid shall not be used. Air blown and/or oxidized asphalt will not be allowed. The supplier must certify that the binder is not acid modified, and that acid was not used. The binder supplier must also certify that air blowing or oxidization has not been done/used to modify the binder or used to change the properties of the binder.
  - (2) The composite material shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified binder shall be heat and storage stable and shall not separate when handled and stored as per the supplier's storage and handling recommendations.
  - (3) The composite material shall be homogenous, and shall not demonstrate evidence of 1) localized gellation or over-crosslinking of polymers, 2) improper use of gelling modifiers used in addition to polymer modification, or 3) otherwise any other lumpy conglomerations.
  - (4) To insure the binder is of a modification system in which no acid is used, the Materials and Research Bituminous Laboratory will perform a random free-acid verification test. ARR-MAZ AD-here LOF65-00, amine anti strip will be added at the rate of 0.5% to sample(s) that have been heated to 300 degrees F or until viscous and stirred for a minimum of 5 minutes. The resultant blend will then be tested for PG grading and compared to PG grading prior to the blending. Binders tested for acid modification shall meet AASHTO M320 specifications, and shall not show a drop of  $G^*/\sin(\delta)$  of more than 25% when compared to the result(s) of the sample prior to the verification test. If the verification test reveals material that does not meet AASHTO M320 specifications, or shows a drop of  $G^*/\sin(\delta)$  greater than 25%, the material that is represented by the sample will be rejected. If a random sample demonstrates acid modification, additional samples will be tested.
  - (5) Supplier-submitted samples of binder proposed for use, can be tested for acid modification. Binders that demonstrate acid modification will not be accepted for use.
  - (6) Lot samples of the binder shall meet or exceed the PG+ specifications as listed, in addition to AASHTO M320 specifications. For PG+, Table 1 specification testing, material will be tested on original unaged binder for phase angle specification,

and RTFO aged material for elastic recovery. Project lot samples can also be tested for acid modification as described in VI.6.f.(4).

- (7) When it is determined that material exceeds Table 1, Table 2 will apply. When it is determined that a single sample(s) does not meet AASHTO M320 specifications, Table 3 will apply.
- (8) All project samples will be tested for original binder dynamic shear rheometry compliance.
- (9) Modified binders with a temperature spread of 104 shall be exempt of the AASHTO M320 requirement for the test of Viscosity, AASHTO T316.
- (10) All specified binders with a temperature spread of 92 or greater, shall be modified with an elastomer modifier as specified in paragraph VI.6.f.(1).

**Table 1**  
**Additional Specifications for Modified Binders**

PG+ Specifications	Spec Base			Spec w/Tol. <sup>2</sup>		
	92	98	104	92	98	104
Temperature Spread <sup>1</sup>						
Elastic Recovery; AASHTO T301 tested at 77°F (RTFO Aged AASHTO T301)	Minimum 65%			Minimum 60%		
Phase Angle; degrees (Maximum) (Original Binder)	77.0	75.0	73.0	79.0	77.0	75.0

<sup>1</sup> Temperature Spread is determined by subtracting the low temperature from the high temperature. Example (PG 64-28: 64 – (-28) = 92).

<sup>2</sup> Tolerances were determined from CSBG round robin data and AASHTO or ASTM precision statements. Material exceeding these tolerances is subject to 75% pay or removal.

**Table 2**  
**PG + Single Sample Tolerance and Pay Factor Table**

	Pay Factor of 0.75 or Removal <sup>1</sup>		
Temperature Spread	92	98	104
Elastic Recovery Percentage (RTFO Aged AASHTO T301)	< 60%		
Phase Angle (degrees) (Original Binder)	> 79.0	> 77.0	>75.0

<sup>1</sup> Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

**Table 3**  
**Single Sample Tolerance and Price Factor Table**

	<b>Pay Factor of 0.75 or Removal<sup>1</sup></b>
<u>Tests on Original Binder</u> Dynamic Shear, $G^*/\sin \delta$ , kPa	< 0.93
<u>Tests on Rolling Thin Film Oven Residue</u> Dynamic Shear, $G^*/\sin \delta$ , kPa	< 1.98
<u>Tests on Pressure Aging Vessel Residue</u> Dynamic Shear, $G^*\sin \delta$ , kPa	> 5600
<u>Creep Stiffness</u> S, mPa	> 325
m-Value	< 0.285

<sup>1</sup> Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

**VII. Overall Project Average - Price Reduction Based on Complete M320 Testing**

1. Binders that demonstrate acid modification as per VI.6.f.(4) shall be rejected, and the test results will not be included in Overall Project Averages.
2. PG+, Table 1 specifications do not apply to Overall Project Averages.
3. Out of specification material will be determined by the specifications outlined in AASHTO M320, excluding Direct Tension.
4. The Nebraska Department of Roads, Materials and Research Bituminous Laboratory, will do complete specifications testing on at least one sample per HMA type from the project. The Department will randomly select one sample for complete specifications testing out of every five samples received. When any test result shows a sample not meeting specifications, the previous and following lot sample received will also be tested for complete specifications compliance. Adjacent lot sample testing will continue in this manner until tested samples meet all specifications, or there are no more lot samples to be tested.
5. Samples not selected for complete specifications testing are "control" samples. Control samples will be tested for original binder AASHTO M320 Dynamic Shear, as well as PG+ phase angle if modified. When a control sample falls out of AASHTO M320 Dynamic Shear and/or PG+ phase angle specification, it will then be tested for complete M320 and PG+ specifications compliance. And, as

mentioned in VII.4, adjacent lot samples will be tested when any results do not meet specification. Adjacent lot testing will continue until tested samples meet all specifications, or there are no more lot samples to be tested. This additional complete testing for M320 and PG+ compliance is in addition to the minimum number of samples that will be tested for complete M320 and PG+ compliance.

6. At the completion of testing, all M320 test results will be averaged. The average will not include M320 results from any binder lots that have already been reduced in pay by Table 3. For averages that do not meet M320 specifications, the largest reduction shown in Table 4 will be applied to all the Performance Graded Binder used on the project, with the exception of any binder lots that were already reduced in pay by Tables 2 and/or 3. In cases where there is only one PG Binder Grade lot sample left when determining the Overall Project Average tests results, then the Pay Factor for the PG Binder lot represented by that sample is determined by Table 4.

**Table 4**  
**Overall Project Average – Pay Factor Table**

	Range of Average	Pay Factor Applied
<u>Tests on Original Binder</u> Dynamic Shear, $G^*/\sin \delta$ , kPa Min. 1.00 kPa	< 1.00 – 0.98	0.98
	< 0.98 – 0.96	0.95
	< 0.96 – 0.94	0.92
	< 0.94	0.85
<u>Tests on Rolling Thin Film Oven Residue</u> Dynamic Shear, $G^*/\sin \delta$ , kPa Min. 2.20 kPa	< 2.20 – 2.156	0.98
	< 2.156 – 2.09	0.95
	< 2.09 – 2.024	0.92
	< 2.024	0.85
<u>Tests Pressure Aging Vessel Residue</u> Dynamic Shear, $G^*\sin \delta$ , kPa Max. 5000 kPa	>5000 – 5100	0.98
	>5100 – 5250	0.95
	>5250 – 5400	0.92
	>5400	0.85
m-Value Min. 0.300	< 0.300 – 0.298	0.98
	< 0.298 – 0.293	0.95
	< 0.293 – 0.290	0.92
	< 0.290	0.85
<u>Creep Stiffness</u> S, mPa Max. 300 mPa	>300 – 306	0.98
	>306 – 315	0.95
	>315 – 324	0.92
	>324	0.85

### VIII. Single Sample Reduction and Overall Project Average Reduction

A sample representing a lot, incurring pay reduction or removal by Table 2 and/or 3, will incur pay reduction or removal only for the material that the sample represents.

Only the largest overall project average reduction from Table 4 will apply when more than one test average falls out of AASHTO M320 specifications.

Pay Factors or removals, based on single sample test results, and pay factors based on overall project average test results, are separate from each other, and both will be applied.

#### **IX. Investigation of Verification Lot Samples That Do Not Meet Specifications**

When the lot sample shows test results out of specification limits, the process of resolving the sample failure will include the following actions, as appropriate:

1. The Bituminous Lab may conduct retesting of the remaining portion of the sample as determined necessary to confirm or disaffirm the original test result(s).
2. The Bituminous Laboratory will notify the NDR project personnel, who will in turn notify the Contractor. All will arrange to investigate all aspects of the testing, loading, handling and delivery of the material in question. The Contractor and NDR project personnel shall report findings to the Bituminous Laboratory.
3. The Bituminous Laboratory will collect and compile all information provided.
4. The Bituminous Laboratory will issue the standard report of tests for all samples tested, to include any resulting pay factor deductions or removals. A copy of the report of tests will be distributed to the District and Construction Division. The District will then provide a copy to the Contractor. Supplier requests for a copy of this report will be directed to the Contractor.

#### **X. Dispute Resolution**

After testing and investigations have been completed on the sample, and there is still a dispute, the NDR will select an independent laboratory for referee testing to take place on the remainder of the sample, or any other representative samples obtained. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing, and the NDR has submitted a final report of the results. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the NDR's, the Contractor will reimburse the NDR for the cost of testing. If the independent lab's tests indicate that the material meets specification or is at a pay deduction less than the NDR's, the NDR will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the NDR's and the independent lab's deductions will be applied.

Only the Contractor can initiate dispute resolution, and request referee testing. The request must be made, in writing, to the NDR Construction Division within 60 days of awareness of sample results. For any period of time past 60 days, dispute resolution is forfeited.

#### **XI. Method of Measurement**

PG Binder shall be measured in accordance with Subsection 503.05 in the Standard Specifications.

**XII. Basis of Payment**

Subsection 503.06 in the Standard Specifications is amended to provide that PG Binder, accepted by the Engineer for use in asphaltic concrete, will be paid for at the contract unit price per ton (Megagram) for the item "Performance Graded Binder \_\_\_\_\_", less any deductions as prescribed in the tolerance and price reduction tables.

**SECTION 1028 - SUPERPAVE ASPHALTIC CONCRETE  
(J-7-1013)**

Section 1028 in the Standard Specifications is void and superseded by the following:

**1028.01 -- Description**

1.
  - a. Superpave Asphaltic Concrete is a Contractor-designed mix.
  - b. The Contractor shall be required to define properties using a gyratory compactor that has met the Superpave evaluation test procedures, during mix design and production.
2. Job Mix Formula
  - a. Before production of asphaltic concrete, the Contractor shall submit, in writing, a tentative Job Mix Formula (JMF) on the NDOR Mix Design Submittal Form for verification to the Department.
  - b. The JMF shall be determined from a mix design for each mixture. A volumetric mixture design in accordance with AASHTO R 35 as modified within this specification will be required. However, the mixture for the Superpave specimens and maximum specific gravity mixture shall be aged for two hours at compaction temperature. The mixture shall be prepared using the following:
    - (1) Mixture Conditioning of Hot Mix Asphalt (HMA), AASHTO R 30.
    - (2) Method for Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the SHRP Gyratory Compactor, AASHTO T312.
  - c. The JMF shall identify:
    - (1) The virgin mineral aggregates and pit locations
    - (2) Recycled Asphalt Pavement (RAP) and source locations
    - (3) Hydrated lime
    - (4) Mineral filler
    - (5) The percent passing value for each specified sieve for the individual and blended materials
  - d.
    - (1) The Contractor shall submit one uncoated, proportioned 22 lb. (10,000 gram) sample of the blended mineral aggregates for consensus properties and specific gravity testing, for all mix types



except SPS. Once verified, the Contractor may begin plant production and QC testing with the QA/QC program.

- (2) The Contractor has the option of submitting the following; 2 proportioned 22 lb. (10,000 gram) samples of the blended mineral aggregates (which are precoated with hydrated lime, if lime is used) and two one-quart (liter) samples of the proposed PG Binder to be used in the mixture to the Department Materials and Research Central Laboratory at least 15 NDR working days before production of asphaltic concrete. If submitted these samples will be used to verify the Contractor's Superpave mix design test results and mix properties.
- (3) Submitted with these samples shall be a copy of the Contractor's results for all Superpave mix design tests.
- (4) Mix design shall include at a minimum:
  - (i) The bulk specific gravity (Gsb), which shall be 2.585, for data purposes and as information only, for all mixes.
  - (ii) The target binder content. The binder content will be determined by ignition oven results. A correction factor of 0.3% will be added to the ignition oven results for mixes containing hydrated lime, and an adjustment factor of 0.1% will be added to the ignition oven results for mixes containing WMA.
  - (iii) The supplier and grade of PG Binder.
  - (iv) The maximum specific gravity of the combined mixture (Rice).
  - (v) The bulk specific gravity (Gmb) and air voids at N initial (Nini), N design (Ndes) and N maximum (Nmax) of the gyratory compacted specimens.
  - (vi) Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) at Ndes.
  - (vii) Fine Aggregate Angularity (FAA) and specific gravity, Coarse Aggregate Angularity (CAA), Flat and Elongated Particles and Sand Equivalent of the aggregate blend.
  - (viii) Location description and/or legal descriptions and producers of materials used in the mix.
  - (ix) Dust to Binder Ratio.
  - (x) JMF compaction temperatures from NDOR Gyratory Temperature Table (See Table 1028.11).
  - (xi) The hydrated lime content.

3. Quality Control Program:

- a. The Contractor shall establish, provide, and maintain an effective Quality Control (QC) Program. The QC Program shall detail the methods and

- procedures that will be taken to assure that all materials and completed construction conforms to all contract requirements.
- b. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract, the Contractor shall assume full responsibility for placing a pavement course that meets the target field values.
  - c. The Contractor shall establish a necessary level of control that will:
    - (1) Adequately provide for the production of acceptable quality materials.
    - (2) Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
  - d.
    - (1) The Contractor shall develop and submit a copy of their QC Program to the Department. A copy of the QC Program shall be kept on file in the QC lab trailer. This Program shall be updated as needed and submitted annually for review.
    - (2) The Contractor shall not begin any construction or production of materials without an approved QC Program.
  - e. The QC Program shall address, as a minimum, the following items:
    - (1) QC organization chart.
    - (2) Inspection requirements.
      - (i) Equipment.
      - (ii) Asphalt concrete production.
      - (iii) Asphalt concrete placement.
    - (3) QC testing plan.
    - (4) Documentation of QC activities.
    - (5) Requirements for corrective action when QC or acceptance criteria are not met.
    - (6) Any additional elements deemed necessary.
    - (7) A list, with the name and manufacturers model number, for all test equipment used during laboratory testing.
    - (8) A description of maintenance and calibration procedures, including the frequency that the procedures are performed.
  - f. The QC organization chart shall consist of the following personnel:
    - (1) A Program Administrator:
      - (i) The Program Administrator shall be a full-time employee of the Contractor or a Subcontractor (Consultant) hired by the Contractor.
      - (ii) The Program Administrator shall have a minimum of 5 years' experience in highway construction.

- (iii) The Program Administrator need not be on the job site at all times but shall have full authority to institute any and all actions necessary for the successful implementation of the QC Program.
      - (iv) The Program Administrator's qualifications and training shall be described in the QC Program.
    - (2) Quality Control Technicians:
      - (i) The quality control technicians shall report directly to the Program Administrator and shall perform all sampling and quality control tests as required by the contract.
      - (ii) The QC technicians shall be certified every 5 years by the Department Materials and Research Division.
      - (iii) Certification at an equivalent level by a state or nationally recognized organization may be acceptable.
      - (iv) The QC technician's credentials and training records shall be submitted to the Department.
      - (v) The Contractor may have a non-certified technician working under the direct supervision of a certified technician for no more than one construction season.
  - g.
    - (1) Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the work.
    - (2) QC test results and periodic inspections shall be used to ensure the mix quality and to adjust and control mix proportioning.
4. Contractor's Lab Equipment:
- a. The Contractor shall calibrate and correlate the testing equipment according to the procedures prescribed for the individual tests and conduct tests in conformance with specified testing procedures.
  - b. The Contractor shall have the following equipment (or approved equal) at or near the project location:
    - (1) A gyratory compactor and molds meeting AASHTO criteria.
    - (2) An Asphalt Content Ignition Oven meeting AASHTO criteria.
    - (3) Rice equipment specified in AASHTO T 209, procedure 9.5.1, Weighing in Water. The thermometer being used to measure water temperature will be as specified in T 209.
    - (4) FAA equipment specified in AASHTO T304.
    - (5) To test density of compacted asphaltic concrete, a minimum 6000 gm balance, 0.1 gm resolution, with under body connect and water container large enough to conveniently place specimen in the basket and completely submerge the basket and specimen without touching the sides or bottom is required.

- (6) QC Laboratory which contain the following:
  - Air conditioner.
  - Dedicated phone.
  - FAX machine or email.
  - Photocopy machine.
  - Sample storage.
  - Work table.
  - Bulletin board.
  - Running water.
  - Desk and chair.
  - Separate power supply.
  - Incidental spoons, trowels, pans, pails.
- (7) Diamond saw for cutting cores.
- (8) Diamond core drill minimum 3 inch (75 mm).
- (9) Oven, 347°F (175°C) minimum, sensitive plus 5°F (plus 2°C).
- (10) USA Standard Series Sieves for coarse and fine aggregate with appropriate shakers (12 inch (300 mm) recommended).
- (11) Personal Computer capable of running the latest version of Department Superpave software, creating an electronic copy of the data, and printing to a Color Printer.

5. QC Testing Plan:

- a. The testing plan shall provide that the samples be collected in accordance with the Department statistically based procedure of random sampling.
- b. The Contractor may add any tests necessary to adequately control production.
- c. All QC test results shall be reported on the latest version of the Department's provided Superpave software by the Contractor with a copy provided to the Engineer within 1 week after the tests are complete. Daily review by the Engineer shall be allowed. At the completion of the asphalt production, the Contractor shall submit to the Department a final copy of the Superpave test results on electronic recording media (CD, e-mail, flash drive, etc.).
- d. Corrective Action Requirements:
  - (1) The Contractor shall establish and utilize QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.
  - (2) The Contractor's QC Program shall detail how the results of QC inspections and tests will be used to determine the need for corrective action.

- (3) (i) A clear set of rules to determine when a process is out of control and the type of correction to be taken to regain process control will be provided.
- (ii) As a minimum, the plan shall address the corrective actions that will be taken when measurements of the following items or conditions relating to the mixture approach the specification limits:
  - (I) Plant produced mix gradations at laydown (See gradation tolerances).
  - (II) Binder content.
  - (III) Air voids.
  - (IV) VMA (mix design only).
  - (V) VFA (mix design only).
  - (VI) FAA AASHTO T 304.  
CAA ASTM D 5821.
  - (VII) Dust to Binder Ratio.
  - (VIII) Density.
  - (IX) Contaminates.
- (iii) Corrective actions that will be taken when the following conditions occur:
  - (I) Rutting.
  - (II) Segregation.
  - (III) Surface voids.
  - (IV) Tearing.
  - (V) Irregular surface.
  - (VI) Low Density.

**1028.02 -- Material Characteristics**

- 1. The type of PG Binder will be shown in the contract.
- 2. Recycled Asphalt Pavement:
  - a. The Contractor may submit to the State a proposal to supplement the virgin aggregates of the asphaltic concrete mix with a Contractor's specified percentage of Recycled Asphalt Pavement (RAP). The Contractor is responsible for investigating and maintaining the quality and verifying the quantity of the RAP material.
  - b. In recycled asphaltic concrete mixtures, the allowable percent of RAP will be as shown in Table 1028.01.

**Table 1028.01**

Asphaltic Concrete Type	Percent, RAP	
	Minimum	Maximum
SPS	0	55
SPR	0	55
SPH	0	35

3. Aggregates:
- a. Aggregates for use in superpave asphaltic concrete shall be tested on an individual basis.
  - b. With the exception of Asphaltic Concrete Type SPS the blended mineral aggregate shall not contain more than 80% limestone on the final surface lift of asphaltic concrete.
  - c. Asphaltic Concrete Type SPR may contain a total maximum of 10% of the virgin material that is composed of natural, uncrushed aggregate by manmade methods commonly known as but not limited to: 47B gravel, 2A gravel, gravel surfacing, sluice sand, blow sand, waste sand, fill sand, road gravel, roofing gravel, hot mix sand or gravel, coarse sand, fine sand, plaster sand, masonry sand, pit run sand or gravel. For clarification on any proposed gravel, contact the Department Flexible Pavements Engineer.
  - d. Chat or coal sand will not be allowed in any mix.
  - e. Crushed rock material for use in asphaltic concrete, 1/4 inch (6.35 mm) and smaller, screenings and manufactured sand shall have a Sodium Sulfate loss of not more than 12% by mass at the end of 5 cycles. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
  - f. Quartzite and granite shall conform to the requirements of Subsection 1033.02, Paragraph 4, a. (8). Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
  - g. Crushed rock (Limestone) and Dolomite shall conform to the requirements of Paragraph 4.a. (4), (5) and (6). of Subsection 1033.02 of the Standard Specifications. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
  - h. Soundness tests shall not be required for fine sand.
  - i. Once the satisfactory quality of aggregates from a source has been established, sufficient additional soundness tests will be performed to insure the continued satisfactory quality of the material, as determined by the Materials Sampling Guide
  - j. Aggregate consensus properties may be performed on material prior to the application of hydrated lime.
  - k. The coarse aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic

concrete type as shown in Table 1028.02. If the coarse portion of the blend is all ledge rock the CAA tests may be waived.

**Table 1028.02  
Coarse Aggregate Angularity  
(ASTM D 5821)**

<b>Asphaltic Concrete Type</b>	<b>CAA (minimum)</b>
SPS	--
SPR	83
SPH	95/90*

\* Denotes two faced crushed requirements

- I. The fine aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.03.
- m. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a washed combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve. The Contractor will determine the specific gravity to be used in the calculation of FAA mixture design value(s) and, if verified by the Department Aggregate Laboratory, this same value can be used throughout production. The verification value determined by the Department Aggregate Laboratory will be on a combined aggregate sample supplied by the Contractor that is representative of the material proposed or being used during production. The specific gravity to be used throughout production to calculate FAA values will be the Contractor's verified value or the Department determined value (whenever verification is not made) and will be noted on the Mix Design. Changes in aggregate percentages during production may require determination of a revised specific gravity for FAA.

**Table 1028.03  
Fine Aggregate Angularity  
(AASHTO T304 Method A)**

<b>Asphaltic Concrete Type</b>	<b>FAA (minimum)</b>
SPS	--
SPR	43.0
SPH	45.0

- n. The coarse aggregate shall not contain flat and elongated particles exceeding the maximum value for the appropriate asphaltic concrete type category shown in these provisions according to Table 1028.04.

**Table 1028.04  
Flat and Elongated Particles\*  
(ASTM D 4791)**

<b>Asphaltic Concrete Type</b>	<b>Percent, Maximum</b>
SPS	25
SPR	10
SPH	10

\*Criterion based on a 5:1 maximum to minimum ratio.

- o. The sand equivalent of the blended aggregate material from the fine and coarse aggregates shall meet or exceed the minimum values for the appropriate asphaltic concrete type shown in these provisions according to Table 1028.05.

**Table 1028.05  
Sand Equivalent Criteria  
(AASHTO T 176)**

<b>Asphaltic Concrete Type</b>	<b>Sand Equivalent, Minimum</b>
SPS	30
SPR	45
SPH	45

- p. Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75  $\mu$ m) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be within 0.70 and 1.70.
- q. The blended aggregate shall conform to the gradation requirements specified in Table 1028.06 and Table 1028.07 for the appropriate nominal size.

**Table 1028.06  
Gradation Control Points for 0.75 Inch (19 mm) and 0.5 Inch (12.5 mm) Nominal Size**

<b>English Sieve (Metric)</b>	<b>0.75 Inch (19 mm) Control Points (percent passing)</b>		<b>0.5 Inch (12.5 mm) Control Points (percent passing)</b>	
	<b>Minimum</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Maximum</b>
1 inch (25 mm)	100.0			
3/4 inch (19 mm)	90.0	100.0	100.0	
1/2 inch (12.5 mm)		90.0	90.0	100.0
3/8 inch (9.5 mm)				90.0
No. 8 (2.36 mm)	23.0	49.0	28.0	58.0
No. 16 (1.18 mm)				
No. 30 (600 $\mu$ m)				
No. 50 (300 $\mu$ m)				
No. 200 (75 $\mu$ m)	2.0	8.0	2.0	10.0



**Table 1028.07**  
**Gradation Control Points for 0.375 Inch (9.5 mm) Nominal Size and SPR**

English Sieve (Metric)	0.375 Inch (9.5 mm) Control Points (percent passing)		SPR Control Points (percent passing)		SPR (Fine) Control Points (percent passing)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
3/4 inch (19 mm)			98.0	100.0		
1/2 inch (12.5 mm)	100.0					
3/8 inch (9.5 mm)	90.0	100.0	81.0	89.0	81.0	96.0
No. 4 (4.75 mm)		90.0				
No. 8 (2.36 mm)	32.0	67.0	46.0	56.0	46.0	56.0
No. 16 (1.18 mm)						
No. 30 (600 μm)						
No. 50 (300 μm)			12.0	21.0	12.0	21.0
No. 200 (75 μm)	2.0	10.0	4.0	9.0	4.0	9.0

- r. The combined mineral aggregate for Asphaltic Concrete, Type SPS, shall be an aggregate or a combination of aggregates, and mineral filler if needed, that conforms to the gradation requirements specified in Table 1028.08.

**Table 1028.08**  
**Gradation Control Points for Type SPS**

English Sieve (Metric)	Control Points (percent passing)	
	Minimum	Maximum
1 inch (25 mm)	100.0	
¾ inch (19 mm)	94.0	100.0
½ inch (12.5 mm)	81.0	100.0
No. 4 (4.75 mm)	70.0	90.0
No. 8 (2.36 mm)	42.0	70.0
No. 16 (1.18 mm)	29.0	43.0
No. 30 (600 μm)	19.0	34.0
No. 50 (300 μm)	11.0	20.0
No. 200 (75 μm)	2.0	10.0

- s. Mineral filler shall consist of pulverized soil, pulverized crushed rock, broken stone, gravel, sand-gravel, sand or a mixture of these materials that conforms to the requirements in Table 1028.09.

**Table 1028.09**  
**Mineral Filler for Type SPS**

	Min.	Max.
Total Percent Passing the No. 50 (300 μm) Sieve	95	100
Total Percent Passing the No. 200 (75 μm) Sieve	80	100
Plasticity Index (material passing the No. 200 (75 μm) Sieve, except soil)	0	3
Plasticity Index for Soil	0	6

**1028.03 -- Acceptance Requirements**

1. Mix Criteria:
  - a. The target value for the air voids of the SPH Asphaltic Concrete shall be 4% ( $\pm 1\%$ ) at the Ndes number of gyrations. For Type SPS Asphaltic Concrete the air voids at Ndes shall be a minimum of 1.5% with a maximum of 5.0%. For Type SPR Asphaltic Concrete the air voids shall be 3% ( $\pm 1\%$ ) at the Ndes number of gyrations.
  - b. The design criteria for each mixture shall be determined from Tables 1028.10, 1028.11, and 1028.12.

**Table 1028.10  
Gyratory Compaction Effort  
(Average Design High Air Temperature <39 degrees C)**

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SPR	7	65	100
SPH	8	95	150

**Table 1028.11  
Gyratory Compaction Temperatures**

Mix Type	% RAP	Compaction Temp °F
SPS	0-25	270 $\pm$ 5
	26-50	280 $\pm$ 5
SPR	0-35	280 $\pm$ 5
	36-50	290 $\pm$ 5
SPH	0-35	300 $\pm$ 5

**Table 1028.12  
Minimum Binder Content**

Mix Type (Metric)	Minimum Binder Content, Percent
SPS	4.8
SPR	5.0
3/8 inch (9.5 mm)	5.5
1/2 inch (12.5 mm)	5.1
3/4 inch (19 mm)	5.0

- c. During production of Lot #1 and randomly selected lots thereafter, the Contractor shall provide to the Department 6 properly prepared gyratory samples for AASHTO T 283 testing for all mixtures except Asphaltic Concrete Type SPS. Superpave mixtures shall contain 1.25% hydrated lime as specified in the Special Provision "Hydrated Lime for Asphaltic

Mixtures". Each Superpave mixture shall be tested for moisture sensitivity in accordance with AASHTO T 283. The 6 inch (150 mm) specimens shall be compacted in accordance with AASHTO T 312 to 7% ( $\pm 0.5\%$ ) air voids at 95 mm in height and evaluated to determine the Tensile Strength Ratio (TSR).

- d. During production of Lot #1, the Contractor shall provide to the Department two 75mm gyratory puck samples at 4.0% voids ( $\pm 0.5\%$ ) for APA testing for all mixtures except Asphaltic Concrete Type SPS.
2. The Contractor shall make Mix adjustments when:
    - a. The mix does not meet the current approved JMF or any other requirements of the contract.
    - b. Surface voids create a surface or texture that does not meet the criteria of Sections 502 and 503 in these Standard Specifications.
    - c. Rutting occurs.
  3. The Contractor shall inform the Engineer when changes in mixture properties or materials used occur for any reason. Changes such as, but not limited to, types or sources of aggregates or changes in grades, sources, properties or modification procedures (if modified) of PG Binders. The Department may require a new job mix formula, mix design and moisture sensitivity test. The new proposed job mix formula shall be in accordance with the requirements as stated above.
  4. Mix adjustments at the plant are authorized within the limits shown in Table 1028.13 as follows:
    - a. The adjustment must produce a mix with the percent air voids and all other properties as stated in these specifications.
    - b. All adjustments must be reported to the Engineer.
    - c. The adjustment values in Table 1028.13 will be the tolerances allowed for adjustments from the Department verified mix design "Combined Gradation" target values which resulted from production or mix design adjustments, but cannot deviate from Superpave gradation criteria. Mix adjustments for individual aggregates, including RAP, greater than 25% of the original verified mix design proportion or greater than 5% change in the original verified mix design percentage, whichever is greater, may require the Contractor to submit a new mix design, as determined by the Engineer. The Contractor is responsible for requesting new mix design targets as they approach these tolerances, failure to do so may result in a suspension of operations until a new mix design is approved.

**Table 1028.13**

<b>Aggregate Adjustments</b>	
<b>Sieve Size</b>	<b>Adjustments</b>
1 inch (25 mm), 3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (4.75 mm)	± 6%
No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	± 5%
No. 200 (75 µm)	± 2%

5. Sampling and Testing:
- a. The Contractor shall take samples at frequencies identified by the Engineer, according to the Department statistically based procedure. The samples shall be approximately 75 lbs (34 kg) and split according to AASHTO T-248 to create a companion sample. This sample splitting can be either at: 1) the sampling location, with the Department taking custody of their sample at that time or 2) after being transported to the test facility in an insulated container, with the Department taking custody of their sample at that time as determined by the Engineer. The details of sampling, location, splitting etc. shall be determined at the pre-construction conference.
  - b. All samples transported to the test facility and companion samples within the Lot shall be identified by attaching or faxing the lab calculation sheet from the latest version of the superpave software, stored, and retained by the Contractor until the Department has completed the verification testing process. Transporting of all samples will be under the observation of Department.
  - c.
    - (1) The sample shall be taken from the roadway, behind the paver before compaction or from the windrow. For SPS mixes, the Contractor has the option to obtain the samples directly at the plant.
    - (2) At least one QC sample shall be tested for every 750 tons (680 Mg) of plant produced mix.
      - (i) If, at the completion of the project, the final lot consists of less than 3,750 tons (3,400 Mg) of asphaltic concrete, 1 sample for each 750 tons (680 Mg) or fraction thereof, shall be taken and tested.
    - (3) Additional sampling and testing for the Contractor's information and quality control may be performed at the Contractor's discretion. Any additional testing will not be used in pay factor determination.
    - (4) (i) When cold feed samples are being taken, the acquisition shall be timed such that the material in the sample represents, as close as possible, the same material in the sample taken behind the paver. If cold feeds are sampled and tested by Contractor, a split of that sample must be submitted with the hot mix subplot sample. The Contractor will be notified what subplot (a minimum of 1 subplot per lot) sample must be tested for FAA and CAA from the blended

cold feed material according to the Department random sampling schedule. All other FAA and CAA subplot samples may be taken from the randomly selected portion of the blended cold feed material or obtained from the random samples taken behind the paver. Samples shall be taken under the observation of Department and split according to AASHTO T-248, with the Department taking custody of their sample at that time.

- (ii) For projects using RAP material the FAA shall be established as follows: a RAP sample will be processed through an ignition oven and then combined with the proportioned amount of virgin aggregate defined by the mix design and then proceeding with FAA and CAA testing.
- d. The sample shall be compacted immediately while still hot (additional heating may be required to raise the temperature of the sample to compaction temperature).
- e. Each production sample shall be tested as follows:
  - (1) Bulk Specific Gravity (Gmb) shall be determined for each specimen in accordance with AASHTO T 166 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens. One specimen shall be compacted for each production sample.
  - (2) One Theoretical Maximum Specific Gravity (Gmm) test for each production sample of uncompacted mixture shall be determined in accordance with AASTHO T 209 procedure 9.5.1. Weight in water - Maximum Specific Gravity of Bituminous Paving Mixtures.
  - (3)
    - (i) The Blended Aggregate Bulk Specific Gravity (Gsb) shall be 2.585 for information only for all mixes.
    - (ii) FAA - AASHTO T 304 Method A. The pour time of the test sample into the funnel shall be completed in 5±1 seconds.
    - (iii) CAA - ASTM 5821. For SPR mixes, CAA testing and results are only required on the cold feed verification test for the lot.
  - (4) The laboratory air voids shall be determined in accordance with the following:

**Table 1028.14**

$\text{Gmb}(\text{corr})@N_{any} = \text{Gmb}(\text{meas})@N_{max} \times (\text{height}@N_{max} \div \text{height}@N_{any})$ $\%Gmm(\text{corr})@N_{any} = 100 \times (\text{Gmb}(\text{corr})@N_{any} \div \text{Gmm}(\text{meas}))$ $\% \text{ Air Voids}@N_{any} = 100 - \%Gmm(\text{corr})@N_{any}$ $\text{VMA}@N_{des} = 100 - (\text{Gmb}(\text{corr})@N_{des} \times P_s \div \text{Gsb})$ $\text{VFA}@N_{des} = 100 \times ((\text{VMA}@N_{des} - \% \text{ Air Voids}@N_{des}) \div \text{VMA}@N_{des})$ $\text{Measured} = (\text{meas})$ $\text{Corrected} = (\text{corr})$
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- (5)
  - (i) The percent of PG Binder shall be determined for each QC test. The percent of PG Binder will be computed by ignition oven results. A correction factor of 0.3% will be

added to the ignition oven results for mixes containing hydrated lime.

- (ii) The gradations shall be determined for each QC test using AASHTO T 30.

- (6) Except as noted in this Subsection, all sampling and testing shall be done as prescribed in the Department Materials Sampling Guide and Standard Method of Tests.

f. Testing Documentation:

- (1) All test results and calculations shall be recorded and documented on data sheets using the latest version of Department provided "Superpave" software. A copy containing complete project documentation will be provided to the Department at the completion of asphalt production.

g. Superpave Software:

- (1) QC charts from the software shall be made available for review by the Engineer at any time.
- (2) As a minimum, the following values shall be reported on Department provided software:
  - (i) Laboratory Gyratory density.
  - (ii) Ignition oven or cold feed aggregate gradations for all Superpave sieves will be reported.
  - (iii) PG Binder content shall be plotted to the nearest 0.01% by ignition oven results in accordance with AASHTO T 308.
  - (iv) The theoretical maximum specific gravity (Rice) to the nearest 0.001% will be reported.
  - (v) Laboratory Gyratory air voids at Ndes shall be plotted to nearest 0.1%. Laboratory Gyratory air voids, at Nini, Ndes and Nmax shall be reported to nearest 0.1%.
  - (vi) FAA and CAA of the asphaltic concrete for both cold feed and ignition oven samples will be reported to the nearest 0.1% for FAA and 1% for CAA. A minimum of one subplot FAA and CAA cold feed sample per lot will be tested and recorded on Department provided software.
  - (vii) VMA content shall be plotted to nearest 0.1% and VFA shall be reported to the nearest 0.1%.
  - (viii) Dust to Binder ratio to the nearest 0.01 will be reported.

6. Verification Sampling and Testing:

- a. The Department will select and test at random one of the subplot samples (750 tons, 680 Mg) within a Lot (3750 tons, 3400 Mg) for verification and report results.

- b. The results of Contractor QC testing will be verified by the Department's verification tests. Any samples outside of the tolerances in Table 1028.15 and 1028.16 will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
- (1) On any given Lot, if the results of Air Void verification testing and its companion QC testing are within 1.0% air voids, the Air Void verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factors. If the Air Void verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
  - (2) On any given Lot, if the results of the FAA verification testing and its companion QC testing are within 0.5 percent, the FAA verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factor. If the FAA verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
- c. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the QC results, the Engineer may cease production and/or request additional verification testing or initiate a complete IA review.

**Table 1028.15  
Asphaltic Concrete Testing Tolerances**

<b>Test</b>	<b>Tolerance</b>
Asphalt Content by Ignition Oven	0.5%
Gyratory Density	0.020
Maximum Specific Gravity	0.015
Bulk Dry Specific Gravity (Gsb)	0.020
FAA	0.5%
CAA	10%
Field Core Density	0.020
Air Voids	1.0%

**Table 1028.16**  
**Blended Aggregate Gradation**  
**Testing Tolerances**

Sieve Size	Tolerance
3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (12.5 mm), No. 8 (2.36 mm)	5%
No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	4%
No. 200 (75 µm)	2%

- d. Independent Assurance (IA) Review of Testing:
- (1) The Contractor shall allow the Department personnel access to their laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in testing procedures will be reported by the department and corrected by the Contractor.
  - (2) During IA review, the Department personnel and the Contractor will split a sample for the purpose of IA testing. The samples selected will be tested in the Department Branch Laboratory. Any IA test results found to be outside of defined testing tolerances above will be reported. The Contractor shall verify the testing apparatus and make corrections if the apparatus is out of tolerance.
  - (3) See Section 28 of the Materials Sample Guide for more information on IA testing.
- e. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department will be asked to resolve the dispute, which will be final. It is the Contractor's responsibility to obtain a large enough sample size for any referee testing (a total sample size of 6000 grams, to be retained by the Department after splitting, is recommended for FAA testing). All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDOR Materials Sampling Guide.



## 7. Production Tolerances, Acceptance, and Pay Factors

**Table 1028.17  
Production Tolerances\***

<b>Test</b>	<b>Allowable Deviation from Specification</b>
<i>Dust to Asphalt Ratio</i>	None
<i>Coarse Aggregate Angularity</i>	- 5% below Min.
<i>Fine Aggregate Angularity for SPR Only</i>	- 0.2% below Min. for cold feed - 0.5% below Min. for ignition oven
<i>Fine Aggregate Angularity for all other mixes</i>	- 0.5% below Min. for cold feed - 1.0% below Min. for ignition oven
Minimum Binder Content	None

\* These tolerances are applied to the mix design specification values, not the submitted mix design targets.

- a. The Contractor shall notify the Engineer whenever a test result approaches the Specification limits.
- b. When any single test result for FAA testing falls outside the allowable production tolerances in Table 1028.17, the material represented by this test will be accepted with a 20% penalty or rejected, as determined by the Engineer. For all other tests, when any single test result, on the same mix property, from two consecutive QC samples fall outside the allowable production tolerances in Table 1028.17, the material represented by these tests will be accepted with a 20% penalty or rejected, as determined by the Engineer.
- c. The Contractor shall assume the responsibility to cease operations when specifications are not being met.
- d. Acceptance and pay factors for Asphaltic Concrete Type SPS will be based on compacted in place average density and joint density.
- e. For each subplot of Asphaltic Concrete Type SPS, SPR and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type \_\_\_\_\_". Included in a subplot, following approval of the control strips, may be any roadway Asphaltic Concrete Type SPS, SPR or SPH which is produced and approved by the Engineer and including material used for Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type \_\_\_\_\_ unit price. When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete sublots.
  - (1) When there is a production tolerance pay factor penalty as stated in Paragraph 7.b. subsection 1028.03 this penalty percentage will be entered in the Superpave Asphalt Pay Factor Summary under production specifications for each subplot affected. These

individual pay factors will then be multiplied by each other to determine a total pay factor for each subplot [(750 tons) (680 Mg)].

- f. The pay factors for the single test air voids and moving average of four air voids pay factors will be determined in accordance with Table 1028.18.

**Table 1028.18**  
**Acceptance Schedule**  
**Air Voids -  $N_{des}$**

Air voids test results for Asphaltic Concrete Type SPR	Air voids test results for SPH Asphaltic Concrete	Pay Factor	
		Moving average of four	Single test
Less than 0.5%	Less than 1.5%	50% or Reject	50% or Reject
0.5% to 0.9%	1.5% to 1.9%	50% or Reject	50%
1.0% to 1.4%	2.0% to 2.4%	50% or Reject	95%
1.5% to 1.9%	2.5% to 2.9%	90%	95%
2.0% to 2.4%	3.0% to 3.4%	100%	100%
2.5% to 3.5%	3.5% to 4.5%	102%	104%
3.6% to 4.0%	4.6% to 5.0%	100%	100%
4.1% to 4.5%	5.1% to 5.5%	95%	95%
4.6% to 5.0%	5.6% to 6.0%	90%	95%
5.1% to 5.5%	6.1% to 6.5%	50% or Reject	90%
5.6% to 6.0%	6.6% to 7.0%	50% or Reject	50%
6.1% and over	7.1% and over	50% or Reject	50% or Reject

8. Asphalt Concrete Density Samples:
- a. The Contractor shall perform density tests under direct observation of Department personnel. The Contractor shall establish the method of testing in the preconstruction conference and shall test in accordance with the AASHTO T 166, NDR T 587, or as otherwise described in these Special Provisions. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel along with all other inputs when NDR T 587 is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheet. When AASHTO T 166 is being used, the Department will observe the Contractor taking, transporting, and testing the cores. The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 will be resolved using AASHTO T 166.

- b. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

**Note:** The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

- c. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
- d. Normally, 1 sample for determination of density will be taken from each subplot (750 tons) (680 Mg) at locations determined by the Engineer.
- e. The average density of the lot shall be used to compute the pay factor for density. Exceptions to the sampling and testing of core samples for the determination of density are as follows:
- (1) When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
  - (2) When the average thickness of the 5 cores for a lot is 1 inch (25 mm) or less, the testing of density samples for this lot will be waived.
  - (3) When the nominal layer thickness and the average of the original 5 cores for a lot are both more than 1 inch (25 mm), but some of the cores are less than 1 inch (25 mm) thick, additional cores shall be cut at randomly selected locations to provide 5 samples of more than 1 inch (25 mm) thickness for the determination of the pay factor for density.
- f. (1) If, at the completion of the project, the final lot consists of less than 3,750 tons (3400 Mg) of asphaltic concrete, a minimum of 3 samples, or 1 sample for each 750 tons (680 Mg) or fraction thereof, whichever is greater, shall be taken and tested for density.
- (2) The test results shall be averaged and the density pay factor based on the values shown in Table 1028.19.
  - (3) Should the average of less than 5 density tests indicate a pay factor less than 1.00, additional density samples to complete the set of five shall be taken at randomly selected locations and the density pay factor based on the average of the 5 tests.

**Table 1028.19**

<b>Acceptance Schedule Density of Compacted Asphaltic Concrete</b>	
<b>Average Density (5 Samples, Percent of Voidless Density)</b>	<b>Pay Factor</b>
Greater than 92.4	1.00
Greater than 91.9 to 92.4	0.95
Greater than 91.4 to 91.9	0.90
Greater than 90.9 to 91.4	0.85
Greater than 90.4 to 90.9	0.80
Greater than 89.9 to 90.4	0.70
89.9 or Less	0.40 or Reject

- g. If requested by the Contractor, check tests for all density tests in the original set, taken no later than the working day following the receipt of all test results for the lot, will be allowed in lots with a density pay factor of less than 1.00. No re-rolling will be allowed in these lots. Locations for checks tests will be provided by the Engineer from the Random Sampling Schedule. The average density obtained by the check tests shall be used to establish the density pay factor for the lot.
- h. The location of density samples are identified by the Random Sampling Schedule. When the random location is noted as zero or the lane width (i.e., zero or 12 ft. on a 12-foot lane), the core shall be cut with the outer edge of the core barrel no greater than 4 inches away (laterally) from the edge of the top of the mat for an unconfined edge or from the edge of the top of the hot mat (joint) for a confined edge. If using a nuclear gauge, the 4 inches would be measured to the edge of the gauge base. The percent density value at these edge-of-lane locations shall be adjusted upward by 2.5%, but to a value of no greater than 92.5%, and the resultant value used in determining the density pay factor. No initial value of 92.5 or greater shall be adjusted.

### **WARM MIX ASPHALT (J-7-1114)**

The Contractor has the option to use Warm Mix Asphalt (WMA) meeting the following requirements.

1. Warm Mix Asphalt (WMA)

Warm Mix Asphalt mixtures shall follow the requirements of Superpave Asphaltic Concrete and all other applicable sections with the following exceptions:

- a. The Contractor shall request the use of a WMA additive in writing when submitting the Job Mix Formula. The requested additive shall be an approved Level I or II production product or combination thereof. The manufacturer's

recommended additive rates, specifications, and all other pertinent information shall be included in the requests. All requests must be approved by the Flexible Pavements Engineer prior to their use.

b. Level I Production

- (1) Level I WMA additives are as follows: water injection devices.
- (2) Hydrated Lime at 1.25% by weight of virgin aggregate is required for all mixtures.
- (3) The allowable drop in temperature shall be a maximum of 40°F below the producer's recommended production temperature for Hot Mix Asphalt (HMA), or less as required during production to achieve proper laydown and compaction properties. Plant production temperatures shall not drop below 230°F.

c. Level II Production

- (1) Level II WMA additives are as follows: Advera, Evotherm (DAT, ET, 3G), AkzoNobel Rediset LQ-1102C, Cecabase RT 945 w/AD-here LOF 65-00, and Sasobit.
- (2) For amine based WMA additives, 25% of the additive must be considered an amine based anti-stripping agent. Amine based WMA additives with anti-stripping agents shall be terminal blended by the binder supplier or a system approved by the Flexible Pavements Engineer for application at the plant. For all other warm mix technologies hydrated lime shall be added at a minimum rate of 1.25% by weight of virgin aggregate, including the weight of limestone. Hydrated Lime shall not be used on Level II WMA mixtures when the WMA additive is an Amine based additive or when the Amine WMA additives are used in combination with Level I water injection. The minimum rate for amine based WMA additives shall be 0.7%. The dosage rate of anti-strip shall not exceed manufacturer's recommendations.
- (3) The drop in temperature shall be a maximum of 90°F from the producer's recommended production temperature for HMA. Plant production temperatures shall not drop below 215°F.

d. Other WMA additives shall not be used unless otherwise approved by the Flexible Pavements Engineer.

e. WMA additives may be used in combination by approval of the Flexible Pavements Engineer.

f. Asphalt mixes shall be tested for TSR on the first lot of production and then on randomly selected lots thereafter.

g. Field samples shall be heated and compacted using the following table unless otherwise approved by the Flexible Pavements Engineer.

### Gyratory Compaction Temperatures

Mix Type	% Rap	Compaction Temp °F
SPS	0-25	270 + 5
	26-50	280 + 5
SPR	0-35	280 + 5
	36-50	290 + 5
SPH	0-35	300 + 5

- h. NDOR may suspend or eliminate the use of WMA on a project if any of the following conditions occur: rutting, segregation, surface voids, tearing, irregular surface, low density, raveling, stripping, or if pavement does not meet any other design criteria.
2. Warm Mix Asphalt (WMA) additives will be measured and paid for directly by the unit of each for the item "Hydrated Lime/Warm Mix Asphalt" for each ton of hot mix asphalt produced.

## ASPHALT DENSITY GAUGE (J-7-1013)

### Description

An Asphalt Density Gauge may be used for Quality Control when determining the in-place density of asphaltic concrete.

### Material Requirements

The device must be approved by the Flexible Pavements Engineer.

### Testing Method

1. The Contractor shall establish the method of testing in the preconstruction conference. All testing shall be in accordance with AASHTO T-343 and as directed in this provision.
2. The first 3 density locations of the project shall be cored in accordance with AASHTO T166 to calibrate the asphalt density gauge. Prior to coring, the Contractor shall calibrate the device at each core location.
3. Calibration: A correction factor shall be established for the first 3 cores by calculating the difference between the average density measurement of the asphalt density gauge and the roadway core density. This correction factor shall be entered into the device and used for measuring subsequent densities. The correction factor shall be verified with another core for every 15 density readings that are to be recorded.
4. Density Reading Procedure: Place the asphalt density gauge on the asphalt mat over the area to be tested. Record the density reading, and repeat this process for a total of 5 readings, as detailed in Figure 1. An average of the 5 readings will be used as the density reading for each location. For densities taken less than 6 inches from the edge

of the lift, density readings shall be taken as shown in Figure 2. The span between density reading locations in each direction shall be no greater than 12”.

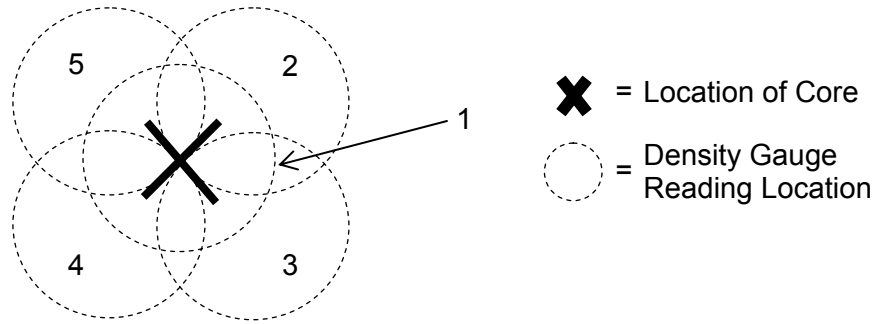


Figure 1: Asphalt density gauge reading pattern

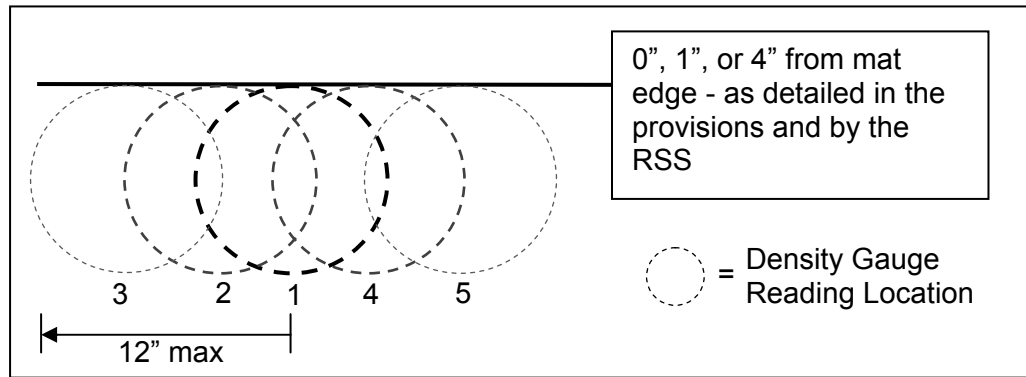


Figure 2: Asphalt density gauge reading pattern less than 6" from mat edge

5. If any density measured by the asphalt density gauge is below 90%, a density core shall be cut at that location and used for density measurement for that subplot. Density readings below 90% shall not be used to calculate a correction factor. All disputed values determined using the asphalt density gauge will be resolved using AASHTO T 166.

### ASPHALTIC CONCRETE LONGITUDINAL JOINT DENSITY TESTING (J-7-1013)

#### Description

One sample for determination of joint density will be taken randomly from each lot. This joint density sample stands independent of the required standard density per subplot used for determining the average of 5 density pay factor.

## Equipment

Testing shall be conducted in accordance with the AASHTO T 166, NDR T 587, or an approved Asphalt Density Gauge. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel, along with all other inputs when NDR T 587 or the Asphalt Density Gauge is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheets.

## Testing

1. The Contractor shall establish the method of testing in the preconstruction conference.
2. One sample for determination of joint density will be taken randomly from each lot, as determined by the Engineer. The location of the edge density samples are identified by the Random Sampling Schedule.
3. The joint density core shall be cut 1 inch away (laterally) from the identified edge of the top of the mat.
4. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
5. The Department will observe the Contractor taking, transporting, and testing the cores (as applicable). The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 or the Asphalt Density Gauge will be resolved using AASHTO T166.
6. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

**Note:** The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

7. Exceptions to the sampling and testing of joint density core samples for the determination of density are as follows:
  - a. When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
  - b. When the average thickness for the standard lot is 1 inch (25 mm) or less, the testing of joint density samples for this lot will be waived.



8. If requested by the Contractor, a re-test for the original joint density test, taken no later than the working day following the receipt of the test result, will be allowed. Locations of re-tests will be provided by the Engineer from the Random Sampling Schedule. The density obtained by the re-test shall be used to establish the density pay factor for the lot.

### Method of Measurement

All work related to the Asphaltic Concrete Longitudinal Joint Density Sample will not be measured and paid for but will be subsidiary to the associated asphaltic concrete.

### Basis of Payment

1. The pay factor shall be computed according to the following table:

<b>Joint Density Test Lot Pay Factor</b>			
<b>Joint Density</b>	<b>SPS</b>	<b>SPR</b>	<b>SPH</b>
93.0 or greater	102%	102%	102%
92.0 to 92.9	100%	102%	102%
91.0 to 91.9	98%	100%	102%
90.0 to 90.9	98%	98%	100%
89.0 to 89.9	98%	98%	98%
88.9 or Less	98%	98%	98%

2. The pay factor will be incorporated in the production specs calculation in the Superpave Software. Any incentive or disincentive will be added or subtracted to the pay factor after any other applicable production tolerances pay factors have been incorporated. The pay factor will apply to the entire lot.

## **HYDRATED LIME FOR ASPHALT MIXTURES (J-12-0213)**

### 1. General

Hydrated lime will be added to all aggregates (at the Contractor's option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS, HRB and SPL. Hydrated lime will be added to pre-moistened aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of moisture and hydrated lime to the aggregates along with equipment calibration and procedures to prevent any "dusting" shall be documented and approved in the Contractor's Quality Control (QC) Plan.

### 2. Material Requirements

The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating

shall also be used within 90 days. Lime that is stored over 90 days in a protected storage silo environment may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

### **3. Construction**

Prior to the addition of hydrated lime the aggregates shall have a minimum moisture content of 3% by weight of aggregate. The surface of the aggregate shall be uniformly dampened by water.

If additional moisture is required it shall be added at the entry end of an enclosed pug mill mixer and prior to the addition of hydrated lime.

Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.

### **4. Equipment**

The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm). Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated, alerting the plant that the hydrated lime is not being introduced into the mixture.

The hydrated lime storage silo shall have enough capacity for continuous production. The silo shall be replenished by pneumatic delivery from road tankers at a pressure that will not create dusting. Hydrated lime will be dispensed from the silo into the pug mill by a conventional vane feeder or a load cell pod system.

The mechanism for adding moisture to the aggregate will be configured and located to insure that all virgin aggregate is uniformly coated with moisture prior to the lime application.

**5. Sampling and Testing**

Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

A physical inventory of hydrated lime usage will be required during mix production. A daily silo inventory, noting "beginning weight", "weight added during the day's production", and "end of day weight", will be recorded and made available for review by the Engineer. When a weigh pod system is used, an accumulative accounting method shall be used to calculate and review lime addition rates throughout production. When calculations indicate a hydrated lime usage of  $\pm 0.15$  percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having 0.15 percent below the design percentage shall be removed and replaced at no cost.

The percent of moisture shall be determined and documented: 1) from belt samples or 2) from stockpile samples, a minimum of once per day.

**6. Mixture QC and Verification Testing**

During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.

**7. Method of Measurement:**

Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.

Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".

**8. Basis of Payment:**

Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

**HYDRATED LIME SLURRY FOR ASPHALT MIXTURES  
(J-12-0213)**

- 1. General** — The Contractor will have the option of using Hydrated Lime Slurry For Asphalt Mixtures or Hydrated Lime For Asphalt Mixtures. Hydrated lime slurry will be added to all aggregates (at the Contractor's option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS and SPL. Hydrated lime slurry will be added to aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of

hydrated lime slurry to the aggregates along with equipment calibration and procedures shall be documented and approved in the Contractor's Quality Control (QC) Plan.

2. **Material Requirements** — The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The dry hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating shall also be used within 90 days. Hydrated lime (dry or slurry) that is stored over 90 days in a protected storage silo or slurry tank may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

3. **Construction** — Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.
4. **Equipment** — The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm).

Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated; alerting the plant that the hydrated lime is not being introduced into the mixture.

A minimum of two hydrated lime slurry tanks shall be used for blending and supply. Slurry shall be drawn for production from only one tank at a time. The hydrated lime slurry tanks shall have enough capacity for continuous production.

Hydrated lime slurry shall be dispensed from a slurry tank into the pug mill by a pressure regulated spray system having an electronic flow measurement system that has been calibrated to insure the proper application rates will be provided. Certificate of Calibration for the spray bar system should be provided by the Contractor with the calibration being performed by a third party every 12 months (minimum) or at the Engineer's request.

The electronic flow measurement system shall automatically record the flow rate of the lime slurry being feed to the pug mill. The data recorder system shall be capable of

recording the flow rate (in gallons per minute) at intervals of not more than 5 minutes and shall have the capability of calculating the volume of lime slurry used each day, from each slurry tank, and shall be capable of printing a summary of the daily lime slurry usage for each tank. This printout of the daily lime slurry volumes shall be presented to the NDOR representative at the end of each day's production.

- 5. Blending and Supply Hydrated Lime Slurry** — The Contractor shall determine the target hydrated lime slurry concentration (percent solids) that will be used to produce the asphalt mixture. This target concentration value shall be provided to the Engineer prior to production of the asphalt mixture and shall not be less than 30 percent. The target concentration value shall not be modified without the approval of the Engineer. It is the Contractor's responsibility to control the concentration of the hydrated lime slurry.

Only valid weights of dry hydrated lime shall be added to the required quantity of water to provide uniform hydrated lime slurry having a dry solids content within  $\pm 0.5$  percent of the Contractor's target value. Water or dry hydrated lime shall not be added to a tank that is actively supplying hydrated lime slurry to the pug mill. Hydrated lime slurry shall not be drawn from a tank that is not completely blended in accordance with the manufacturer's recommendations.

The hydrated lime slurry in the active supply tank shall be agitated prior to and during production in accordance with the manufacturer's recommendations.

Dry hydrated lime shall be transferred at a pressure that will not create dusting.

- 5.1** If individual hydrated lime slurry tanks are dedicated to only blending or supply, then thoroughly mixed hydrated lime slurry may be added from the blending tank(s) to the supply tank during production, provided the concentrations are within  $\pm 0.5$  percent.
- 5.2** If the hydrated lime slurry tanks are used for both blending and supply, the tanks shall be plumbed such that hydrated lime slurry can be supplied to the pug mill from any of the blending/supply tanks without disruption of the slurry supply.
- 6. Sampling and Testing** — Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

The concentration of the lime slurry shall be controlled within  $\pm 0.5$  percent of the target hydrated lime slurry concentration (percent solids). The concentration of the hydrated lime shall be determined in accordance with section 6.1. It is the Contractor's responsibility to halt production to make adjustments when the concentrations fall out of compliance.

The concentration of the lime slurry shall be determined and recorded by the Contractor immediately following blending each batch of lime slurry for the project. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be made available to the Engineer upon request.

A physical inventory of hydrated lime usage will be required during mix production. This inventory shall be used to verify the lime application rate, and for payment of the

hydrated lime. The concentration of the lime slurry shall be determined and recorded by the Contractor at the beginning and at approximately the mid-point of each day's production. The hydrated lime slurry samples shall be collected from the supply line leading to the pug mill. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be presented to the NDOR representative at the end of each day's production.

When calculations indicate that the application rate of "dry" hydrated lime to the aggregate is  $\pm 0.15$  percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having a "dry" hydrated lime application rate (applied to aggregate) of 0.15 percent below the design percentage shall be removed and replaced at no cost.

**6.1** The Contractor shall determine the solids content (concentration) of the hydrated lime slurry using Table 1, Table 2 and the Slurry Worksheet. The Contractor shall provide and use the standard weight per 83.205-ml Gardner cup meeting the requirements of ASTM D 244.

After a batch of lime slurry has been produced, use the following procedures to verify that the intended percent solids have been achieved.

1. Fill a quart container 3/4 full with lime slurry. Samples can be taken from ports located at either end of the vessel. Do not use glass.
2. Weigh a dry, empty Gardner (WPG) cup and cover to the nearest 0.01 of a gram. Record this weight.
3. Shake the lime slurry sample well. Immediately fill the WPG cup.
4. Tap the WPG cup lightly on an immovable object to allow for the escape of air bubbles.
5. Slowly turn the cap of the WPG cup until it is completely seated. If the cover is pushed on quickly, lime slurry will squirt out through the hole in the center. Be sure to point the top of the WPG away from you (or others) while putting on the cap.
6. Hold the WPG cup by the top and bottom with thumb and forefinger. Be sure to cover the hole in the cap.
7. Rinse the WPG cup under running water to remove any lime from the outside of the cup.
8. Dry the outside of the cup thoroughly.
9. Weigh the dry, filled WPG cup to the nearest 0.01 of a gram. Record this weight.
10. Promptly remove the cover, insert thermometer and record the temperature.
11. Subtract the empty cup weight (from step 2) from the filled cup weight (step 9) and record the difference.

12. Multiply the difference by 0.1. This number is the density (lbs./gallon) of the lime slurry. Record this number.
  13. Look up the temperature correction in Table 2 and record the value.
  14. Multiply the slurry density times the temperature correction value. This is the adjusted slurry density. Record the adjusted slurry density on the slurry worksheet.
  15. Find the nearest density to that recorded above on the "Slurry Solids Chart" on Table 1, Slurry Solids Chart - 24 degrees C. The corresponding number is the percent solids (concentration) of the lime slurry sample. Record on worksheet.
7. **Mixture QC and Verification Testing** — During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.
8. **Method of Measurement** — Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.
- Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".
9. **Basis of Payment** — Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

**Table 1, Page 1**  
**Slurry Solids Chart – 24°C**

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
9.108	15.1	9.402	20.1	9.715	25.1	10.050	30.1
9.114	15.2	9.406	20.2	9.722	25.2	10.057	30.2
9.120	15.3	9.414	20.3	9.728	25.3	10.064	30.3
9.128	15.4	9.420	20.4	9.735	25.4	10.071	30.4
9.131	15.5	9.426	20.5	9.741	25.5	10.078	30.5
9.137	15.6	9.433	20.6	9.748	25.6	10.085	30.6
9.143	15.7	9.439	20.7	9.755	25.7	10.092	30.7
9.148	15.8	9.445	20.8	9.761	25.8	10.099	30.8
9.154	15.9	9.451	20.9	9.768	25.9	10.106	30.9
9.160	16.0	9.457	21.0	9.774	26.0	10.113	31.0
9.166	16.1	9.463	21.1	9.781	26.1	10.120	31.1
9.171	16.2	9.469	21.2	9.787	26.2	10.127	31.2
9.177	16.3	9.476	21.3	9.794	26.3	10.134	31.3
9.183	16.4	9.482	21.4	9.800	26.4	10.141	31.4
9.189	16.5	9.488	21.5	9.807	26.5	10.148	31.5
9.195	16.6	9.494	21.6	9.814	26.6	10.155	31.6
9.200	16.7	9.500	21.7	9.820	26.7	10.163	31.7
9.206	16.8	9.506	21.8	9.827	26.8	10.170	31.8
9.212	16.9	9.513	21.9	9.833	26.9	10.177	31.9
9.218	17.0	9.519	22.0	9.840	27.0	10.184	32.0
9.224	17.1	9.525	22.1	9.847	27.1	10.191	32.1
9.230	17.2	9.531	22.2	9.853	27.2	10.198	32.2
9.235	17.3	9.538	22.3	9.860	27.3	10.205	32.3
9.241	17.4	9.544	22.4	9.867	27.4	10.212	32.4
9.247	17.5	9.550	22.5	9.873	27.5	10.220	32.5
9.253	17.6	9.556	22.6	9.880	27.6	10.227	32.6
9.259	17.7	9.563	22.7	9.887	27.7	10.234	32.7
9.265	17.8	9.569	22.8	9.894	27.8	10.241	32.8
9.271	17.9	9.575	22.9	9.900	27.9	10.248	32.9
9.277	18.0	9.581	23.0	9.907	28.0	10.255	33.0
9.282	18.1	9.588	23.1	9.914	28.1	10.263	33.1
9.288	18.2	9.594	23.2	9.920	28.2	10.270	33.2
9.294	18.3	9.600	23.3	9.927	28.3	10.277	33.3
9.300	18.4	9.607	23.4	9.934	28.4	10.284	33.4
9.306	18.5	9.613	23.5	9.941	28.5	10.292	33.5
9.312	18.6	9.619	23.6	2.948	28.6	10.299	33.6
9.318	18.7	9.626	23.7	9.954	28.7	10.306	33.7
9.324	18.8	9.632	23.8	9.961	28.8	10.314	33.8
9.330	18.9	9.638	23.9	9.968	28.9	10.321	33.9
9.336	19.0	9.645	24.0	9.975	29.0	10.328	34.0
9.342	19.1	9.651	24.1	9.982	29.1	10.335	34.1
9.348	19.2	9.658	24.2	9.988	29.2	10.343	34.2
9.354	19.3	9.664	24.3	9.995	29.3	10.350	34.3
9.360	19.4	9.670	24.4	10.002	29.4	10.358	34.4
9.366	19.5	9.677	24.5	10.009	29.5	10.365	34.5
9.372	19.6	9.683	24.6	10.016	29.6	10.372	34.6
9.378	19.7	9.690	24.7	10.023	29.7	10.380	34.7
9.384	19.8	9.696	24.8	10.030	29.8	10.387	34.8
9.390	19.9	9.703	24.9	10.037	29.9	10.394	34.9
9.396	20.0	9.709	25.0	10.044	30.0	10.402	35.0



**Table 1, Page 2**  
**Slurry Solids Chart – 24°C**

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
10.409	35.1	10.795	40.1	11.210	45.1	11.658	50.1
10.417	35.2	10.803	40.2	11.218	45.2	11.667	50.2
10.424	35.3	10.811	40.3	11.227	45.3	11.677	50.3
10.432	35.4	10.819	40.4	11.236	45.4	11.686	50.4
10.439	35.5	10.827	40.5	11.244	45.5	11.695	50.5
10.447	35.6	10.835	40.6	11.253	45.6	11.705	50.6
10.454	35.7	10.843	40.7	11.262	45.7	11.714	50.7
10.462	35.8	10.851	40.8	11.270	45.8	11.724	50.8
10.469	35.9	10.859	40.9	11.279	45.9	11.733	50.9
10.477	36.0	10.867	41.0	11.288	46.0	11.743	51.0
10.484	36.1	10.875	41.1	11.297	46.1	11.752	51.1
10.492	36.2	10.883	41.2	11.305	46.2	11.762	51.2
10.499	36.3	10.892	41.3	11.314	46.3	11.771	51.3
10.507	36.4	10.900	41.4	11.323	46.4	11.781	51.4
10.514	36.5	10.908	41.5	11.332	46.5	11.790	51.5
10.522	36.6	10.916	41.6	11.341	46.6	11.800	51.6
10.530	36.7	10.924	41.7	11.349	46.7	11.809	51.7
10.537	36.8	10.932	41.8	11.358	46.8	11.819	51.8
10.545	36.9	10.941	41.9	11.367	46.9	11.828	51.9
10.552	37.0	10.949	42.0	11.376	47.0	11.838	52.0
10.560	37.1	10.957	42.1	11.385	47.1	11.848	52.1
10.568	37.2	10.965	42.2	11.394	47.2	11.857	52.2
10.575	37.3	10.974	42.3	11.403	47.3	11.867	52.3
10.583	37.4	10.982	42.4	11.412	47.4	11.877	52.4
10.591	37.5	10.990	42.5	11.421	47.5	11.886	52.5
10.599	37.6	10.998	42.6	11.430	47.6	11.896	52.6
10.606	37.7	11.007	42.7	11.439	47.7	11.906	52.7
10.614	37.8	11.015	42.8	11.447	47.8	11.915	52.8
10.622	37.9	11.023	42.9	11.456	47.9	11.925	52.9
10.629	38.0	11.032	43.0	11.465	48.0	11.935	53.0
10.637	38.1	11.040	43.1	11.475	48.1	11.945	53.1
10.645	38.2	11.048	43.2	11.484	48.2	11.954	53.2
10.653	38.3	11.057	43.3	11.493	48.3	11.964	53.3
10.661	38.4	11.065	43.4	11.502	48.4	11.974	53.4
10.668	38.5	11.074	43.5	11.511	48.5	11.984	53.5
10.676	38.6	11.082	43.6	11.520	48.6	11.994	53.6
10.684	38.7	11.090	43.7	11.529	48.7	12.004	53.7
10.692	38.8	11.099	43.8	11.538	48.8	12.014	53.8
10.700	38.9	11.107	43.9	11.547	48.9	12.023	53.9
10.707	39.0	11.116	44.0	11.556	49.0	12.033	54.0
10.715	39.1	11.124	44.1	11.566	49.1	12.043	54.1
10.723	39.2	11.133	44.2	11.575	49.2	12.053	54.2
10.731	39.3	11.141	44.3	11.584	49.3	12.063	54.3
10.739	39.4	11.150	44.4	11.593	49.4	12.073	54.4
10.747	39.5	11.158	44.5	11.602	49.5	12.083	54.5
10.755	39.6	11.167	44.6	11.612	49.6	12.093	54.6
10.763	39.7	11.175	44.7	11.621	49.7	12.103	54.7
10.771	39.8	11.184	44.8	11.630	49.8	12.113	54.8
10.779	39.9	11.193	44.9	11.639	49.9	12.123	54.9
10.787	40.0	11.201	45.0	11.649	50.0	12.134	55.0

**Table 2**  
**Correction Factor to Adjust Slurry Densities for Temperature**

<b>Temp (C)</b>	<b>Factor</b>	<b>Temp (C)</b>	<b>Factor</b>
20	0.99927	61	1.01176
21	0.99944	62	1.01218
22	0.99962	63	1.01262
23	0.99981	64	1.01305
24	1.00000	65	1.01349
25	1.00002	66	1.01394
26	1.00041	67	1.01439
27	1.00063	68	1.01485
28	1.00085	69	1.01531
29	1.00109	70	1.01578
30	1.00132	71	1.01626
31	1.00157	72	1.01673
32	1.00182	73	1.01722
33	1.00208	74	1.01770
34	1.00234	75	1.01820
35	1.00261	76	1.01870
36	1.00289	77	1.01920
37	1.00318	78	1.01971
38	1.00347	79	1.02022
39	1.00376	80	1.02074
40	1.00407	81	1.02126
41	1.00438	82	1.02179
42	1.00469	83	1.02232
43	1.00501	84	1.02286
44	1.00534	85	1.02341
45	1.00567	86	1.02395
46	1.00601	87	1.02451
47	1.00635	88	1.02506
48	1.00670	89	1.02563
49	1.00706	90	1.02619
50	1.00742	91	1.02677
51	1.00779	92	1.02734
52	1.00816	93	1.02793
53	1.00854	94	1.02851
54	1.00892	95	1.02911
55	1.00931	96	1.02970
56	1.00970	97	1.03031
57	1.01010	98	1.03091
58	1.01051	99	1.03152
59	1.01092	100	1.03214
60	1.01134	101	1.03276



**PORTLAND CEMENT CONCRETE  
(J-15-0914)**

Paragraph 1. of Subsection 1002.02 in the Standard Specifications is amended to include the following:

Concrete mixes will be in accordance of Table 1002.02.

Paragraph 3. of Subsection 1002.02 is void and superseded by the following:

3. Type IP and IT Interground/Blended cement shall be used for all classes of concrete except for pavement repair. Type IP and IT Interground/Blended cement shall meet all requirements of ASTM C 595. Pavement repair shall include Type I/II Portland Cement for Class PR1 Concrete and Type III Portland Cement shall be used in Class PR3 Concrete.

Tables 1002.02 and 1002.03 in Subsection 1002.02 are void and superseded by the following:

**ENGLISH  
TABLE 1002.02**

Class of Concrete (1)	Base Cement Type	Total Cementitious Materials Min. lb/cy	Total Aggregate		Air Content % Min.-Max. (2)	Ledge Rock (%)	Water/Cement Ratio Max. (3)	Required Strength Min. psi
			Min. lb/cy	Max. lb/cy				
47B**	IP/IT*	564	2850	3150	6.5 - 9.0	-	0.45	3500
47B***		564	2850	3150	6.0 - 8.5	-	0.45	3500
47BD		658	2500	3000	6.0 - 8.5	30+3	0.42	4000
47B-HE		752	2500	3000	6.0 - 8.5	30±3	0.40	3500
BX <sub>(4)</sub>		564	2850	3150	6.0 - 8.5	-	0.45	3500
47B-OL		564	2850	3200	6.0-8.5	30±3	0.36	4000
PR1	I/II	752	2500	2950	6.0 - 8.5	30±3	0.36	3500
PR3	III	799	2500	2950	6.0 - 8.5	30±3	0.45	3500
SF <sub>(5)</sub>	I/II	589	2850	3200	6.0 - 8.5	50±3	0.36	4000

- (1) Each class of concrete shall identify the minimum strength requirement, per plans and specifications.  
All classes of concrete shall be air-entrained and a water-reducing admixture shall be used per manufacture's recommendations.
- Class R Combined Aggregate shall use a mid-range water reducer admixture. The dosage shall be at the manufacture's recommendation and the Engineer may approve a low-range water reducer admixture.
- (2) As determined by ASTM C 138 or ASTM C 231.  
*FOR INFORMATION ONLY. The Contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as, checking the air content behind the paver.*
- (3) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38, unless the Contractor requests approval from the Engineer in writing to change the minimum water/cement ratio to 0.36.
- (4) For temporary surfacing, Type I/II cement is allowed.
- (5) Minimum Portland Cement shall be 564 lbs/cyds and the total Silica Fume added shall be 25 lbs/cyds.

(\* ) Refer to Subsection 1004.02 for material characteristics.

**Lithium Nitrate** may be used in place of Supplemental Cementitious Materials (SCMs), see Section 1007 of the Standard Specifications as modified in these Special Provisions.

(\*\*) For slip form applications.

(\*\*\*) For hand-pours and substructures applications.

<b>Table 1002.03</b>	
<b>Table of Acceptable Concrete Class Substitutions</b>	
Class Specified	Acceptable Class for Substitution
BX	47B, 47BD or 47B-HE
47B	47BD or 47B-HE

Paragraphs 5., 6., 7., 8., 9. and 10. of Subsection 1002.02 are void and superseded by the following:

5. Class PR1 and PR3 Concrete:
  - a. The calcium chloride for use in PR concrete shall be either:
    - (1) A commercially prepared solution with a concentration of approximately 32 percent by weight.
    - (2) A Contractor prepared solution made by dissolving 4.5 pounds of Grade 2 or 6.2 pounds of Grade 1 calcium chloride per gallon of water to provide a solution of approximately 32 percent by weight.
  - b. The 7.4 pounds of water in each gallon of solution shall be considered part of the total water per batch of concrete.
  - c. The calcium chloride solution shall be added, just prior to placement, at a rate of 0.375 gallons/100 pounds of cement (1.4 lb. calcium chloride per 100 lb. cement).
  - d. Class A, Flaked or Pellet Calcium Chloride shall be added at a rate not to exceed 2.0 percent of the weight of the cement for Grade 1, or 1.6 percent of the weight of the cement for Grade 2. Grade 1 Calcium Chloride purity is between 70 and 90 percent and Grade 2 Calcium Chloride is between 91 and 100 percent.
  - e. Where mixing trucks are used:
    - (1) For Class PR3 Concrete, calcium chloride shall be thoroughly mixed into the concrete before placement. The minimum mixing time is 2 minutes.
    - (2) For Class PR1 Concrete, calcium chloride shall be added first and then the concrete mixed at least 2 minutes or as required by manufacturer. Next, the Type F high range water-reducer admixture is added and the concrete is mixed an additional 5 minutes.
6. Class High Early (47B-HE) Concrete
  - a. High Early (47B-HE) concrete shall be cured as prescribed in Subsection 603.03, Paragraph 7. The Contractor shall take necessary curing measures so the required strength is achieved.
  - b. High Early concrete shall achieve a compressive strength of 3,500 psi at 48 hours after placement.

- c. The 48-hour compressive strengths shall be used to determine pay factor deductions for high early concrete in accordance with Table 603.03.
  - d. A non-calcium chloride accelerator shall be used when the ambient temperature at the time of the placement of concrete is 70°F or less.
  - e. When requested by the Contractor, the maturity method, as provided in NDR C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraphs 11.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic and acceptance. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Engineer.
7. The yield of the concrete proportions shall be determined and adjusted by the Producer.
8. All Classes of Concrete with the exception of PR1 and PR3 shall have a Durability Factor not less than 70 and a mass loss not greater than five percent after 300 freeze/thaw cycles when tested in accordance with ASTM C 666. The freeze/thaw testing shall be conducted according to Procedure A.

Paragraphs 1. & 2. of Subsection 1002.03 are void and superseded by the following:

1. The Contractor shall identify the plant that will supply the concrete 14 days before use and be entirely responsible for its calibration, batching of concrete, aggregate and sampling of cement per NDR Sampling Guide.
- a. The Contractor shall be responsible for the following:
    - 1) Batching concrete.
    - 2) Contractor shall sample aggregate from the conveyor belt or stockpile. Gradations from a split sample shall be tested in accordance to Section 1033 and reported to the Engineer at the frequency required by the Materials Sampling Guide.
      - i. Contractor shall retain possession of the split samples on-site at the Contractor's facility until such a time as determined by the Engineer.
        - a. At the pre-construction meeting:
          - 1) Contractor shall determine the location of testing and report the names of the technician performing the sampling and testing.
          - 2) Engineer will notify the Contractor of the retrieval of the split samples.
        - ii. The Contractor shall split the sample, place the Department's split sample into a cloth bag and immediately seal the split sample with the provided security seal. The cloth sample bag shall be supplied by the Department.
        - iii. The sampling splitting and placement of the security seal of aggregate samples shall be witnessed by certified Department personnel.

- iv. Contractor shall secure the split sample using a consecutively numbered security seal of 75 pounds breaking strength provided by the Department. The Contractor shall use the consecutively numbered security seals to identify and track each Aggregate Class. Samples that are not consecutively numbered will be investigated for custody of the sample and the Engineer may cease production until it is determined what action will be required.
  - a. The Contractor shall report the security seal tracking number with the split sample gradation.
  - b. The following training shall be required for personnel who oversee the batching of the concrete:
    - 1) Concrete Technician Personnel
      - i. Concrete Plant Technician
    - 2) Portland Cement Sampler
      - i. NDR Portland Cement Sampler
- 2. Portland Cement Concrete shall be supplied by certified Ready Mix Plants that are in compliance with the requirements in the *Quality Control Manual*, Section 3, -- Certification of Ready Mixed Concrete Production Facilities published by the National Ready Mixed Concrete Association. Refer to NDR Material Sampling Guide for the policy on stationary and portable plants.

Paragraph 4. of Subsection 1002.03 is void and superseded by the following:

- 4. a. Mix times shall meet the requirements of ASTM C 94. Mixing time tests shall be repeated whenever the concrete appearance indicates that mixing was inadequate.
- b. Batch plants that are transporting the concrete in non-agitating trucks, the mixing time will not be less than 60 seconds, and for agitating trucks, the mixing time will not be less than 45 seconds.
- c. The Certification of stationary and portable ready mix plants will conform to the tests that are required in the NDR Materials Sampling Guide.

Paragraph 6. of Subsection 1002.03 is void and superseded by the following:

- 6. Batch tickets shall be prepared as prescribed in the National Ready Mixed Concrete Association's *Quality Control Manual*. The Contractor shall keep all gradations and batch tickets until final acceptance by the Department. Projects that have less than 200 cubic yards of concrete placed will be allowed to have hand written tickets. For projects greater than 200 cubic yards, hand written tickets will be at the Engineer's discretion. The concrete batch tickets shall show batch weights, aggregate moisture (shall be tested daily and moisture probes are allowed), admixtures used, water, and mix design calculations. A copy of the batch ticket shall be given to the Engineer upon delivery of concrete.



Paragraph 8. of Subsection 1002.03 is void and superseded by the following:

8. Coarse aggregate and aggregate from a dry pit shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours prior to the concrete mixing to allow complete saturation.

Paragraph 13.a. of Subsection 1002.03 is void and superseded by the following:

13. a. The quantity of water shall be determined by the Contractor. The minimum quantity of water should be used which will produce required workability. Any additional water used to rinse the charging hopper and fins after the batching of concrete is allowed. This water must be estimated and recorded on the batch ticket.

Subsection 1002.04 is void and superseded by the following:

1. Class 47B Concrete Mix Design Submittal:
  - a. The Contractor shall submit the Concrete Mix Design Worksheet consisting of design mix proportions, testing of mix design from a minimum of 4 cubic yards and aggregate data for 47B class of concrete being placed on the project.
    - (1) All testing must be performed by a qualified laboratory found on the NDR's Material and Research website, under the *Nebraska Qualified Consultant & LPA Laboratories* and submitted to the Engineer.
    - (2) The Concrete Mix Design shall be submitted to the Engineer 4 weeks prior to any concrete being placed on the project.
    - (3) The Concrete Mix Design shall not be paid for directly by the Department and shall be subsidiary to items which direct payment is made.
    - (4) Concrete shall not be placed on the project before the Concrete Mix Design Worksheet has been reviewed and approved by the Engineer.
  - b. The Contractor shall submit the Concrete Mix Design Worksheet to the Engineer. Email submissions are preferred but will be accepted by fax or postal mail.
    - (1) Contractor's Mix Design Worksheet can be found on the Materials and Research website. The submitted Mix Design Worksheet shall include the following:
      - Contractor Name
      - Project Number
      - Date
      - Location of ready mix or central mix plant
      - Date submitted
      - Signature of Contractor representative

- (2) Material Source Information.
  - Cement Manufacturer
  - Type of Interground/Blended Cement
  - Type of Admixtures
  - Aggregate Pit and Quarry location
- (3) Specific Gravity of each individual aggregate source.
- (4) Sand Equivalent for dry pit sand-gravel aggregate.
- (5) Combined Aggregate percent passing as described on Table 1033.03C.
- (6) Contractor's Target combined aggregate gradation percent passing.
  - (i) The Contractor's required worksheet can be found on the Materials and Research website.

(7) Testing of Mix Design:

The mix design shall show the weights of all ingredients including Interground/Blended cements, aggregates, water, admixtures types and water cement ratio.

- Temperature of concrete at time of sampling, ASTM C 1064.
  - The air content of plastic concrete, ASTM C 231.
  - Weight per cubic foot, Yield, ASTM C 138. The relative Yield shall be a minimum of 97%.
  - Compressive strength shall be performed with a minimum of three averaged specimens at 7-day and 28-day, ASTM C 39. The minimum 28-day compressive strength shall be 3500 psi.
- (8) Traditional 47B Mix Design is defined as an IP(25) cement, 70 percent Class B Aggregate and 30 percent Class E Aggregate may be exempt from the concrete testing described in Paragraph 1.(b)(7). All other requirements shall be included in the Concrete Mix Design Report.

- c. The PCC Engineer will notify the Contractor of the mix design approval for Class 47B Concrete. Approval of the mix design does not alleviate the Contractor of the responsibility of the in-place concrete. The Contractor may adjust admixtures, water cement ratio, vibrator frequency, etc., as needed in accordance to the specifications.
- d. The Contractor shall submit a new concrete mix design worksheet meeting the above requirements when a change occurs in the source,

type, or proportions of cements or aggregates; unless otherwise approved by the Engineer.

2. The quantity of water to be used shall be determined by the Contractor. It shall not be varied without the Engineer's consent.
3. If the concrete mixture is excessively wet causing segregation, excessive bleeding, excessively dry or any other undesirable condition, the concrete shall be rejected. At the option of the Engineer, slump tests may be performed to determine the consistency.
4. Concrete which has developed initial set before it is consolidated and finished shall be rejected.
5.
  - a. If false set is encountered, the batching operation shall be stopped until the problem is resolved.
  - b. Each batch must be mixed or agitated for at least 3 additional minutes after observing the false set and the concrete must be of satisfactory consistency.
6. Compressive strength tests shall be made in accordance with ASTM C 39.
7. Concrete shall be sampled as prescribed in the NDR *Materials Sampling Guide*. Samples shall be taken at the point of placement, never before the discharge from the last conveyance.
8. Aggregate Acceptance, Verification, Sampling and Testing:
  - a. The aggregate will be accepted based on the Contractor's testing results except as noted below.
  - b. The aggregate verification sampling and testing by the Department will be randomly selected and tested according to subplot sizes in Table 1002.05.

Table 1002.05

Aggregate Class	Lot	Sublot
E and F	3000 tons	1000 tons
A,B and C	6000 tons	2000 tons
R	3000 tons	1000 tons

- c. The results of Contractor split sample will be verified by the Department's verification tests. Any samples outside of the tolerances as specified according to the Materials Sampling Guide, Section 28 under the *Acceptable Tolerance Limits for Independent Assurance* will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
  - d. On any given Lot, if the results of the gradation from the verification test are within Department's specification, the Contractor's results will be used for the entire lot. On any given Lot, if the gradations results from the

verification test are outside Department's specification, further investigation will be initiated by the Engineer for that subplot. Any or all of the remaining Department subplot samples may be tested and the Department subplot test results may be applied to the respective subplot and the acceptance will apply.

- e. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the split sample results, the Engineer will exercise one or more of the following:
  - Cease production.
  - Request additional verification testing.
  - Initiate a complete IA review.
  
- f. Independent Assurance (IA) Review of Testing:
  - 1) The Contractor shall allow the Department personnel access to the Contractors' laboratory to conduct IA review of the technician testing procedures and apparatus. Any deficiencies discovered in the Contractor's testing procedures will be reported to the Contractor and corrected by the Contractor.
  
  - 2) During the IA review, the Department personnel and the Contractor shall split a sample for the purpose of IA testing. The samples selected will be tested in the Department's Branch Laboratory. Any IA test results found to be outside of defined testing tolerances as stated in Paragraph 8.c. of Subsection 1002.04 will be reported to the Contractor. The Contractor shall immediately correct any deficiencies found during the IA review.
  
  - 3) If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department Central Laboratory will be asked to resolve the dispute, which will be final. All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDR's Materials Sampling Guide.

## **PORTLAND AND INTERGROUND/BLENDED CEMENT (J-15-0214)**

Section 1004 in the Standard Specifications is void and superseded by the following:

### **1004.01 – Description**

- 1. Portland cement is the binder in concrete, locking the aggregate into a solid structure. It is manufactured from Lime, Silica, and Alumina (with a small amount of plaster of Gypsum).
  
- 2. Equivalent alkali referred to herein is hereby defined as the sum of the Sodium Oxide ( $\text{Na}_2\text{O}$ ) and the Potassium Oxide ( $\text{K}_2\text{O}$ ) calculated as Equivalent Alkali  $\text{Na}_2\text{O}_e = \text{Na}_2\text{O} + 0.658 \text{K}_2\text{O}$ .

3. Interground and Blended cements consist of intimate and uniform intergrinding or blending of Portland cement clinker, Slag cement, Pozzolan and/or Limestone.

#### **1004.02 – Material Characteristics**

1. Type I, Type II, Type I/II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements:
  - a. Portland cement shall not contain more than 0.60 percent equivalent alkali.
  - b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and the total amount does not exceed 1 percent of the weight of Portland cement clinker.
2. Interground and Blended Cement shall conform to the requirements in ASTM C 595 with the following additional requirements:
  - a. Interground/Blended cement (Type IP)
    - (1) For Type IP(25) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 25%  $\pm$  2%.
    - (2) For Type IP(20) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 20% + 2%.
  - b. Interground/Blended cement (Type IT)
    - (1) For SCMs, Slag cement and Limestone, the maximum replacement by weight shall be 40%. The manufacturer has a production tolerance of  $\pm$  2% from the proposed replacement.
    - (2) For Slag Cement, the maximum replacement shall be 20% or less when incorporated into the final Interground/Blended cement.
    - (3) For Limestone cement, the replacement range shall be from 5.1% to 10.0% when incorporated into the final Interground/Blended cement.
  - c. No additional SCMs, Slag cement and Limestone will be added at the batch plant.

#### **1004.03 – Procedures**

1. The Contractor shall provide adequate protection for the Portland and Interground/Blended cement against dampness.
  - a. Portland and Interground/Blended cement shall be hauled or stored in railroad cars, dry bulk trailers or in suitable moisture-proof buildings.
  - b. The use of tarpaulins for the protection of the Portland and Interground/Blended cement against moisture will not be allowed.

2. No Portland and Interground/Blended cement which has become caked or lumpy shall be used.
3. Portland and Interground/Blended cement which has been spilled shall not be used.
4. Accepted Portland and Interground/Blended cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.
5. Portland and Interground/Blended cement coming directly from the manufacturer shall not be used until the temperature is 150°F or less.
6. Portland cement having false set when tested in accordance with in ASTM C 150 will not be used.

#### **1004.04 – Acceptance Requirements**

1. For Department projects, Portland and Interground/Blended cements must be on the NDR Approved Product List (APL).
2. The Contractor shall submit any new Portland and Interground/Blended cements to the Engineer to be approved for the APL with the following:
  - a. Material source information:
    - 1) Mill Location
    - 2) Type of Portland and Interground/Blended cements
    - 3) Grinding Period
    - 4) Associated Manufacture Product Name
    - 5) Provide source and type of each SCMs and/or Slag Cement used for final product.
      - (i) The Department will allow the use of ASTM C 1697.
        - a. When two or more SCMs and/or Slag Cement are pre-blended, the Contractor shall report chemical composition analysis of the final blend.
        - b. The final blend shall be reported as per ASTM C 1697, Paragraph 4.
    - 6) Portland cement shall conform to ASTM C 150.
    - 7) Interground/blended cements shall conform to ASTM C 595.
    - 8) Provide total cementitious materials replacement per ASTM C 595.
    - 9) Report test results per ASTM C 1567 at 28-days.

3. Alkali Silica Reaction Requirements and Testing:
  - a. Interground/Blended cement shall be tested according to the provisions of ASTM C 1567.
    - (1) The mortar bars shall be composed of Type IP or IT Interground/blended cement and sand and gravel from an approved Platte River Valley-Saunders County source.
      - i. When Elkhorn River-Madison County source or an out of state aggregate source and type IP(20) or IT cement is being used on a project, the Elkhorn River or an out of state aggregate source shall be used in lieu of the Platte River Valley-Saunders County source.
      - ii. When Contractor proposes a change of aggregate source, then the new aggregate source shall be tested by ASTM C 1567.
    - (2) The mortar bars for the ASTM C 1567 shall not exceed 0.10% expansion at 28 days.
      - i. To accommodate precision within multi-laboratory testing, expansion up to and including 0.13% will be accepted for use. If the expansion is above 0.13%, the material is noncompliant. If tolerance problems are not corrected within 30 days following notification, the Interground/blended cement in question will be removed from the NDR's APL.
4. Portland and Interground/Blended cements will be placed on NDR's APL based on the conformance with the NDR's Acceptance Policy Portland and Interground/Blended Cements.

#### **1004.05 - Sampling and Testing Requirements**

1. All Portland and Interground/Blended cements shall be sampled and tested at the rate as described in the NDR's Materials Sampling Guide.
  - a. The Department will inform the Contractor when a sample is required.
  - b. A sample shall be taken by a Contractor's Certified Portland Cement Sampler and must be under the supervision of Department certified personnel.
  - c. The sample shall be taken at the plant from a bulk shipment of a rail car, dry bulk trailer, batch plant silo or from the line between the bulk truck and the silo. Upon sampling, the Department will take immediate custody of the sample.
  - d. When Elkhorn River aggregate- Madison County source or an out of state aggregate source and type IP(20) or IT cement is being used on a project, the Elkhorn River or an out of state aggregate source shall be used in lieu of the Platte River Valley aggregate source.
2. Noncompliant material from the mill, terminal or project will be temporarily removed from the Approved Products List pending further investigation.
3. If the noncompliant Portland or Interground/Blended cement is removed from the Approval Products List, all shipments from the supplier will be held until the investigation of the failing samples have been completed by the NDR Materials and Research Division. These procedures shall be in accordance with this provision.

**WATER FOR CONCRETE  
(J-15-0214)**

Section 1005 in the Standard Specifications is void and superseded by the following:

**1005.01 – Description**

1. Water shall be free from objectionable quantities of oil, acid, alkali, salt, organic matter, or other deleterious materials and shall not be used until the source of supply has been approved.
2. Wash water from the mixer washout may be used only with the Engineer's approval. Use of wash water will be discontinued if undesirable reaction with admixtures or aggregates occurs.

**1005.02 – Material Characteristics**

1. Water which contains more than 0.25 percent total solids by weight shall not be used.
2. When required by the Engineer, the quality of mixing water shall be determined by NDR C 114, NDR T 290, NDR D 512, NDR C 1602, ASTM C 31, ASTM C 109, ASTM C 191, and ASTM C 1603.
3. Upon written request by the concrete producer and approval by Materials and Research, the concrete producer may utilize up to 10% wash water for batching all classes of concrete with the following conditions:
  - a. Wash water shall conform to the requirements in NDR's Material Sampling Guide under Policy for Certification of Ready Mix Plants.
  - b. Wash water must be clarified wash water that has been passed through a settling pond system.
  - c. Wash water must be scalped off of a settling basin that has been undisturbed for a minimum of 12 hours.
  - d. Wash water must be metered into each load.
  - e. Wash water quantities shall be shown on the batch ticket.

**CALCIUM CHLORIDE  
(J-15-0214)**

Section 1006 of the Standard Specifications is void and superseded by the following:

**1006.01 – Description**

Calcium Chloride shall be Type S (Solid) or Type L (Liquid). Calcium Chloride can be used for; but not limited to, dust control and acceleration of the set of concrete.



**1006.02 – Material Characteristics**

The requirements for calcium chloride shall be tested in accordance with ASTM D 98.

**1006.03 – Acceptance Requirements**

Acceptance shall be based on requirements contained in the NDR Materials Sampling Guide.

**SECTION 1007 -- CHEMICAL ADMIXTURES  
(J-15-0214)**

Section 1007 in the Standard Specifications is void and superseded by the following:

**1007.01 -- Description**

1. Admixtures are materials added to Portland cement concrete to change characteristics such as workability, strength, permeability, freezing point, and curing.
2. The Department's concrete admixture types are:
  - a. Type A - Water-Reducing Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump.
  - b. Type B - Retarding Admixture - An admixture that slows the setting of concrete.
  - c. Type C - Accelerating Admixture - An admixture that speeds the setting and early strength development of concrete.
  - d. Type D - Water-Reducing and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and slows the setting of concrete.
  - e. Type E - Water-Reducing and Accelerating Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and speeds the setting and early strength development of concrete.
  - f. Type F - Water-Reducing, High Range Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater.
  - g. Type G - Water-Reducing, High Range and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater and slows the setting of concrete.
  - h. Air-Entraining - An admixture that encapsulates air in the concrete.
  - i. Lithium Nitrate – An admixture used to control the Akali Silica Reaction (ASR) in concrete.

**1007.02 -- Material Characteristics**

1. Type A through G admixtures shall meet the requirements in ASTM C 494.
2. Air-entraining admixtures shall meet the requirements in ASTM C 260.
3. Use of admixtures other than those cited may be requested by the Contractor.
4. Admixtures shall not contain more than 1 percent of chlorides calculated as calcium chloride unless specified otherwise in the Specification.
5. Admixtures shall be used at the manufacturer's recommended dosage rates.
6. The air-entraining admixture characteristics shall produce concrete with satisfactory workability and total air content as prescribed in Table 1002.02.
7.
  - a. When using the Lithium Nitrate admixture, the Contractor shall submit to the Engineer:
    - (i) A five pound sample of Portland cement that will be used on the project.
    - (ii) The Manufacturer's method for determining the recommendation for the required dose rate based on the equivalent alkali content.
    - (iii) Water content of the Lithium Nitrate admixture solution.
  - b. The Engineer will report the equivalent alkali content to the Contractor. The Contractor shall use the reported equivalent alkali content to determine the required dose rate based on the manufacturer's recommendation.

**1007.03 -- Procedures**

1. The process for adding admixtures to a ready mix truck on the project site involves positioning the load of concrete up to the truck chute, stopping short of discharge.
  - a. The admixture is then poured over the surface of the concrete and mixed for at least 5 minutes.
  - b. No more than 1.3 gallons of water shall be used to rinse the admixture from the fins and top chute. This water must be shown on the proportioning report and shall not exceed the water cement ratio.
  - c. When Lithium Nitrate is used, the portion of the admixture that is water will be shown on the proportioning report and shall not exceed the water cement ratio.
  - d. The Contractor is responsible for the addition of the admixture.
2.
  - a. If the air content is less than the minimum specified, addition of air-entraining admixtures is allowed.
  - b. The Contractor shall take measures based on manufacturer's recommendations, that are within compliance of NDR Specifications, to bring the load of concrete into NDR prescribed limits according to Table 1002.02.
  - c. If the air content is then outside the limits in Table 1002.02, the load of concrete shall be rejected.

**1007.04 -- Acceptance Requirements**

1. a. Approved chemical admixtures are shown on the NDR Approved Products List.
- b. Admixture approval shall be based upon annual certifications and certified test results submitted to the NDR Materials and Research Division.
2. The admixture must be essentially identical in concentration, composition, and performance to the admixture tested for certification.
3. Admixtures not identified on the NDR Approved Products List may be used under the following conditions:
  - a. A certificate of compliance and certified test results must be submitted to the NDR Materials and Research Division and approval for use must be given by the NDR Materials and Research Division.

**SILICA FUME  
(J-15-0307)**

Paragraph 2 of Subsection 1009.03 in the Standard Specifications is void and superseded by the following:

2. Silica fume shall be protected from temperatures in excess of 90°F (32°C).

**LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE  
(J-15-0307)**

Subsection 1012.03 in the Standard Specifications is void and superseded by the following:

**1012.03 – Acceptance Requirements**

1. All curing compounds to be approved must be from the current calendar year with no carry-over from the previous years.
2. Approved compounds are on the NDR Approved Products List.
3. Products not on the NDR Approved Products List shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

## **BITUMINOUS LIQUID COMPOUNDS FOR CURING CONCRETE (J-15-1007)**

Section 1013 in the Standard Specifications is void and superseded by the following:

### **1013.01 – Description**

The compound shall consist essentially of an asphaltic base and shall be of a consistency suitable for spraying at temperatures existing at the time of construction operations. It shall form a continuous, uniform film. It shall be free of precipitated matter caused by conditions of storage or temperature. The compounds shall be relatively nontoxic.

### **1013.02 – Material Characteristics**

- a. When tested in accordance with AASHTO T 155, the loss of water shall not be more than 0.11 lb/ft<sup>2</sup> (0.55 kg/m<sup>2</sup>) of surface area at 3 days, unless otherwise specified by the Engineer.
- b. The Contractor has the option of using bituminous tack coat. The tack coat shall conform to all requirements of Section 504.

### **1013.03 – Acceptance Requirements**

Products shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

## **JOINT AND CRACK SEALING FILLER (J-15-0813)**

Section 1014 in the Standard Specifications is void and superseded by the following:

### **1014.01 – Description**

Joint sealing filler shall be either a cold applied silicone product or an asphalt product (hot pour) conforming to the requirements of this Section. The type of joint filler to be used shall be as specified in the plans or special provisions. If not specified, any of the joint sealing fillers in this Section may be used.

Crack sealing filler shall be a hot pour sealer conforming to the requirements of this Section.

### **1014.02 -- Material Characteristics**

1. NE-3405 and NE-3405LM (hot pour)
  - a. NE-3405 joint and crack sealer shall conform to the requirements of ASTM D6690, Type II. The material shall conform to the requirements of Table 1 with the following exception:
    - (i) The test of Bond, non-immersed, ASTM D5329, 3 specimens through 3 cycles shall be run at 0°F (-18°C), 100% extension.

- b. NE-3405LM (Low Modulus) joint and crack sealer shall conform to the requirements of ASTM D6690, Type IV. The material shall conform to the requirements of Table 1.
- c. The test of Bond, non-immersed, ASTM-D5329, will be tested on concrete blocks that will be constructed by the NDR Concrete Laboratory. The concrete blocks will be made of a 47B concrete mixture as prescribed in Section 1002 in the NDR Standard Specifications. The design is amended so that no fly ash is used in the mixture. All other specifications for Portland Cement Concrete apply.
- d. Sample conditioning, preparation and heating shall be in accordance with ASTM D 5167 with the following exceptions:
  - (i) The following sentence of Section 8.1.2, "Also, if present, remove container liner by cutting it away", is void and superseded by the following:

"Also, if present, as much of the polyethylene bag as possible, shall be removed by cutting it away. Wholly-meltable type container in contact with the sample section shall be left in place."
  - (ii) The last sentence of Section 8.1.2 "Solid Materials" is void and superseded by the following:

The entire vertical section which has been cut, shall be placed into the pot for melting.
  - (iii) The Section of 8.2.2.1 "Solid Materials" is void.
  - (iv) The Section of 8.2.3 is void and superseded by the following:

After the solid segment is added to the melter, the material shall be allowed to minimally melt to a uniform viscous state suitable for the installation of the stirrer or paddle. The sample shall then be stirred for one full hour. The oil bath temperature shall be regulated to bring the material to the maximum heating temperature within the one hour of stirring.
  - (v) The Section of 8.2.4.1 is void and superseded by the following:

During the one full hour of stirring, check the temperature of the material at maximum 15 minute intervals using a Type K thermocouple with the calibration verified in accordance with Section 6.1.7 to ensure conformance with specified temperature requirements. Stop the mechanical stirrer when measuring temperatures. If material temperatures ever exceed the maximum heating temperature, or ever drop below the minimum application temperature after the maximum heating temperature was reached, discard the sample and re-do the heating. Maintain appropriate records of times and temperatures to verify conformance with specification requirements.
  - (vi) The Section of 8.2.4.2 is void.

- e. ASTM D 5329 shall include the following changes:
- (i) Sections 6.4 and 12.4 “Specimen Preparation” shall have the reference of “177 ml (6 oz.)” replaced with “3 oz.”
  - (ii) Section 6 “Cone Penetration, Non-Immersed” shall be superseded with the following exceptions:
    - 1. Section 6.5 “Procedure” is void and superseded by the following:

Place the specimen in a water bath maintained at 77 +/- 0.2°F (25 +/- 0.1°C) for two hours immediately before testing. Remove the specimen from the bath and dry the surface by shaking gently to remove free water from the surface of the specimen. Using the apparatus described in Section 6.3, make one determination at or near the center of the specimen. Take care to ensure the cone point is placed on a point in the specimen that is representative of the material itself, and is free of dust, water, bubbles, or other foreign material.
    - 2. Section 6.6 “Report” is void and superseded by the following:

Record the value as penetration of the specimen in dmm units.
  - (iii) Section 12 “Resilience” shall be superseded with the following exceptions:
    - 1. Section 12.5 “Procedure”, void the sentence “Make determinations at three points equally spaced from each other and less than 13mm (½ inch) from the container rim” and supersede with the sentence “Make one determination at or near the center of the tin.”
    - 2. Section 12.6 “Report” is void.

2. Silicone Joint Sealer (cold applied)
  - a. Silicone joint sealers may be either self-leveling or non-sag and shall meet the requirements in Table 1014.01.

**Table 1014.01**

<b>Silicone Joint Sealer Requirement</b>		
<b>Property</b>	<b>Requirement</b>	<b>Test</b>
As supplied:		
Specific Gravity	1.010-1.515	ASTM D792
Work Time, minimum	10 minutes	
Tack-Free, at 25°C	20-360 minutes	
Cure Time, at 25°C, maximum	14 days	
Full Adhesion, maximum	21 days	
As cured, at 25°C + 1.5		
Elongation, minimum	800%	ASTM D412
Durometer		
Non-Sag, Shore A	10-25	ASTM D2240
Self-Leveling, Shore 00, minimum	40	ASTM D2240
Joint Movement Capacity	+100% to -50%	ASTM C719
Tensile Stress, at 150% Elongation	45 psi	ASTM D412

**1014.03 -- Packaging**

1. NE-3405 and NE-3405LM
  - a. The joint and crack sealer can be packaged in either cardboard box of wholly-meltable type containers.
    - (i) Cardboard box containers shall be manufactured from double wall kraft board producing a minimum bursting test certification of 350 PSI (241 N/cm<sup>2</sup>) and using water-resistant adhesives. The use of metal staples or fasteners of any kind will be prohibited for closing the lids of the boxes. Tape or other like material is acceptable.
      - a. The joint and crack sealer shall be in meltable [300°F (149°C)] polyethylene bag(s).
    - (ii) Wholly-meltable type containers, and any of their components, shall be fully meltable and integrational with the joint and crack sealer by the time the manufacturer's minimum application temperature is reached.
      - a. The wholly-melted and integrated container must not adversely affect the test specifications of the joint and crack sealer.
2. Silicone Joint Sealer
  - a. Each container shall include information regarding manufacturer and product name.

#### 1014.04 -- Acceptance Requirements

1. NE-3405 and NE-3405LM
  - a. Acceptance of the manufactured material is based on pre-approval by either on or off-site sampling. Acceptable hot pour sealant lots are listed on the NDR Approved Products List.
    - (i) NDR on-site field sampling shall be in accordance with the NDR Materials Sampling Guide.
    - (ii) Off-site (Proxy) sampling shall be in accordance with ASTM D 6690.
      1. Proxy sampling shall be overseen by an outside party approved by the NDR, preferably another DOT Agency. Proxy samples shall include a manufacturer's Certificate of Compliance. Proxy samples shall also include a dated signature of origin by the Representative that is not affiliated with the manufacturer, and can either be on the Certificate of Compliance, or separate letter.
      2. For convenience in both sampling and shipping samples, sample containers smaller than a manufacturer's usual production containers are allowed, as long as the sample is 1500 grams min.
      3. Samples shall be sent to the NDR Bituminous Laboratory, or alternatively, sent to an NDR-approved independent laboratory for testing which will be at no cost to the Department. If a NDR-approved independent laboratory will be used for testing purposes, the NDR Bituminous Laboratory must be notified so that NDR concrete blocks for Bond testing can be sent to it.
2. Silicone Joint Sealer
  - a. Acceptance of applied silicone joint sealers shall be in accordance with the NDR *Materials Sampling Guide*.
  - b. Acceptable silicone joint sealer manufacturer products are listed on the NDR Approved Products List.
    - (i) For products that are not listed, approval may be based upon test results from an independent laboratory submitted to the NDR Concrete Materials Section by the manufacturer, and testing by the NDR. Approval must be made prior to product use.



## **EPOXY COMPOUNDS AND ADHESIVES (J-15-0308)**

Section 1018 in the Standard Specifications is void and superseded by the following:

### **1018.01 – Description**

This specification provides requirements for two-component, epoxy-resin bonding systems for use in non-load bearing applications and resin adhesives for application to Portland cement concrete.

### **1018.02 – Material Characteristics**

1. Epoxy-resin bonding systems shall conform to the requirements of ASTM C 881. Approved systems are shown on the NDR Approved Products List.
2. The classification of Epoxy-Resin Bonding Systems is as follows:
  - a. Type I For use in non-load bearing applications for bonding hardened concrete and other material to hardened concrete.
  - Type II For use in non-load bearing applications for bonding freshly mixed concrete to hardened concrete.
  - Type III For use in bonding skid resistant materials to hardened concrete, and as a binder in epoxy mortars or epoxy concretes.
  - b. Grade 1 Low viscosity.
  - Grade 2 Medium viscosity.
  - Grade 3 Non-sagging consistency.
  - c. Class A For use below 40°F (4°C); the lowest allowable temperature to be defined by the manufacturer of the product.
  - Class B For use between 40°F and 60°F (4°C and 15°C).
  - Class C For use above 60°F (15°C); the highest allowable temperature to be defined by the manufacturer of the product.
  - Class D For use between 40°F and 65°F (4°C and 18° C).
  - Class E For use between 60°F and 80°F (15°C and 26°C).
  - Class F For use between 75°F and 90°F (24°C and 32°C).

### **1018.03 – Procedures**

1. The compounds shall be of the type and grade specified in the plans or as directed by the Engineer.

2. The class of the compounds shall be selected for use according to climatic conditions at the time of application.
3. All bonding surfaces shall be clean and free of all oil, dirt, grease, or any other materials which would prevent bonding.
4. Mixing and application shall be in strict accordance with the manufacturer's instructions.

**1018.04 – Acceptance Requirements**

1. Epoxy-resin bonding systems and resin adhesives approved for use are shown on the NDR Approved Products List.
2. Epoxy-resin bonding systems that are not on the NDR Approved Products List may be accepted based on a manufacturer's certificate of compliance.

**DEFORMED METAL CENTER JOINT AND METAL KEYWAY  
(J-15-0307)**

Paragraph 1 a. of Subsection 1027.01 in the Standard Specifications is void and superseded by the following:

a. Metal Center Joint:

Metal center joint sections shall be manufactured from sheets no less than 18 gauge [0.05 inch (1.3 mm)] thick and shall be of the size and trapezoidal shape shown in the plans. The sections shall be punched along the centerline of the narrow face of the trapezoid to admit the tie bars required by the plans and also at intervals of not greater than 2 feet (600 mm) to receive pins that are driven vertically into the subgrade to support the metal center joint.

**AGGREGATES  
(J-15-0914)**

Subsection 1033.01 is amended to include the following paragraphs and Subsection 1033.02, Paragraphs 1 and 3. of the Standard Specifications is void and superseded by the following:

**1033.01 – Description**

This combined aggregate gradation using Class R aggregate is to optimize aggregate blends utilizing more locally available materials.

Achieving a uniform gradation for Class R may require the use of two or more different aggregates. It is the responsibility of the contractor to consider additional material characteristics; such as, but not limited to particle shape, cubicity, angularity, etc., when designing a mix.

**1033.02 -- Material Characteristics****1. Sampling and Testing Procedures:**

All materials shall be sampled and tested in accordance with Table 1033.01. All material source locations and quarries must be approved by the Department for prior to use.

**Table 1033.01**

<b>Sampling and Testing Procedures</b>	
<b>Procedure</b>	<b>Method</b>
Sampling	NDR T 2
Sieve Analysis	NDR T 27
Clay Lumps, Shale, and Soft Particles	NDR T 504
Abrasion	AASHTO T 96
Freeze and Thaw Soundness	NDR T 103
Specific Gravity and Absorption (course aggregate)	AASHTO T 85
Specific Gravity and Absorption (fine aggregate)	AASHTO T 84
Total Evaporable Moisture Content of Aggregates by Drying	AASHTO T 255
Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test	AASHTO T 176
Sodium Sulfate Soundness	AASHTO T 104
Calcium Carbonate	NDR C 25
Organic Impurities	AASHTO T 21
Mortar-Making Properties	AASHTO T 71
Reducing Field Samples of Aggregate to Testing Size	AASHTO T 248

**2. Portland Cement Concrete Aggregates:****a. Sand-Gravel Aggregate:**

- (1) Aggregate shall be washed and composed of clean, hard, durable and uncoated particles.
- (2) Aggregates produced from wet pits by pumping must be adequately washed by means approved by the Department.
- (3) Aggregates from dry pits shall be adequately washed by means approved by the Department and have a Sand Equivalent value not less than 90 in accordance with AASTHO T 176.
  - (i) If the Sand Equivalent is less than 90, the Engineer may elect to stop aggregate production until such a time ASTM C 109 has been completed. The aggregate, when subjected to the test for mortar-making properties, shall produce a mortar having a compressive strength at the age of 7 days equal to or greater than that developed by mortar of the same proportions and consistency made of the same cement and aggregate after the aggregate has been washed to a sand equivalent greater than 90. Materials failing to produce equal or greater strength shall be unacceptable.

- (4) Aggregate for concrete shall have a soundness loss of not more than 10% by weight at the end of 5 cycles using Sodium Sulfate Soundness test AASHTO T 104.
- (5) The weight of the aggregate shall not contain more than 0.5% clay lumps.
- (6) Aggregate subjected to the colorimetric test for organic impurities which produces a color darker than the standard shall be further tested for its mortar-making properties in accordance with AASHTO T 71. The Engineer may elect to stop aggregate production until such a time AASHTO T 71 testing has been completed.
  - (i) Aggregate, when subjected to the test for mortar-making properties, shall produce a mortar having a compressive strength at the age of 7 days equal to or greater than that developed by mortar of the same proportions and consistency made of the same cement and aggregate after the aggregate has been treated in a 3% solution of sodium hydroxide. Materials failing to produce equal or greater strength shall be unacceptable, except when determined to be acceptable under the provisions of Subsection 105.03.
- (7) Aggregate shall meet the requirement in Tables 1033.02A, 1033.02B and 1033.03C.

**Table 1033.02A**

		Percentage	Percent Passing									
			1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200
AGGREGATE SPECIFICATION RANGE	Class A	Max	--	--	--	--	100	100	90	--	40	3
		Min	--	--	--	--	100	92	64	--	10	0
	Class B	Max	--	100	--	--	--	97	70	--	40	3
		Min	--	100	--	--	--	77	50	--	16	0
	Class C	Max	--	100	--	--	--	88	50	--	20	3
		Min	--	100	--	--	--	44	24	--	4	0

**Table 1033.02B**

Aggregate Classes and Uses	
Aggregate Class	Concrete Description
A	Overlay Concrete SF
B	47BD, 47B-HE, 47B-OL, PR 1 and PR 3
C	BX

**b. Ledge Rock Aggregate:**

- (1) Aggregate shall consist of Limestone, Quartzite, Dolomite, Gravel and Granite composed of clean, hard, durable, and uncoated particles.
- (2) The percent of clay lumps, shale, or soft particles shall not exceed the following amounts:

Clay Lumps .....	0.5%
Shale .....	1.0%
Soft Particles .....	3.5%

- (3) Any combination of clay lumps, shale, and soft particles shall not exceed 3.5%.

- (4) Aggregate for concrete shall be free of coatings that will inhibit bond and free of injurious quantities of loam, alkali, organic matter, thin or laminated pieces, chert, or other deleterious substances as determined by the Engineer.
- (5) Aggregate for concrete shall not have a soundness loss greater than 8.0% by weight at the completion of 16 cycles of alternate freezing and thawing.
- (6) Aggregates for concrete shall have a Los Angeles Abrasion loss percentage of not more than 40.
- (7) All fractions passing the No.4 sieve shall meet quality requirement of soundness loss of not more than 10% by weight at the end of 5 cycles using sodium sulfate solution.
- (8) The ledge rock shall be tested according to ASTM C 1260.
  - (a) The mortar bars for the ASTM C 1260 shall not exceed 0.10% expansion at 28 days.
    - (i) If the proposed ledge rock exceeds 0.10% expansion at 28 days, the ledge rock shall be tested in accordance to ASTM C 1567. If the expansion is greater than 0.10%, the ledge aggregate shall not be used.
      - a. The ASTM C 1567 mortar bars shall be composed of Type IP or IT Interground/blended cement and the proposed Ledge Rock aggregate.
      - b. To accommodate precision within multi-laboratory testing, expansion up to and including 0.13% will be accepted for use. If the expansion is above 0.13%, the material is noncompliant.
- (9) Aggregate shall meet the requirements in Tables 1033.03A, B, and C.

**Table 1033.03A**

	Percent	Percent Passing										
		1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200	
AGGREGATE SPECIFICATION RANGE	Class E	Max	100	100	90	--	45	12	--	*4	--	3
	Class E	Min	100	92	66	--	15	0	--	0	--	0
AGGREGATE SPECIFICATION RANGE	Class F	Max	--	--	100	100	90	30	8	--	--	3
	Class F	Min	--	--	100	96	40	4	0	--	--	0

\*If the No. 200 sieve is less than 1.5% passing the No.20 sieve could be increased to maximum of 6% passing.

**Table 1033.03B**

Aggregate Classes and Uses	
Aggregate Class	Concrete Description
E	47BD, 47B-HE, PR 1 and PR 3
F	47B-OL, Overlay Concrete SF

**c. Combined Aggregates:**

- (1) The Contractor shall design and meet the specification requirements. It is the Contractor's responsibility to provide desirable mix properties; such as, but not limited to, workability, resistance to segregation, stable air void system, good finishing properties and good consolidation properties.
- (2) The combined blended aggregate shall meet the requirement in Table 1033.03C and 1033.03D.

**Table 1033.03C**

<b>*Class R - Combined Aggregate Gradation Limits (Percent Passing)</b>								
<b>Sieve Size</b>	<b>1 ½ inch</b>	<b>1 inch</b>	<b>¾ inch</b>	<b>No.4</b>	<b>No.10</b>	<b>No.30</b>	<b>No. 50</b>	<b>No.200</b>
Max	100	100	98.0	70.0	50.0	30.0	12.0	3.0
Min	-	92.0	85.0	45.0	31.0	8.0	2.0	0

\* Refer to Subsection 1002.04, Paragraph 1.b.(8) for the traditional 47B Mix Design

**Table 1033.03D**

<b>Aggregate Classes and Uses</b>	
<b>Aggregate Class</b>	<b>Concrete Description</b>
R	47B

**d. Aggregate Production and Testing:**

- (1) Any change greater than 3% in the original verified constituent percentage of the combined aggregates gradation will be considered non-compliant. Any change of the combined gradation targets must remain within the Combined Aggregate Gradation Limits in Table 1033.03C. The Contractor shall resubmit a new mix design if the material is deemed non-compliant in accordance with Subsection 1002.04, Paragraph 1.
- (2) The blended gradation tolerance ranges from the approved mix design are established in Table 1033.03E.
  - (i) The Contractor shall assume the responsibility to cease operations when the specifications are not met. Production shall not be started again without the approval of the Engineer.

**Table 1033.03E Blended Aggregate Production Tolerances**

<b>Sieve Size</b>	<b>Tolerances</b>
No. 4 or greater	+ 5%
No. 10 to No. 30	+ 4%
No. 50	+ 3%
Minus No. 200	+ 1%

- (3) Ledge rock and aggregate from a dry pit shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours before concrete mixing to allow complete saturation.

**DOWEL BARS  
(J-15-0812)**

Paragraph 1.c. of Subsection 1022.01 in the Standard Specifications is void and superseded by the following:

1. c. Both Type A and Type B coated dowel bars shall be coated with a bond breaker shown on the NDR Approved Products List, dipped in asphalt or paraffin, or greased in accordance with the specified requirements as shown in the Standard Plans.

**EPOXY COATED REINFORCING STEEL  
(J-15-0509)**

Paragraph 5. of Subsection 1021.03 in the Standard Specifications is void and superseded by the following:

5. In order to protect the coated reinforcement from damage, the Contractor shall use padded or nonmetallic slings and padded straps. Bundled bars shall be handled in a manner which will prevent excessive sagging of bars which will damage the coating. If circumstances require storing coated steel reinforcing bars outdoors for more than two months, protective storage measures shall be implemented to protect the material from sunlight, salt spray and weather exposure. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be covered with opaque polyethylene sheeting or other suitable opaque protective material. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be secured adequately, and allow for air circulation around the bars to minimize condensation under the covering. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be stored off the ground on protective cribbing. The bundled bars shall not be dropped or dragged. If, in the opinion of the Engineer, the coated bars have been extensively damaged, the material will be rejected. The Contractor may propose, for the approval of the Engineer, alternate precautionary measures.

**INCENTIVE PAYMENT FOR THE USE OF  
RECYCLED ASPHALTIC PAVEMENT (RAP) FOR ASPHALTIC MIXTURES  
(J-22-1213)**

**General**

This specification establishes a standard method for paying an incentive to use Recycled Asphaltic Pavement (RAP) in asphalt mixture types: SPH, SPS, SPR, SLX and LC. The intent of this specification is to provide an incentive for incorporating as much RAP into the asphalt mixtures as allowed by the respective mixture's specification.

**Method of Measurement**

1. The RAP Incentive Payment shall be based on the actual total of asphalt production for the entire project. A RAP Incentive Payment shall be calculated for each eligible asphaltic concrete type.
2. The following formula will be used to calculate the “RAP Incentive Factor”.

$$\text{RAP Incentive Factor} = [(A-B) \div 100] \times C \times D$$

Where:

- A = State’s Established Percent Binder – based on gradation band.
- B = Actual Percentage of Binder – added to asphaltic mixture.
- C = Unit Bid price of Binder
- D = RAP Pay Factor

3. The State’s established percent binder values (‘A’ values) are as follows:

<b>Asphaltic Concrete Types</b>	<b>‘A’ Value</b>
SPH having 0.500-inch grading band	5.2% Binder
SPS, SPL, SPR and SPR (Fine)	5.2% Binder
SLX	5.5% Binder
SPH having 0.375-inch grading band	5.8% Binder
LC	6.2% Binder

*Incentive payments will be made for only the mix types list in this table.*

4. The actual percentage of binder added to the particular asphaltic mixture (‘B’ value) shall be calculated as follows:

$$B = (\text{Actual Pay Tons of Binder} \div \text{Actual Pay Tons of Asphaltic Concrete}) \times 100$$

5. The Unit Bid Price of Binder (‘C’ value) is the established contract price for the performance graded binder type used to produce the mix for which the incentive is being calculated.

6. The RAP Pay Factor (‘D’ value) shall be as follows:

<b>RAP Source</b>	<b>‘D’ Value</b>
Contractor supplied RAP	0.50
State supplied RAP coming from an <b>OFF</b> -project source	0.35
* RAP coming from an <b>ON</b> -project source	0.15

\* RAP coming from an **ON**-project source shall be completely utilized before allowing RAP from any other source to be used in the asphalt production.

7. Contractor supplied RAP and RAP supplied from either off-project or on-project sources shall be stored, handled and used separately. Incentive payments for RAP from these three source types shall be paid separately. The Contractor may propose a RAP



consumption plan that will use multiple RAP sources concurrently and will follow the utilization hierarchy (as detailed above) upon the completion of the project.

8. The Contractor has sole responsibility for determining the quality, quantity, and uniformity of the RAP material. The maintenance of any stockpiles and processing of the RAP material shall also be the sole responsibility of the Contractor.

**Basis of Payment**

- |    |  |                              |
|----|--|------------------------------|
| 1. | <b>Pay Item</b><br>RAP Incentive Payment _____ | <b>Pay Unit</b><br>Each (ea) |
|----|--|------------------------------|
2. The overall RAP Incentive Payments shall be full compensation for all RAP materials and all hauling, handling and processing necessary to complete the work described in this section.
  3. The overall RAP Incentive Payments – for each eligible mix type and/or RAP source – shall be the RAP Incentive Factor multiplied by the total accepted tons of asphaltic concrete in which the RAP was incorporated.
  4. RAP Incentive Payment is paid for as an “established” contract unit price which is shown in the bid proposal “Schedule of Items”.
  5. The actual quantity for RAP Incentive Payment will be calculated based on the Method of Measurement stated above in this provision.

**RECYCLED ASPHALT SHINGLES FOR USE IN ASPHALTIC CONCRETE  
(J-25-0411)**

**Description:**

Recycled Asphalt Shingles (RAS) may be used in Asphaltic Concrete. The maximum allowable (by weight) will be 10% on shoulders and 5% on mainline.

**Materials:**

All RAS shall consist of organic felt shingles or fiberglass shingles, obtained from a shingle manufacturing facility or tear offs. Scrap shingles shall not contain any objectionable materials (less than 1.5% by weight), including but not limited to: road tar, metal, glass, wood, plastic, brick, rubber, fabric, or any other material having similar characteristics. The RAS shall not contain harmful quantities of asbestos in accordance with guidelines provided by the Environmental Protection Agency and shall conform to all state and local regulations.

All RAS material shall be sized so that 100% (by weight) of the material passes through a 1/2-inch sieve, and at least 95 percent shall pass through a 3/8-inch sieve.

Before mix design approval, the following shall be submitted, along with materials and paper work for the mix design.

- I. Certification by the processor of the shingle scrap, as to the shingle scraps content and source. Certification forms are available from DOR.

- II. A 5-lb. sample of the shingle scrap material for review.

**Construction Requirements:**

RAS shall be stockpiled separate, from other salvaged material. Blending of scrap material in a stockpile with other salvage material is prohibited.

Scrap shingles shall be introduced into the hot mix asphalt, at the asphalt mixing plant, at the same point where Recycled Asphalt Pavement (RAP) is introduced.

Asphaltic Concrete containing RAS, regardless of RAP content, shall have a minimum of 55% virgin PG Binder.

**Basis of Payment:**

The RAS material will be eligible for the RAP Incentive at a rate of 50% as specified elsewhere in the specifications.

### RECYCLED ASPHALT SHINGLES (RAS) CERTIFICATION SHEET

Project .....

**Processor of Shingle Scrap:**

Name .....

Address .....

.....

Contact .....

Phone .....

We the undersigned, certify that the shingle scrap to be used on this project, was supplied directly from the processor listed below. We also certify that the material supplied consisted of only organic and/or fiberglass shingles and contains no harmful quantity of asbestos or other hazardous material in accordance with Environmental Protection Agency and all state and local regulations.

.....  
*Name of Contractor Shingle Scrap was Supplied to*

.....  
*Address*

.....  
*Authorized Representative of Processor of Shingle Material* *Date*

### ASPHALTIC CONCRETE TYPE SLX (J-29-0414)

Asphaltic Concrete, Type SLX shall meet all of the requirements of Asphaltic Concrete, Type SPR, listed in Section 1028 and these Special Provisions, with the following exceptions:

- 1. Material Characteristics:**
  - a. The type of PG Binder used shall be PG Binder 64-34 with 0.7% of an approved amine-based WMA additive.

- b. Reclaimed Asphalt Pavement (RAP) will be added to the mix at a minimum of 20% and a maximum of 35%. The RAP must be fractionated/processed prior to use, to a sizing such that the combined hot mix meets the required gradation. The mat cannot exhibit any visual defects or cold spots from RAP conglomeration.
- c. The mix shall contain a minimum of 20% Crushed Rock Chips (with a minimum of 45% retained on the #4 sieve and a maximum of 5% passing the #200 sieve).
- d. The Asphaltic Concrete shall have a minimum Fine Aggregate Angularity (FAA) of 43.0 on the combined aggregate blend. There is no requirement for Coarse Aggregate Angularity (CAA).
- e. Asphaltic Concrete Type SLX shall use the gradation band listed below.

**Gradation Control Points for Type SLX**

English Sieve (Metric)	Control Points (percent passing)	
	Minimum	Maximum
1/2 inch (12.5 mm)	98.0	100.0
3/8 inch (9.5 mm)	93.0	100.0
No. 4 (4.75 mm)	70.0	87.0
No. 8 (2.36 mm)	45.0	65.0
No. 16 (1.18 mm)	25.0	41.0
No. 30 (600 μm)	15.0	31.0
No. 50 (300 μm)	10.0	21.0
No. 100 (150 μm)	---	---
*No. 200 (75 μm)	4.0	10.0

\* Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75 μm) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be between 0.70 and 1.70.

**2. Design Criteria:**

- a. The optimum binder content shall be the binder content that produces 2.0 to 4.0 percent air voids at 50 gyrations, with a minimum content of 5.3%.
- b. The Voids in the Mineral Aggregate (VMA) shall be a minimum of 16% ± 1% (mix design only).

**3. Placing and Finishing:**

- a. Asphaltic Concrete shall be placed only when the ambient temperature is at least 40°F (4°C) and rising.
- b. The asphaltic concrete temperature shall be 285° F (154°C) or above measured in the truck just prior to placement. Exceptions to this requirement are that the PG Binder Supplier recommended maximum temperature requirement shall not be exceeded.
- c. The Contractor will use steel wheel compactors only. Rubber tire rollers will not be allowed.

**4. Asphaltic Concrete Density:**

Regardless of layer thickness, Asphaltic Concrete Type SLX will be monitored for density.

An initial rolling pattern test strip shall be completed to determine the rolling pattern that will target a minimum of 92.5% density. The Contractor shall monitor the density through a combination of rolling pattern and field testing as deemed necessary by the Engineer.

**Method of Measurement:**

For each lot of Asphaltic Concrete Type SLX, the asphaltic concrete shall be paid by the contract unit price for the item "Asphaltic Concrete, Type SLX". The asphaltic concrete unit price is a product of all applicable pay factors excluding density and CAA.

**Basis of Payment:**

Paragraphs 2.a., 2.b.(1), 2.b.(2) and 2.b.(3) of Subsection 503.06 are void and superseded by the following:

Asphaltic Concrete Type SLX shall be paid per ton (Mg) for the item "Asphaltic Concrete Type SLX".

**PROPOSAL GUARANTY  
(A-40-0307)**

As an evidence of good faith in submitting a bid for this work, the bidder shall indicate the type of bid bond applied to this project in accordance with the Proposal Guaranty Bid Bond Section of these Special Provisions.

\* \* \* \* \*

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PAGE: 1  
DATE: 01/07/15

SCHEDULE OF ITEMS

CONTRACT ID: 3233X

PROJECT(S): RD-81-3(1055)

CALL ORDER NO. : 305

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 GROUP 9 BITUMINOUS						
0001	0001.08 BARRICADE, TYPE II	14605.000 BDAY	0.50000		7302.50	
0002	0001.10 BARRICADE, TYPE III	419.000 BDAY	.		.	
0003	0001.75 TEMPORARY SIGN DAY	890.000 EACH	.		.	
0004	0001.90 SIGN DAY	8876.000 EACH	.		.	
0005	0002.55 OVERLAY BROKEN LINES	1136.000 STA	.		.	
0006	0002.60 OVERLAY SOLID LINES	2272.000 STA	.		.	
0007	0002.97 FLASHING ARROW PANEL	23.000 DAY	.		.	
0008	0003.10 FLAGGING	114.000 DAY	.		.	
0009	0003.20 FURNISHING AND OPERATING PILOT VEHICLE	57.000 DAY	.		.	
0010	0030.90 MOBILIZATION	LUMP	LUMP		.	



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DATE: 01/07/15

SCHEDULE OF ITEMS

CONTRACT ID: 3233X

PROJECT(S): RD-81-3(1055)

CALL ORDER NO. : 305

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	1101.25 SAWING PAVEMENT	31.000 LF	.		.	
0012	1102.05 REMOVE ASPHALT SURFACING FROM PAVEMENT	226.670 SY	.		.	
0013	1122.01 REMOVE CONCRETE MEDIAN SURFACING	8.450 SY	.		.	
0014	3008.20 CROSS STITCHING	639.000 EACH	.		.	
0015	3010.42 CONCRETE CURB REPAIR	20.000 LF	.		.	
0016	3017.39 CONCRETE CLASS 47B-3000 MEDIAN SURFACING	8.450 SY	.		.	
0017	3039.11 CONCRETE PAVEMENT REPAIR, TYPE A, FULL DEPTH	16.700 CY	.		.	
0018	3039.12 CONCRETE PAVEMENT REPAIR, TYPE B, FULL DEPTH	131.270 CY	.		.	
0019	3039.13 CONCRETE PAVEMENT REPAIR, TYPE C, FULL DEPTH	274.000 CY	.		.	
0020	3039.14 CONCRETE PAVEMENT REPAIR, TYPE A, PARTIAL DEPTH	81.270 CY	.		.	
0021	3039.15 CONCRETE PAVEMENT REPAIR, TYPE B, PARTIAL DEPTH	6.770 CY	.		.	

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SCHEDULE OF ITEMS

CONTRACT ID: 3233X

PROJECT(S): RD-81-3(1055)

CALL ORDER NO. : 305

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0022	3210.10 DIAMOND GRINDING AND TEXTURING CONCRETE PAVEMENT	28543.000 SY	.		.	
0023	3211.25 SEALING CRACKS	43.000 LF	.		.	
0024	3211.30 SEALING JOINTS	50465.000 LF	.		.	
0025	3211.35 SEALING CONCRETE REPAIR JOINT	6.000 LF	.		.	
0026	3221.13 CONCRETE PAVEMENT, CLASS PR-3500 JOINT REPAIR	40.780 CY	.		.	
0027	3221.21 CONCRETE PAVEMENT, CLASS 47B-HE-3500 JOINT REPAIR	19.000 CY	.		.	
0028	3300.50 PORTLAND CEMENT CONCRETE SMOOTHNESS TESTING	LUMP		LUMP		.
0029	6960.15 BRIDGE APPROACH REPAIR	6.520 CY	.		.	
0030	8022.20 HYDRATED LIME/WARM MIX ASPHALT	9220.000 EACH	.		.	
0031	8028.01 FOUNDATION COURSE REPLACEMENT	12.390 CY	.		.	

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DATE: 01/07/15

SCHEDULE OF ITEMS

CONTRACT ID: 3233X

PROJECT(S): RD-81-3(1055)

CALL ORDER NO. : 305

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0032	9001.90 ULTRATHIN BONDED ASPHALT WEARING COURSE	9220.000 TON	.		.	
0033	9021.13 PERFORMANCE GRADED BINDER (64-34)	387.240 TON	.		.	
0034	9110.01 RENTAL OF LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0035	9110.02 RENTAL OF MOTOR GRADER, FULLY OPERATED	50.000 HOUR	.		.	
0036	9110.03 RENTAL OF DUMP TRUCK, FULLY OPERATED	50.000 HOUR	.		.	
0037	9110.07 RENTAL OF SKID LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0038	9186.01 CONCRETE SURFACE MILLING	516.790 STA	.		.	
0039	9300.38 RAP INCENTIVE PAYMENT	15674.000 EACH	1.00000		15674.00	
0040	9300.50 ASPHALT PAVEMENT SMOOTHNESS TESTING	LUMP		LUMP		.
0041	L860.50 ENVIRONMENTAL COMMITMENTS - CONTRACTOR COMPLIANCE	LUMP		LUMP		.
	SECTION 0001 TOTAL				.	
	TOTAL BID				.	