

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

NEBRASKA DEPARTMENT OF ROADS  
LETTING DATE: November 14, 2013

CALL ORDER: 200                    CONTRACT ID: 2143X

CONTROL NO./SEQ. NO.: 22139 /000 PROJECT NO.: S-80-9(1186)  
CONTROL NO./SEQ. NO.: 22140 /000 PROJECT NO.: S-80-9(1187)  
CONTROL NO./SEQ. NO.: 22142 /000 PROJECT NO.: S-80-9(1188)  
CONTROL NO./SEQ. NO.: 22143 /000 PROJECT NO.: S-80-9(1185)

TENTATIVE START DATE: 01/06/14                    CONTRACT TIME: 510 CALENDAR DAYS

LOCATION: I-80/480-60TH STREET, OMAHA  
IN COUNTY: DOUGLAS

BIDDER

GROUP 1 GRADING  
GROUP 1A MSE WALL  
GROUP 3 CONCRETE PAVEMENT  
GROUP 4 CULVERTS  
GROUP 6 BRIDGE AT STA. 1200+17.28 LT.  
GROUP 6A BRIDGE AT STA. 1241+04.53 LT.  
GROUP 6B BRIDGE AT STA. 1295+80.87 LT.  
GROUP 7 GUARDRAIL  
GROUP 7B FENCE  
GROUP 8B ELECTRICAL  
GROUP 8C SIGNING  
GROUP 10 GENERAL ITEMS

SEE SPECIAL PROVISIONS FOR GROUP TIES

## 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 NOS. S-80-9(1185), S-80-9(1186), S-80-9(1187), and S-80-9(1188)**

**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 November 14, 2013, 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.

GROUPS 1, 1A, 3, 4, 6, 6A, 6B, 7, 7B, 8B, 8C & 10 ARE TIED TOGETHER AND BIDDING PROPOSAL FORMS FOR THIS WORK WILL BE ISSUED AND A CONTRACT AWARDED TO A CONTRACTOR WHO IS QUALIFIED FOR CONCRETE PAVEMENT OR BRIDGE.

**NOTICE TO BIDDERS  
(Noise Control)**

The Contractor shall be required to abide by the City of Omaha's ordinance concerning Noise Control as found in Chapter 17 of the *Municipal Code For The City Of Omaha*. The Contractor shall be solely responsible for complying with the most current ordinance concerning noise control and for obtaining any variances or permits necessary to conduct their operations in compliance with City code.

## STATUS OF UTILITIES

The following information is current as of October 10, 2013:

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:

**AT&T**

**Century Link**

**City of Omaha**

**Metropolitan Utilities District**

**MUD has pipeline facilities within the highway right of way of the 50<sup>th</sup> Street Bridge that will need to be protected during construction. Please refer to protective measures as noted on plans. For construction coordination or information about MUD's existing facilities, contact Mr. Jon Zellars at (402) 504-7913.**

**Cox Cable of Omaha**

**Omaha Public Power District**

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.

## **SPECIAL PROSECUTION AND PROGRESS (General Requirements)**

### **I. General**

The plans depict traffic phasing sequences, temporary pavement geometrics and pavement marking typicals required for the performance of work included in this proposal. Any modification of these sequences, geometrics or typicals shall require **written approval** of the NDOR Traffic Engineer, the Roadway Design Division and the Project Engineer. Prior to opening a modified phasing sequence to traffic, the NDOR Traffic Engineer and the Roadway Design Division shall be notified.

On the phasing plans, the construction build notes for temporary surfacing (to be removed as part of the project) are shown on the phasing plans. Permanent pavement to be constructed as part of the phase is shown as "begin construction" on the phasing plans and is noted on the Construction plan sheets.

### **II. Settlement**

No settlement or paving delays are required for the construction of embankments or MSE walls on this project. See the 2-K sheets for soils information.

### **III. Winter Work**

#### **A. Bridge (3 Sites)**

Beginning January 6, 2014, winter work operations on bridge substructures will be allowed to begin and these substructure operations will not interrupt mainline I-80 traffic operations.

#### **B. Sign Structures & Median Concrete Protection Barriers (4 Sites)**

Beginning January 6, 2014, winter work operations will be allowed to begin on the median barrier/sign foundation work as shown in the plans. This work shall be completed prior to any work beginning on mainline I-80 widening, which is scheduled to begin March 31, 2014, or as otherwise directed by the Engineer.

#### **C. MSE Walls & Concrete Protection Barriers the for the I-480 NB On-ramp**

Beginning January 6, 2014, winter work will be allowed to begin on the concrete protection barrier placement, MSE wall construction and bridge substructure operations. These operations will not interrupt mainline I-80 or I-480 traffic operations (See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic)**).

### **IV. Mainline I-80 WB Roadway Work**

Mainline I-80 WB roadway work shall begin March 31, 2014, or as otherwise directed by the Engineer.

**V. Completion of Work**

All work (including but not limited to grading, drainage, concrete and asphalt surfacing, MSE wall construction, all bridge widening, overhead sign and DMS structures, including all signage, lighting and temporary pavement marking paint) shall be completed and all lanes of WB I-80 and the NB I-480 on-ramp open to traffic on or before **November 15, 2014**, and with traffic shifted to the ultimate configuration. After this date, the Contractor will be allowed to complete any remaining minor work in 2015 as long as it doesn't interrupt mainline WB I-80 and I-480 NB on-ramp traffic during peak hours.

The Contractor shall have until **May 30, 2015**, to complete all remaining minor work. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic)**.

**SPECIAL PROSECUTION AND PROGRESS  
(Accommodation of Public Vehicular Traffic)**

**I. General**

When working adjacent to existing driving lanes, the Contractor, during the same work period, shall perform temporary surfacing and pavement widening in a manner as to place surfacing materials to the elevation of the adjacent pavement within all areas where the existing shoulder has been removed. In the event the surfacing is not placed, the drop-off shall be filled with compacted earth materials, to a 4:1 or flatter slope, prior to opening the lane to public vehicular traffic.

When asphaltic concrete is used for temporary surfacing the following construction methods shall be observed. After any intermediate lift of asphalt has been placed, the drop-off shall be filled with an asphalt wedge, to a 3:1 or flatter slope, prior to opening the lane to public vehicular traffic. If proper density is obtained on this asphalt wedge, it may be left in place as additional intermediate lifts are placed. The top lift of asphalt will be placed at a uniform depth, which may require removal of a portion of the asphalt wedge.

**II. Peak Hours for Interstate I-80**

For this project, I-80 and I-480 **peak hours** shall be from 6:00 a.m. to 11:00 p.m. Monday through Friday, from 8:00 a.m. to 11:00 p.m. Saturday, and from 11:00 a.m. to 11:00 p.m. Sunday. All other hours shall be considered as **non-peak hours**.

During **peak hours**, the Contractor shall perform work in a manner as to maintain the number of traffic lanes shown in the plans.

When the Contractor's work is required closer than 12 feet to the nearest driving lane, the work shall be performed during **non-peak hours** with a lane closure or the work area shall be protected with concrete protection barriers.

During **non-peak hours**, the Contractor may be allowed to reduce the number of lanes shown in the plans, if requested and approved by the Engineer, for the following operations (see **SPECIAL PROSECUTION AND PROGRESS (Procedure For I-80 Lane Closure)** for restrictions to reducing the number of lanes):

1. One lane of traffic may be closed for the purpose of setting or removing concrete protection barriers.
2. One lane of traffic may be closed for the purpose of building temporary pavement marking.
3. The Contractor will be permitted to close one lane of traffic in order to build and remove temporary surfacing and pavement noted in the phasing plans.
4. The Contractor will be permitted to close one lane of traffic in order to deliver materials to the project.
5. The Contractor will be permitted to close one lane of traffic for specific tasks requiring work immediately adjacent to the traveled lanes, which in the opinion of the Engineer would constitute a hazard for the traveling public.

**III. I-80 Lane Closures for Median Sign Structure Work & I-480 NB On-ramp Group 6B Bridge Work**

The Contractor may be permitted to close one lane of EB and WB I-80 mainline and one lane at a time on the I-480 NB on-ramp, from 11:00 p.m. to 6:00 a.m. of the following morning, for the purpose of placing and removing concrete protection barriers required for these operations.

**IV. I-480 SB On-ramp**

The Contractor shall be allowed a 36 hour period, from 11:00 p.m. Friday night to 11:00 a.m. Sunday morning, to close one lane of this on-ramp to traffic to perform the 13" PR concrete base course replacement at Sta. 5016+50± R5, as shown on plan sheet 2-N8.

**V. WB I-80 & I-480 NB On-ramp Roadway Closures**

**A. WB I-80 Closures**

The Contractor shall be allowed four (4) closures of WB I-80 for the removal of the 3 existing sign structures and the existing DMS structure and four (4) closures of WB I-80 for the installation of the horizontal components of the 3 new sign structures and of the new DMS structure (the installation of all new signs and the new DMS sign shall also occur during these 4 closure periods). These eight (8) WB I-80 closures shall occur between the hours of 2:00 a.m. and 4:30 a.m. The Contractor shall be required to schedule their operations accordingly.

**B. I-480 NB On-ramp Closure**

The Contractor shall be allowed a total of six (6) I-480 NB On-ramps closures for the purpose of deck removal and girder placement. Phase 1 and Phase 2 bridge work at this location shall have a total three (3) closures for each phase. The Contractor shall be required to schedule their operations accordingly. These closures shall occur between 11:00 p.m. and 6:00 a.m. of the following morning. The Contractor shall be required to schedule their operations accordingly.

## **VI. Procedure for I-80 or I-480 NB On-ramp Lane Closure**

Before closing any lane to traffic, the Contractor shall notify the Engineer a minimum of two weeks prior to the closing date, and again 48 hours prior to the actual closing. If the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the actual closing.

The Contractor shall notify the Engineer in writing of each specific lane closure. Each notification shall describe the work requiring the closure and the approximate time required for the closure. Lane closures shall be limited to the specific operations described in **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic)**.

A lane closure that affects the way a ramp movement merges into the thru lane will require the Engineer's approval of the modified merge geometry. The lane closure shall not reduce the length of an entrance ramp to be less than 300 feet parallel plus 300 feet of taper. If these minimum lengths cannot be maintained for the ramp merge, the ramp must be closed for the duration of the lane closure. The Contractor shall submit to the Engineer for approval, a traffic control plan or a detour plan for nighttime ramp modifications or closures.

The Contractor will be required to have a work crew on the site at all times during a lane closure.

A lane closure will not be permitted during inclement weather conditions or during periods of time that atmospheric conditions may constitute a hazard to the traveling public, as determined by the Engineer.

In cases where multiple charges can be assessed for violations in lane closure procedures, the highest single lane closure assessment will be charged for the appropriate period. The lane closure assessment charge will be in addition to other liquidated damages described elsewhere in this proposal.

Lane closures during emergency or incident situations will not be assessed.

## **VII. Procedure for I-80 or I-480 NB On-ramp Roadway Closure**

The Contractor shall plan and organize their work in a manner to finish the required work in the allowed time. Roadway closures shall be coordinated with the City of Omaha and the District 2 office. The Contractor shall contact the District 2 Engineer to accomplish this coordination.

The request for each roadway closure must be submitted a minimum of two weeks prior to the planned closure period and again 48 hours prior to the actual closing, if the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the actual closing. Each roadway closure shall be approved by the District 2 Engineer.

## **VIII. Procedure for Lane Closure & Street Closure on City Streets**

The Contractor shall be permitted to close one lane of traffic in either or both directions for construction operations. However, it is expected that lane closures will not be

permanent nor occur on a daily basis. Lane closures shall be for specific work operations requested by the Contractor and approved by the Engineer.

Street closures of 50<sup>th</sup> Street and directional street closures of 42<sup>nd</sup> Street shall be allowed from 11:00 p.m. to 6:00 a.m. of the following morning. The Contractor shall be allowed two street closures at 50<sup>th</sup> Street and two street closures for the both NB and SB directions on 42<sup>nd</sup> Street. 42<sup>nd</sup> Street and 50<sup>th</sup> Street shall not be closed to traffic at the same time.

The Contractor shall advise the Engineer and the City of Omaha of the purpose and length of any lane closure, a minimum of 48 hours prior to the closure and for a street closure, a minimum of 2 weeks and again 48 hours prior to the closure. If the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the lane or street closure.

The City of Omaha shall be notified of any lane or street closure. The Contractor shall contact Public Works Department, City of Omaha, at (402) 444-5950.

## **SPECIAL PROSECUTION AND PROGRESS (Liquidated Damages and Assessments)**

### **I. Project Liquidated Damage**

The equation used to determine project liquidated damages, as shown in paragraph 2, Subsection 108.08 in the Standard Specifications, is void and superseded by the following:

$$LD = \frac{R \times (0.05)(C)}{T}$$

Where: LD = Liquidated damages per calendar day (rounded to the nearest dollar).  
C = Original contract amount (includes all work completed and unfinished).  
0.05 = Estimated percentage of work remaining after 11-15-14.  
T = Original number of calendar days (510 CD).  
R = 0.12 for calendar day contracts.

### **II. Liquidated Damage Assessments**

#### **A. General**

Liquidated damage assessments described in this provision shall be in addition to other liquidated damage assessments described elsewhere in this proposal or in the Standard Specifications

#### **B. Internal Liquidated Damage**

The Contractor's failure to have all lanes of WB I-80 and the NB I-480 on-ramp open to traffic in the ultimate configuration, as described the provision titled **SPECIAL PROSECUTION AND PROGRESS (General Requirements) Section V**, by November 15, 2014, shall result in the assessment of a \$5,120 per calendar day internal liquidated damage assessment. This internal liquidated damage assessment shall begin on November 16, 2014, and shall continue until, and including, the day this traffic is returned to its ultimate configuration on the

completed roadways. The following formula was used to determination this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{ADT})(\$ \text{ Pass}) + (\%T)(\text{ADT})(\$ \text{ Trucks})] \times D \\ &= [(1-0.07)(44,505)(\$0.23) + (0.07)(44,505)(\$0.44)] \times 0.47 \\ &= [\$9,519.62 + \$1,370.75] \times 0.47 \\ &= \$5,118.48 \rightarrow \text{Rounded to } \$5,120/\text{calendar day} \end{aligned}$$

Where: %T = percent trucks  
 ADT = average daily traffic  
 \$ Pass = passenger car factor = \$0.23  
 \$ Truck = truck factor = \$0.44  
 D = delay (in minutes)

**C. WB I-80 Non-Peak Hour Lane Closure Assessment**

The Contractor is required to have a work crew on site during a non-peak hour lane closure and if, in the opinion of the Engineer, it is determined the lane closure is no longer needed, the Contractor shall have one hour after notification from the Engineer to remove the lane closure. If the Contractor has not begun to clear the lane closure within the specified time, the Contractor shall be assessed a \$50/lane/per hour non-peak hour lane closure assessment. Any portion of an hour shall be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpnp}) (\$ \text{ Pass}) + (\%T)(\text{vpnp}) (\$ \text{ Trucks})] \times D \\ &= [(1-0.07)(540)(\$0.23) + (0.07)(540)(\$0.44)] \times 0.25 \\ &= [\$115.51 + \$16.63] \times 0.25 \\ &= \$33.04 \rightarrow \text{Rounded to } \$50/\text{lane/hour} \end{aligned}$$

Where: %T = percent trucks  
 vpnp = vehicles per non-peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

**D. WB I-80 Peak Hour Lane Closure Assessment**

If a non-peak hour lane closure extends into a peak hour, the Contractor shall be assessed a \$1,635/lane/peak hour lane closure assessment. Any portion of an hour shall be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpph}) (\$ \text{ Pass}) + (\%T)(\text{vpph}) (\$ \text{ Trucks})] \times D \\ &= [(1-0.07)(4,451)(\$0.23) + (0.07)(4,451)(\$0.44)] \times 1.5 \\ &= [\$952.07 + \$137.09] \times 1.5 \\ &= \$1,633.74 \rightarrow \text{Rounded to } \$1,635/\text{lane/hour} \end{aligned}$$

Where: %T = percent trucks  
 vpph = vehicles per peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

**E. NB I-40 On-ramp Non-Peak Hour Lane Closure Assessment**

The Contractor is required to have a work crew on site during a non-peak hour lane closure and if, in the opinion of the Engineer, it is determined the lane closure is no longer needed, the Contractor shall have one hour after notification from the Engineer to remove the lane closure. If the Contractor has not begun to clear the lane closure within the specified time, the Contractor shall be assessed a \$25/lane/per hour non-peak hour lane closure assessment. Any portion of an hour shall be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpnph})(\$ \text{ Pass}) + (\%T)(\text{vpnph})(\$ \text{ Trucks})] \times D \\ &= [(1-0.04)(385)(\$0.23) + (0.04)(385)(\$0.44)] \times 0.25 \\ &= [\$85.00 + \$6.76] \times 0.25 \\ &= \$22.94 \rightarrow \text{Rounded to } \$25/\text{lane}/\text{hour} \end{aligned}$$

Where: %T = percent trucks  
 vpnph = vehicles per non-peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

**F. NB I-480 On-ramp Peak Hour Lane Closure Assessment**

If a non-peak hour lane closure extends into a peak hour, the Contractor shall be assessed a \$1,100/lane/peak hour lane closure assessment. Any portion of an hour shall be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpph})(\$ \text{ Pass}) + (\%T)(\text{vpph})(\$ \text{ Trucks})] \times D \\ &= [(1-0.04)(3,075)(\$0.23) + (0.04)(3,075)(\$0.44)] \times 1.5 \\ &= [\$678.96 + \$54.12] \times 1.5 \\ &= \$1,099.62 \rightarrow \text{Rounded to } \$1,100/\text{lane}/\text{hour} \end{aligned}$$

Where: %T = percent trucks  
 vpph = vehicles per peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

**G. WB I-80 Roadway Closure**

**1. Closure Prior to a Peak Hour**

The hours for a WB I-80 interstate closure are from 2:00 a.m. to 4:30 a.m. If a WB I-80 closure extends past 4:30 a.m., the Contractor shall be assessed a \$1,320/ non-peak hour I-80 closure assessment until the appropriate peak hour period. Any portion of an hour will be considered

as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpnpH})(\$ \text{ Pass}) + (\%T)(\text{vpnpH})(\$ \text{ Trucks})] \times D \\ &= [(1-0.07)(540)(\$0.23) + (0.07)(540)(\$0.44)] \times 10.0 \\ &= [\$115.51 + \$16.63] \times 10.0 \\ &= \$1,321.40 \rightarrow \text{Rounded to } \$1,320/\text{lane}/\text{hour} \end{aligned}$$

Where: %T = percent trucks  
 vpnpH = vehicles per non-peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

## 2. Closure Into a Peak Hour

If the WB I-80 interstate closure extends into a peak hour period, then the Contactor shall be assessed a \$16,335/peak hour I-80 closure assessment. Any portion of an hour will be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpPH})(\$ \text{ Pass}) + (\%T)(\text{vpPH})(\$ \text{ Trucks})] \times D \\ &= [(1-0.07)(4,451)(\$0.23) + (0.07)(4,451)(\$0.44)] \times 15.0 \\ &= [\$952.07 + \$137.09] \times 15.0 \\ &= \$16,337.40 \rightarrow \text{Rounded to } \$16335/\text{lane}/\text{hour} \end{aligned}$$

Where: %T = percent trucks  
 vpPH = vehicles per peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

## H. NB I-480 On-ramp Closure

The hours for the six NB I-480 closures, deck removal and girder replacement, are from 11:00 p.m. to 6:00 a.m. of the following morning. If any of these NB I-480 closures extends in a peak hour, the Contractor shall be assessed a \$7,330/hour NB I-480 closure assessment. Any portion of an hour will be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpPH})(\$ \text{ Pass}) + (\%T)(\text{vpPH})(\$ \text{ Trucks})] \times D \\ &= [(1-0.04)(3,075)(\$0.23) + (0.04)(3,075)(\$0.44)] \times 10.0 \\ &= [\$678.96 + \$54.12] \times 10.0 \\ &= \$7,330.80 \rightarrow \text{Rounded to } \$7,330/\text{hour} \end{aligned}$$

Where: %T = percent trucks  
 vpPH = vehicles per peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

**SPECIAL PROSECUTION AND PROGRESS  
(Transporting Equipment)**

If absolutely necessary as determined and approved by the Engineer, the Contractor will be allowed to transport equipment (such as draglines and cranes) across traffic lanes at grade only between 12:00 midnight and 5:00 a.m. A law enforcement officer shall be acquired by the Contractor to monitor the public vehicular traffic movements, and insure safety during the transportation of equipment across the traveled lanes. Flaggers and appropriate signing must be furnished for the crossings. Each crossing will require the approval of the Engineer.

**SPECIAL PROSECUTION AND PROGRESS  
(Transportation of Excavation Materials)**

The Contractor's excavating and hauling equipment will not be allowed to cross any ramps, streets or highways that are within the State right-of-way during peak hours. During non-peak hours, hauling routes that cross public vehicular traffic movements will be controlled by flaggers. When embankment material is to be transported across ramps, the crossing for exit ramps shall be a minimum distance of 400 feet from the gore point. For entrance ramps, the crossing shall be a minimum distance of 300 feet from the gore point. The Contractor shall not be allowed to build a haul road over the mainline lanes.

**SPECIAL PROSECUTION AND PROGRESS  
(Grading Operations in Conflict with Drainage Structures)**

At various locations throughout the project, new drainage structures, particularly storm sewer pipe, will be constructed to an elevation that may be very close to the bottom of the new concrete pavement. Some grading operations such as subgrade prep work may be affected by these items. The Contractor shall exercise caution when performing any grading operations so that no drainage items are damaged as a result of the grading.

Any structures damaged as a result of the grading operations shall be replaced or repaired by the Contractor at their expense.

**SPECIAL PROSECUTION AND PROGRESS  
(Drainage)**

***I. Temporary Bulkhead for Storm Sewer***

This work shall consist of furnishing and installing a temporary bulkhead for storm sewers as needed for phasing.

Temporary bulkheads shall be constructed of 3/4-inch exterior grade plywood. The outside diameter of the bulkhead shall be the outside diameter of the sewer pipe plus 12 inches.

The work of furnishing and installing the temporary bulkheads shall be considered incidental to the work related to furnishing and installing of storm sewer, and shall not be paid for directly.

## **II. Manholes & Inlets**

At several locations throughout the project existing manholes and inlets will be removed and replaced with new structures to accommodate the new drainage system. Before constructing the new manhole or inlet, the existing pipes that connect to the new structures shall be inspected by the Engineer for damage.

Pipes that have been damaged at the ends as a result of the removal of the existing manhole or inlet shall be repaired or replaced by the Contractor.

In order to build the new structures, the existing drainage pipes may need to be shifted, modified or removed beyond where they will be positioned ultimately to drain into or away from the structure.

The work of modifying, extending, shifting, salvaging or working around the existing drainage pipe in order to ultimately position the pipe to drain into or away from the new structure is subsidiary to the work of building the new manhole or inlet.

### **SPECIAL PROSECUTION AND PROGRESS (Epoxy Polymer Overlay & Bridge Phasing For The 50<sup>th</sup> Street Bridge)**

The Contractor will not be allowed to do the EXPOXY POLYMER OVERLAY (EPO) until after the Labor Day holiday in 2014.

The concrete protection barriers have to stay in their Phase 1 location until switching to begin Phase 2 Stage 3, which shall not begin until after Labor Day. Because Phase 2 Stage 3 and Phase 3 Stage 1 will require the closure of a traffic lane, the Contractor will only be allowed 7 calendar days for the Phase 2 Stage 3 bridge work and 7 calendar days for the Phase 3 Stage 1 bridge work. During each 7 calendar day period, the Expansion Joint replacement must precede the placement of the Multi-layer EPO. The Contractor shall take care that the EPO equipment does not damage the new expansion joint material. Any damage to the expansion joint material by the Contractor during the EPO placement shall be repaired by the Contractor at no cost to the Department.

### **SPECIAL PROSECUTION AND PROGRESS (Existing MSE Wall Modification Wall 1)**

The existing MSE wall along the I-480 northbound ramp between the eastbound and westbound bridges of I-80 is being modified in order to accommodate the widening of the westbound I-80 bridge. This work consists of removing a portion of the existing face panels, coping and surfacing behind the coping to the limits described in the plans, and constructing new coping and surfacing behind the coping. For details of the removal refer to "*Preparation of Structure Wall 1*" of this proposal.

The work of constructing the new coping shall include extending the coping to the existing abutment/bulkhead at a depth of no less than 6" and at a minimum 4% slope. This portion of the surfacing shall be reinforced with 6" x 6" - W2.9 x W2.9 welded wire fabric placed at one-half the depth of the concrete. A 1" preformed expansion joint filler shall be placed between the new concrete and the existing abutment/bulkhead.

The new coping shall be anchored to the existing face panels by 2 - No. 4 x 1'-7" rebar per panel. The rebar shall be installed by drilling a hole 12" deep and plumb into the existing face panel and setting the rebar in an epoxy grout.

The work and materials required to perform the described items above including the rebar, welded wire fabric, additional concrete, expansion joint and random fill shall not be paid for directly, but shall be subsidiary to the item "Coping". The price bid shall be full compensation for any materials, tools, labor and incidentals required to complete the work.

### **SPECIAL PROSECUTION AND PROGRESS (Existing MSE Wall Modification Wall 2)**

The existing MSE wall along the I-480 northbound ramp between the eastbound and westbound bridges of I-80 is being modified in order to accommodate the widening of the westbound I-80 bridge. This work consists of removing a portion of the existing face panels, coping and surfacing behind the coping to the limits described in the plans, and constructing new coping and surfacing behind the coping. For details of the removal refer to "*Preparation of Structure Wall 2*" of this proposal.

The work of constructing the new coping shall include extending the coping to the existing abutment/bulkhead at a depth of no less than 6" and at a minimum 4% slope. This portion of the surfacing shall be reinforced with 6" x 6" - W2.9 x W2.9 welded wire fabric placed at one-half the depth of the concrete. A 1" preformed expansion joint filler shall be placed between the new concrete and the existing abutment/bulkhead.

The new coping shall be anchored to the existing face panels by 2 - No. 4 x 1'-7" rebar per panel. The rebar shall be installed by drilling a hole 12" deep and plumb into the existing face panel and setting the rebar in an epoxy grout.

The work and materials required to perform the described items above including the rebar, welded wire fabric, additional concrete, expansion joint and random fill shall not be paid for directly, but shall be subsidiary to the item "Coping". The price bid shall be full compensation for any materials, tools, labor and incidentals required to complete the work.

## **SPECIAL PROSECUTION AND PROGRESS (Holidays & UNL Football Game Day)**

The Contractor will be required to schedule his operations in a manner to have all traffic lanes open to traffic on the following holidays:

Memorial Day and Labor Day weekends – these holiday weekends shall begin at 3:00 p.m., Friday, and shall include the remainder of Friday and all day Saturday, Sunday and the Monday holiday.

- July 4<sup>th</sup> - If July 4<sup>th</sup> falls on a Monday or Friday, the Saturday and Sunday either preceding or following July 4<sup>th</sup> shall be included as part of the holiday.
- If July 4<sup>th</sup> falls on either Tuesday, Wednesday or Thursday, only that day will be considered as the holiday.
- If July 4<sup>th</sup> falls on a Saturday or Sunday, the day preceding and the day following July 4<sup>th</sup> shall be included as part of the holiday.
- The July 4<sup>th</sup> holiday shall begin at 3:00 p.m. on the day preceding the first day of the July 4<sup>th</sup> holiday, as defined above.

The Contractor will also be required to have all traffic lanes, as depicted in the plans, open to traffic on any day that the University of Nebraska has a home football game (including the Spring game). All lanes shall be open to traffic from 3:00 p.m. of the day before the home football game until 9:00 a.m. of the day following the home football game.

Failure to have all traffic lanes open to traffic, as specified, on these holidays & any UNL home football game day will result in a liquidated damage assessment of \$5,000 per day. This assessment will be in addition to other liquidated damages described elsewhere in this proposal or in the Standard Specifications used for this project.

## **CONSTRUCTION LIGHTING**

### **Description**

1. If the Contractor elects to perform work during nighttime hours, the Contractor shall furnish, place, maintain, provide fuel, and operate sufficient lighting equipment to permit proper workmanship and inspection when the contract requires nighttime work. Nighttime work occurs between from one half hour before sunset to one half hour after sunrise.
2. The Contractor shall have a supervisor on site during all nighttime operations to ensure proper maintenance of traffic control.

### **Equipment Requirements**

1. Lighting shall be accomplished by the use of portable floodlights, standard equipment lights, existing streetlights, temporary streetlights, or other lighting methods acceptable to the Engineer.

2. Equipment shall be operated within all manufacture's operating parameters.

**Construction Methods**

1. General

- a. The Contractor shall submit a lighting plan in accordance with Subsection 105.02 for review by the Engineer.

- (1) Lighting levels shall meet the Categories required for the type of work shown in Table 1.
- (2) Glare control shall be maintained by proper direction control of luminaires. Arrange the lighting to prevent interference with traffic or produce undue glare to property owners.
- (3) Light trespass onto private property shall be avoided.
- (4) The use of vehicle headlights or hand held lighting devices will not be allowed.

**Table 1**

Lighting Category	Minimum Illumination (lx)	Area to be Illuminated	Type of Work Activity	Sample Activities
I	54	Illumination throughout the work area	General area lighting Visual tasks of large size, med. contrast, low required accuracy	Grading
II	108	Illumination of work area and areas adjacent to equipment	Visual tasks of medium size, low to med. contrast, medium required accuracy	Paving Bridges Culverts Milling
III	216	Illumination of task	Visual tasks of small size, low contrast, high required accuracy	Flagging Traffic Control Crack Filling

2. Do not start night work prior to the Engineer's review of the lighting plan.
3. The Department will furnish, place and maintain variable message signs to alert approaching motorists of lighted construction zones ahead.

**Method of Measurement**

1. Construction Lighting will not be measured and paid for but shall be considered subsidiary to other items of work for which direct payment is made.

## ENVIRONMENTAL COMMITMENT

**Control No.:** 22143                      **Project No.:** S-80-9(1185)

**Project Name:** Expand I-80 WB, I-80/480 Intch. – 60<sup>th</sup> St.

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

No wetland impacts. No 404 permit required. Regulated Wetlands and/or Water Resources for this project have been identified and delineated in the field by NDOR. The Contractor shall not drive through, stage, store, waste or stockpile materials and equipment within delineated wetland boundaries (Wetlands – Do Not Disturb) and/or environmentally sensitive areas (Area of Environmental Concern – Do Not Disturb) as shown in the 2-W aerial plan sheets and/or the erosion control plan sheets included in the plan set. (Contractor, District Construction)

Contact Person: Justin Williams, Highway Environmental Biologist, (402) 479-3812

### **General Conservation Conditions**

- A-1 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 Federal Highway Administration. (District Construction, Contractor)
- A-2 Conservation Conditions.** Conservation conditions are to be fully implemented within the project boundaries as shown on the plans. (District Construction, Contractor)
- A-3 Early Construction Starts.** Request for early construction starts must be coordinated by the Project Construction Engineer with NDOR Environmental for approval of early start to ensure avoidance of listed species sensitive lifecycle timeframes. Work in these timeframes will require approval from the Federal Highway Administration and could require consultation with the USFWS and NGPC. (District Construction, Contractor)
- A-4 E&T Species.** If federal or state listed species are observed during construction, contact NDOR Environmental. Contact NDOR Environmental for a reference of federal and state listed species. (NDOR Environmental, District Construction, Contractor)
- A-5 Refueling.** Refueling will be conducted outside of those sensitive areas identified on the plans, in the contract, and/or marked in the field. (Contractor)
- A-6 Restricted Activities.** The following project activities shall, to the extent possible, be restricted to between the beginning and ending points (*stationing, reference posts, mile markers, and/or section-township-range references*) of the project, within the right-of-way designated on the project plans: borrow sites, burn sites, construction debris waste disposal areas, concrete and asphalt plants, haul roads, stockpiling areas, staging

areas, and material storage sites. Any project related activities that occur outside of these areas 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 submitted to the District Construction Project Manager prior to the start of the above listed project activities. The Contractor shall submit information such as an aerial photo showing the proposed activity site, a soil survey map with the location of the site, a plan-sheet or drawing showing the location and dimensions of the activity site, a minimum of 4 different ground photos showing the existing conditions at the proposed activity site, depth to ground water and depth of pit, and the "Platte River depletion status" of the site. The District Construction Project Manager will notify NDOR Environmental which will coordinate with FHWA for acceptance if needed. 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. (NDOR Environmental, District Construction, Contractor)

**A-7 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. (Contractor)

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

**NOTICE TO BIDDERS  
(Storm Water Pollution Prevention Plan)  
(A-20-0307)**

The Contractor shall understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site. For reference, the general permit is posted on the Department's website.

Additionally, the Contractor, as evidenced by their signature on this proposal, agrees and understands that, if awarded the contract on this project, he/she:

- 1) becomes a co-permittee, along with the owner(s), to the Nebraska Department of Environmental Quality NPDES General Permit for Storm Water Discharges from construction sites on this project;
- 2) is legally bound to comply with the Clean Water Act to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under the NPDES permit and the terms of the NPDES permit; and
- 3) will hold the owners harmless for damages or fines arising as a result of noncompliance with the terms of the storm water permits and authorizations associated with the work on this project.

**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.

**SHOP PLANS  
(A-43-1108)**

Paragraph 5. of Subsection 105.02 in the *Standard Specifications* is amended to provide that the Contractor may furnish shop plans on half-size plan sheets [11x17 inches (297x420 mm)], provided all information is legible.

**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-43-0813)**

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.

**ELECTRONIC SHOP DRAWINGS  
(A-43-0813)**

Subsection 105.02 of the Standard Specifications is amended to include the following:

- 8. a.(1) The Contractor may provide electronic working drawings in a Portable Document Format (PDF). The PDFs shall be sized to print on an 11 x 17 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.

- (2) Electronic working drawing files shall be named with the following file naming format:

Control Number\_Brief Description\_Date.pdf

For example: 12345\_FloorDrains\_12May2013.pdf

- (3) The project number, control number, and project location as it appears on the plans shall be shown on each sheet of the shop drawings. Structure numbers shall be included, if applicable.

- b. 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. The letter of approval shall clearly indicate that the Contractor is responsible for any errors on the working drawings.

- c.(1) Electronic submittals shall be submitted by email to the following address:

[DOR.ShopDrawings@nebraska.gov](mailto:DOR.ShopDrawings@nebraska.gov)

- (2) Attachments shall be limited to 25 MB of data per email. Larger files shall be separated and sent in multiple emails.

- (3) Electronic working drawings will only be accepted from the Prime Contractor.

## **LIABILITY INSURANCE (A-55-0611)**

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. 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.

- 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**

### **FUEL COST ADJUSTMENT PAYMENT (B-1-0708)**

Paragraph 16.a. of Subsection 205.05 in the Standard Specifications is amended to provide that the references to fuel cost fluctuation will be 5% instead of the 10% shown.

The fuel use factor, "F", shown in Paragraph 16.c. of Subsection 205.05 is void and superseded by the following:

F = English

The fuel use factor for diesel fuel, in gallons per cubic yard. For the items of work "Excavation", "Excavation, Borrow", and "Excavation, Established Quantity", "F" shall be equal to 0.20. For the item of work "Earthwork Measured in Embankment", "F" shall be equal to 0.27.

Metric

The fuel use factor for diesel fuel, in liters per cubic meter. For the items of work "Excavation", "Excavation, Borrow", and "Excavation, Established Quantity", "F" shall be equal to 0.99. For the item of work "Earthwork Measured in Embankment", "F" shall be equal to 1.32.

Paragraph 16.d. of Subsection 205.05 is void and superseded by the following:

- d. The allowable price differential, "D", for the current estimate will be computed according to the following formula:

When the current price, P, is greater than the base price, P(b).

$D = P - 1.05P(b)$ , but not less than zero.

When the current price, P, is less than the base price, P(b).

$D = P - 0.95P(b)$ , but not greater than zero.

### **WATER (B-1-0307)**

Paragraph 4.a. of Subsection 205.04 in the Standard Specifications is amended to include the following:

Payment shall be made at the established contract unit price.

**EXCAVATION AND EMBANKMENT  
(B-1-0212)**

Paragraph 6. of Subsection 205.02 in the Standard Specifications is void and superseded by the following:

6. Frozen Layers:
  - a. Thin Frozen Layer. A thin soil layer that freezes during the construction of an embankment may remain provided that the layer:
    - (i) had proper density and moisture prior to freezing,
    - (ii) can be readily broke up by a single pass of a tamping (sheepsfoot) roller or track mounted excavator,
    - (iii) is thoroughly scarified into pieces having a single dimension of 3 inches or less, and a second dimension of ½ inch or less, and
    - (iv) is not within 10 inches (measured vertically) of any thin frozen layer that was previously scarified and left in place.
  - b. Thick Frozen Layer. A soil layer that freezes during the construction of an embankment, but does not meet the Thin Frozen Layer requirements:
    - (i) may remain in the embankment provided that the layer is thawed and has proper density and moisture after thawing, or
    - (ii) shall be completely removed from the embankment prior to placing any additional embankment material.

**GENERAL CLEARING AND GRUBBING  
(B-2-0307)**

Paragraph 1. of Subsection 202.03 in the Standard Specifications is amended to provide that General Clearing and Grubbing shall include all tree removal.

Paragraphs 2.a., and b., of Subsection 202.03 in the Standard Specifications are void.

Paragraph 3. of Subsection 202.04 in the Standard Specifications is void and superseded by the following:

3. All tree removal is subsidiary to the pay item "General Clearing and Grubbing".

**TEMPORARY WATER POLLUTION CONTROL  
(B-3-0509)**

Section 204 in the Standard Specifications is void.

**CONSTRUCTION STORMWATER MANAGEMENT CONTROL  
(B-3-0509)**

**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. 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.
3. a. The Contractor shall take sufficient precautions to prevent pollution of the waters of the state, the project site, and adjacent property with construction debris, petroleum products, chemicals, or other harmful materials.  
b. The Contractor shall conduct and schedule the operations to avoid interference with any protected species.  
c. The Contractor shall comply with all applicable statutes relating to pollution of the waters of the state and fish and game regulations.
4. 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.
5. The erosion and sediment control measures shall continue until the permanent drainage facilities have been constructed and the slopes are sufficiently vegetated to be an effective erosion deterrent or until tentative acceptance of the work.
6. All erosion and sediment control measures shall be properly maintained by the Contractor.
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-3-0509)**

**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 unless an equal amount of finished grading and seeding has been completed in the previously opened area. 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 require 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 live streams and wetlands will not be allowed, unless explicitly allowed in the contract.

## **CONSTRUCTION METHODS (B-3-0509)**

### **General**

1. The Contractor shall conduct all construction activities to control sediment and avoid soil erosion.
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 construction work areas located outside the right-of-way, such as borrow pit operations, haul roads, plant sites, staging areas, 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 areas.
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. The installation of all erosion and sediment control items shall be installed by qualified 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 NDOR-Certified Erosion and Sediment Control Inspector. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be present at each site during installation to direct and inspect all erosion and sediment control BMP installations.
- c. The Contractor shall notify the Engineer of all Contractor NDOR-Certified Erosion and Sediment Control 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 NDOR Certified Erosion and Sediment Control 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 NDOR Standard Plan or the manufacturer's instructions.

**ENVIRONMENTAL COMMITMENT DOCUMENT  
(B-3-0509)**

**General**

This specification establishes the required documentation included in the Environmental Commitment Document and Project Erosion and Sediment Control Inspection. The Department and the Contractor, as co-permittees, will comply with all conditions required by the current NPDES Construction Storm Water General Permit.

**Environmental Commitment Document**

1. An Environmental Commitment Document will be created by the Department to identify all project specific environmental commitments, when applicable.
  - a. (Pre-Bid) The Department will provide information related to commitments made for but not limited to:
    - i. Storm Water Pollution Prevention Plan.
    - ii. U. S. Army Corps of Engineers 404 Permit.
    - iii. Nebraska Department of Environmental Quality 401 Water Quality Certification.

- iv. State Title 117 Waters (COE Non-Jurisdictional).
  - v. Floodplain Permit.
  - vi. Historic Clearance.
  - vii. Threatened & Endangered Species Clearance.
  - viii. FHWA Environmental Clearance.
  - ix. NPDES Construction Stormwater Permit (within Right-of-Way limits, only).
  - x. Conservation Measures.
  - xi. Migratory Bird Treaty Act.
  - xii. Other pertinent issues.
- b. (Post-Bid) The Contractor shall provide the following information that will be included in the Environmental Commitment Document but not limited to:
- i. Temporary Erosion Control Plan.
  - ii. Spill Prevention and Control Plan.
  - iii. Name and telephone number of the Contractor's representative responsible for the Environmental Commitments.
  - iv. Name and telephone number of the employees that are NDOR-Certified Erosion and Sediment Control Inspectors.
  - v. Construction Schedule/Critical Path.

#### **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 submittal of the Temporary Erosion Control Plan, the approval to increase the maximum surface area, or any payment for or acceptance of any or all of the work shall not operate as a waiver of the Contractor's responsibility under this specification.
3. The Temporary Erosion Control Plan shall be amended as work progresses and site conditions change.
4. The Temporary Erosion Control Plan will be reviewed at the project progress meeting. All active Contractors will have their Inspectors present, and work as a team to determine Temporary Erosion Control BMP's as they are needed.
5. Payment for preparing the Temporary Erosion Control Plan is subsidiary to items that direct payment is made.

#### **Spill Prevention and Control Plan**

1. The Contractor shall prepare and submit the Spill Prevention and Control Plan prior to the start of any work. The Contractor shall not begin work until the Spill Prevention and Control Plan has been submitted to the Engineer and appropriate Spill Prevention and Control measures are in place.

- a. Spill Prevention and Control Plan should clearly state measures to stop the source of the spill, contain the spill, clean up the spill, dispose of contaminated materials, and train personnel to prevent and control future spills.
  - b. Spill Prevention and Control Plans are applicable to construction sites where hazardous wastes are stored or used. Hazardous wastes include, but not limited to: pesticides, paints, cleaners, petroleum products, fertilizers, and solvents.
2. The Spill Prevention and Control Plan will be included in the Environmental Commitment Document.
  3. Direct payment will not be made for the Spill Prevention and Control Plan.

### **Storm Water Pollution Prevention Plan (SWPPP)**

1. The Contractor shall comply with all conditions required by the current NPDES Construction Storm Water General Permit.
2. The Department will prepare the NDOR Project SWPPP for construction activities causing a land disturbance within the Right-of-Way, temporary easements, and permanent easements of one (1) acre or more.
  - a. Areas of construction support activities located on private property, obtained by the Contractor, are not included in the NDOR Project SWPPP.
3. The Engineer and the Contractor will perform inspections as required by the current NPDES Construction Storm Water General Permit. Payment for project inspection is subsidiary to items that direct payment is made.
4. 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.
5. 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.

### **Project Erosion and Sediment Control Inspection**

1. Inspections must be conducted by a NDOR-Certified Erosion and Sediment Control Inspector. The Contractor and the Engineer shall conduct inspections in accordance with the NPDES Construction Storm Water General Permit.
2. The NDOR-Certified 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.

3. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be responsible for ensuring that all BMPs are installed in accordance with NDOR Specifications, Special Provisions, NDOR Standard Plans, or the manufacturers' recommended installation instructions. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be capable of reading and interpreting these documents. The Inspector shall be familiar with product and structural BMPs. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector is required to 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.
4. Payment for project inspection is subsidiary to items that direct payment is made.

### **ENVIRONMENTAL COMMITMENT DOCUMENT ENFORCEMENT (B-3-0509)**

#### **General**

1. This specification establishes a disincentive assessment for the Contractor's failure to comply with 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 U. S. Army Corps of Engineers 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 Plans, Specifications, and Contract requirements for the Environmental Commitment Document.

#### **Conditions**

1.
  - a. The count of Working Days and Calendar Days shall continue during the time period that corrective work is being performed.
    - i. Delays to the project as a result of the Contractor conducting corrective actions for the Environmental Commitment Document shall not constitute a valid reason for an extension of the contract time allowance.

- b. The Contractor shall begin maintenance operations, provide adequate equipment and personnel, and diligently pursue the work without cessation until all deficiencies have been corrected.

### **Corrective Actions**

1. a. Deficiencies shall be corrected within seven calendar days of notification. When deficiencies are not corrected within seven calendar days, the Engineer will make a disincentive assessment to the contract as stated herein.
2. If soil, weather, or other conditions prevent the Contractor from completing the corrective actions within seven 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 Corrective Action Plan within 48 hours. Corrective work shall continue while the 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 to the Engineer, the Contractor will be allowed to proceed with the plan as proposed without incurring a disincentive assessment. If work described in the approved Corrective Action Plan does not commence as proposed, the Engineer may immediately invoke the NDOR Environmental Commitment Control Deficiency Notification Shut-Down Notice.
3. The Engineer may require the Contractor to provide a written Procedures Plan. The Procedures Plan shall detail the process to prevent reoccurrence of deficiencies. The written Procedures Plan shall be provided within seven 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.

### **Notification**

1. Deficiencies will be documented using the NDOR Environmental Commitment Deficiency Notification Form and the Corrective Action Log.
2. Initial Notice:
  - a. The Initial Notice will notify the Contractor of Environmental Commitment deficiencies and direct that they be corrected.
  - b. If all corrective work is completed within the time allowance shown in the initial notice or time shown in the Contractor's approved Corrective Action Plan, a disincentive assessment will not be imposed upon the Contractor.
3. Shut-Down Notice:
  - a. If all corrective work identified in the Corrective Action Log attached to the Initial Notice has not been completed at the end of the seventh calendar day after the Initial Notice Date, a Shut-Down Notice will become effective on the eighth calendar day after the Initial Notice Date.
  - b. All current operations shall cease as of the date and time cited by the Shut-Down Notice. The Contractor shall only work on Environmental Commitment

deficiencies. After the Shut-Down Notice, the penalty day assessment will be counted as a Calendar Day.

**Disincentive Assessments**

1. If the corrective work is not complete within seven Calendar Days after the Initial Notice, a disincentive assessment of \$250.00 per Deficiency Location per Calendar Day for each Deficiency Location remaining uncorrected will begin on the eighth calendar day after the Initial Notice Date and continue through and count the day the last corrective work was completed for each Deficiency Location.

**Corrective Action Incentive**

1. The Contractor shall comply with the NPDES Construction Storm Water General Permit to correct all pollution prevention control deficiencies within 7 calendar days from when the Contractor was notified of the Environmental Commitment deficiencies and prior to the next storm event. The Contractor shall begin maintenance operations, provide adequate equipment and personnel, and diligently pursue the work --- without cessation --- until all deficiencies have been corrected.
2. The Department will pay an incentive as outlined in Table A when the Contractor is notified by the Environmental Commitment Deficiency Notification and Corrective Action Log and commences work to correct deficiencies resulting from a storm event that exceeded 0.50 inch of rain. One payment per notification will be made. Multiple deficiencies may be included in one notification.

<b>Table A</b>	
<b>Corrective Action Incentive Payment Schedule</b>	
Incentive to commence corrective work within:	
24 Hours of Notification	\$300.00
48 Hours of Notification	\$200.00

3. An incentive payment will not be paid if corrective work does not commence as outlined in Table A and completed within 7 days, or if an unscheduled visit coincides with a normally scheduled visit.
4. An incentive payment will not be paid for scheduled maintenance visits, expected to occur every 14 days, or pollution prevention BMP installations, maintenance, and removals required due to daily Contractor operations.
5. Immediate Action Deficiencies are not eligible for incentive payment.

**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 Notification Form. The corrective work for Immediate Action Deficiencies shall begin immediately and continue without cessation until completed.

2. The Contractor will be assessed a disincentive assessment of \$500.00 per Deficiency per Calendar Day for failure to begin corrective actions or failing to continue to completion.
3. Examples of Immediate Action Deficiencies include but not limited to:
  - a. Threatened & Endangered Species habitat protection deficiencies
  - b. U. S. Army Corps of Engineers 404 Permit Noncompliance
  - c. Petroleum Spills/Tank Leakage
  - d. Hazardous Material Spills

### **Rights Reserved**

1. The Department reserves the right to initiate and perform corrective action on any deficiencies and then assess the costs to perform the work against the Contractor.
2. The Contractor shall be liable to the Department for any and all costs incurred by the Department as a result of the Contractor's actions, inactions, or for failure to comply with the NPDES Construction Storm Water General Permit, U. S. Army Corps of Engineers 404 Permit, or any other applicable permit.
3. It is expressly understood that the provisions of this specification will not relieve the Contractor of his/her responsibilities nor shall it relieve the surety of its obligation for and concerning any just claim.

### **SAWING PAVEMENT**

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

### **REMOVE PIPE UNDERDRAINS**

The Contractor will be required to remove the existing pipe underdrains, filter fabric, granular material, and headwalls along the project where there is widening. The materials excavated during the removal operation shall become the property of the Contractor and removed from the project. The work to remove the pipe underdrains, including disposal of excess materials, will not be paid for directly but shall be considered subsidiary to the item "Excavation".

### **SUBGRADE PREPARATION (C-1-0307)**

Paragraph 2.a. of Subsection 302.03 in the Standard Specifications is amended to include that trimming on narrow, irregular or roadway grading of 1/2 mile (0.8 km) or less may be accomplished using conventional methods.

**BITUMINOUS FOUNDATION COURSE  
(C-2-0708)**

Paragraph 2.b. of Subsection 307.02 in the Standard Specifications is void and superseded by the following:

2. b. All salvaged bituminous material must be less than 3 inches (75 mm) in maximum dimension and shall not contain more than 5 percent by weight of material retained on a 2-inch (50 mm) sieve just prior to its use.
  - (1) Contractor Production
    - (i) All salvaged bituminous material produced by the Contractor from pavement removal or by cold milling material from the existing pavement structure on the project, whether hauled directly to the site of use or temporarily stockpiled, shall be screened to meet the requirements of Paragraph 2.b.
    - (ii) If, after screening, there is insufficient material to produce the plan quantity, the Engineer may order the oversized salvaged bituminous material to be further processed at no cost to the State prior to delivery to the roadway. Processing shall mean crushing, pulverizing, re-screening, or a combination of these methods.
    - (iii) On projects that allow multiple foundation course materials to be used, the Engineer may direct that the remaining salvaged bituminous material continue to be placed for bituminous foundation course to the extent this material is available and can be utilized on the project.
    - (iv) Unless otherwise shown in the plans or special provisions, all Contractor produced salvaged bituminous material including oversized remaining at the end of the bituminous foundation course operation shall become the property of the Contractor and removed from the project.
  - (2) State Provided Stockpiles
    - (i) If the salvaged bituminous material is to be obtained from existing stockpiles described in the special provisions or the plans, the salvaged bituminous material shall be screened to meet the requirements of Paragraph 2.b. prior to delivery to the roadway. Any oversized bituminous material remaining from the screening operation shall remain the property of the State.
    - (ii) If, after screening, there is insufficient material to produce the plan quantity, the Engineer may order the oversized bituminous material to be further processed prior to the delivery to the roadway. Processing shall mean crushing, pulverizing, re-screening, or a combination of these methods.

Paragraph 2.b.(3) of Subsection 307.03 is void and superseded by the following:

- (3) The Department shall monitor the rolling pattern with a nuclear density gauge, testing and recording the density every ½ mile (0.8 km). Additional testing of separately placed irregular areas shall be performed as directed by the Engineer.

Paragraph 2.b.(5) of Subsection 307.03 is void.

### **Method of Measurement**

Subsection 307.04 is amended to include the following:

4. a. Screening of salvaged bituminous material will not be measured for payment.
- b. Processing of Contractor produced salvaged bituminous material, ordered by the Engineer, which contains excessive oversized material due to the Contractor's production methods, will not be measured for payment.

### **Basis of Payment**

Paragraph 6. of Subsection 307.05 is void and superseded by the following:

6. Screening of salvaged bituminous material shall be considered subsidiary to the bituminous foundation course item.
7. Processing of salvaged bituminous material, ordered by the Engineer, which contains excessive oversize material due to the Contractor's production methods, shall be considered subsidiary to the bituminous foundation course item.
8. If the Contractor is required to reprocess the oversized bituminous material from State stockpiles, the work of reprocessing will be paid for as "extra work".
9. Payment is full compensation for all work prescribed in this Section.

## **AGGREGATE FOUNDATION COURSE-D (C-3-1109)**

Amend Section 307 of the Standard Specifications to include Aggregate Foundation Course-D.

1. Material Requirements
  - a. Foundation Course-D shall consist of mineral aggregate.
  - b. Aggregate shall conform to the quality requirements of Subsection 1033.02, Paragraphs 1., 2., and 9.
  - c. At least 14 days before beginning foundation course production, the Contractor shall submit a proposed mix design along with a 50 pound (23 kg) sample of each aggregate to the NDR Materials and Research laboratory for approval. The mix design will:

- (1) Result in an aggregate mix that meets the gradation requirements of Table 1.
  - (2) Propose single defined values for the percentage passing each sieve on the gradations of Table 1.
  - (3) Include the average aggregate(s) gradations used to calculate the mix design.
  - (4) Create a fine aggregate angularity value of 43.0 or greater. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve as defined in AASHTO T 304 Method A, except the specific gravity material shall be washed over the No. 100 (150 µm) sieve.
- d. The NDR Materials and Research laboratory will determine the specific moisture-density values for the proposed foundation course design.

Table 1

Aggregate Foundation Course-D Gradation Requirements		
Sieve Size	Target Value (Percent Passing)	Tolerance
1/2 in (12.5 mm)	100	0
3/8 in (9.5 mm)	100	-4
No. 4 (4.75 mm)	93	±4
No. 10 (2.0 mm)	55	±10
No. 30 (600 µm)	25	±5
No. 40 (425 µm)	20	±4
No. 200 (75 µm)	3	±3

2. Construction Methods

- a. The Contractor shall place compact and profile the foundation course as shown in the plans.
- b. The foundation course shall be spread in a uniform layer and compacted to at least 100 percent of the maximum density as determined by AASHTO T 99.
- c. After compaction the foundation course shall be trimmed such that the thickness will not vary from the plan thickness by more than 1/2 inch (12.5 mm).

**CRUSHED CONCRETE FOUNDATION COURSE  
(C-4-0212)**

Section 307 of the Standard Specifications is amended to include the following:

All samples, including field samples, will be washed sieve. All samples will be taken from the project grade prior to spreading and trimming. Material represented by samples with 15 percent or more passing the No. 200 (75 µm) sieve will be subject to removal.

Paragraphs 3.b. and 3.c. of Subsection 307.02 of the Standard Specifications are void.

Paragraph 3.d. of Subsection 307.02 of the Standard Specifications is void and superseded by the following:

The crushed concrete gradation shall be determined as prescribed in NDR T 27 (washed test). The target gradation requirement for the crushed concrete foundation course is shown below:

Material gradation will be accepted by the table below on a lot basis of 2500 cubic yards on the average of 5 consecutive tests, one for each 500 cubic yard subplot. If at the end of the project, the final lot consists of less than 2500 cubic yards, a minimum of 3 samples, or 1 sample for each 500 cubic yards or fraction thereof, whichever is greater shall be taken and tested and acceptance based on the average of those tests.

Crushed Concrete Foundation Course Gradation Requirements	
Sieve Size	(Percent Passing)
1½ inch (37.5 mm)	100 minimum
¾ inch (19.0 mm)	85 maximum
No. 4 (4.75 mm)	20 to 50
No. 200 (75 µm)	0 to 8

Paragraph 3.a. of Subsection 307.03 of the Standard Specifications is amended to include the following:

- a. (1) The Contractor shall roll the crushed concrete foundation course until no further compaction can be obtained and all roller marks are eliminated.
- (2) The Department will establish a rolling pattern for the project and set a density range.
- (3) The Department shall monitor the rolling pattern with a nuclear density gauge, testing and recording the density every 1/2 mile (0.8 km). Additional testing of separately placed irregular areas shall be performed as directed by the Engineer.
- (4) The Contractor shall take immediate action to correct the foundation course density if any density measurements are outside of the specified range.

### **FOUNDATION COURSE 4" & 5"**

The Contractor shall have the option of using Aggregate Foundation Course-D, Crushed Concrete Foundation Course or Bituminous Foundation Course; and the Contractor shall bid the pay item "Foundation Course \_\_\_\_" accordingly.

These different foundation courses may be used interchangeably throughout the project, with the exception being that the same type of foundation course shall be used across the entire width of a pavement section to provide uniform drainage across that template. The Contractor shall make every attempt to use the same type of foundation course in long paving runs and any changes in foundation course type shall be approved by the Engineer.

Regardless of the type of material used, it shall be obtained from Contractor sources or from the pavement removal operation on the project.

Regardless of the type of material used it shall be measured and paid for as "Foundation Course \_\_\_\_".

**Method of Measurement**

Foundation Course shall be measured as prescribed in Paragraph 3 of Subsection 307.04.

**Basis of Payment**

Amend Subsection 307.05 of the Standard Specifications to include the following:

1.	<b>Pay Item</b>	<b>Pay Unit</b>
	Foundation Course ____	Square Yard

**CONCRETE PROTECTION BARRIERS**

Guidance for concrete protection barriers:

1. Type A: 4-loop barriers with a large opening at the bottom.  
Type B: 6-loop barriers with 4 lifting slots and no slots for tie-down rods.  
Type C: 6-loop barriers with 4 lifting slots and 6 slots for tie-down rods.
2. Barriers Type A, B and C may be used on this project and may directly be pinned to each other in the same installation arrangement; however, only Type B or C concrete protection barriers shall be allowed for use on any Interstate roadway or Interstate bridge.
3. Other existing barriers meeting NCHRP 350 or MASH testing guidelines and FHWA approval may only be used with written permission (containing this project name and/or control number) from the District and Roadway Design Division.
4. If new barriers are to be fabricated for use on this project, only Type C barriers shall be fabricated.

Paragraph 5 of Subsection 422.03 in the Standard Specifications is amended to include the following:

- f. (1) Concrete protection barriers that become dislodged or moved out of alignment shall be placed back in alignment as soon as practical. If the dislodged barriers are considered to be a hazard to the traveling public by the Engineer, or the barriers encroach into the traveled lane, the barriers shall be realigned within four (4) hours of the time the Contractor is notified. For each occurrence, failure to realign the barriers within the four (4) hour time period will result in the assessment of a lump sum \$1,000 liquidated damage assessment and the Engineer may proceed to correct the adverse condition(s) in a manner that is deemed appropriate. The Contractor will also be assessed the cost incurred when the action is performed by others. This assessment has not been provided for elsewhere in the contract and shall be considered in addition to other liquidated damage assessments which are a part of the contract.

At the beginning of the project, the Contractor shall haul the required number of barriers for the initial phases from NDOR stockpile site located at US-75 & D Street. All subsequent barriers shall be hauled from the same site. When no longer needed on the project, all remaining barriers shall be inspected for damage and hauled back to the stockpile site. Any damaged barrier shall be removed and shall become the property of the Contractor.

## **TRAFFIC CONTROL MANAGEMENT**

### **Description and General Requirements**

Paragraph 1. of Subsection 422.01 in the Standard Specifications is void and superseded by the following:

1. a. This work consists of furnishing, installing at the locations shown on the plans, operating, maintaining, and when work is complete, removing the temporary traffic control devices described in this Section. This work shall also consist of providing Traffic Control Management by furnishing one or more qualified individuals who shall be specifically responsible for performing or supervising the installation, inspection, maintenance, and removal of those devices.
- b. When project conditions warrant, the Engineer may suspend the need for Traffic Control Management and will notify the Contractor accordingly. The Contractor shall be given at least three days' notice of the suspension, but the work may be suspended in a lesser time if mutually acceptable to the Department and the Contractor. During periods when no payment is being made for Traffic Control Management under this special provision, this provision will not apply.
- c. T.C.M. shall be utilized from January 6, 2014 until November 29, 2014 and from March 30, 2015 until May 30, 2015 or as otherwise directed by the Engineer.

Paragraphs 2.i., 2.j.(2)(ii), and 2.k. of Subsection 422.01 of the Standard Specifications are void.

Paragraph 2. of Subsection 422.01 of the Standard Specifications is amended to include the following:

- p.(1) The Contractor shall designate an individual, other than the Project Superintendent, to be the Traffic Control Manager for the project. This person shall be qualified by having attended and having satisfactorily passed the examination which accompanies the training for the courses for Traffic Control Supervisor or Traffic Control Technician offered by the American Traffic Safety Services Association (ATSSA). The training shall have been completed no more than 4 years prior to working on the project. Formal certification by ATSSA in these disciplines is encouraged, but not mandated. Other training or certifications may be accepted if approved by the Engineer. The Traffic Control Manager shall also possess a current Flagger Certification Card. Documentation of the Traffic Control Manager's training or certifications shall be provided to the Engineer prior to the installation of any traffic control devices on the project.
- (2) The Contractor may also designate one or more Assistant Traffic Control Managers for the project. These individuals shall possess a valid Flagger Certification Card and be qualified by having attended and having satisfactorily

passed the examination which accompanies the training for the course for Traffic Control Technician or Traffic Control Supervisor offered by the American Traffic Safety Services Association (ATSSA) --- the training having been completed no more than 4 years prior to working on the project --- or by certification according to the Department's certification program for Assistant Traffic Control Managers --- the training having been completed no more than 2 years prior to working on the project . Documentation of the Assistant Traffic Control Manager's training or certifications shall be provided to the Engineer.

- (3) In order to be qualified according to the Department's Certification Program, the prospective Assistant Traffic Control Manager must:
  - i. View the 47-minute video "Training and Certification of Assistant Traffic Control Managers."
  - ii. Correctly answer 80 percent of the questions on an examination that accompanies the video.
- (4) Upon satisfactory completion of the training and examination procedure, the prospective Assistant Traffic Control Manager shall be issued an Assistant Traffic Control Manager Certification Card by the examining Contractor. The Assistant Traffic Control Manager's name, last four digits of social security number, and test score shall be reported to the Construction Engineer on DR Form 90a, "Certification Report for Assistant Traffic Control Managers."
- (5) The video examination forms, Assistant Traffic Control Manager Cards, and Certification Reports for Assistant Traffic Control Managers shall be furnished by the Department.
- q. The Traffic Control Manager or Assistant Traffic Control Manager shall be available and reasonably accessible (within 30 minutes) to the project during normal working hours on every day that work is being performed on the project and always on-call at other times. During other than normal working hours, these individuals shall respond and be on the project within 60 minutes of notice being given that traffic control items on the project are in need of attention. The Contractor may elect to have an employee or employees perform this function simultaneously on more than one project, but shall not be relieved from the sanctions or disincentives that may be imposed for failure to meet the deadlines specified herein.
- r. The Traffic Control Manager's or Assistant Traffic Control Manager's activities on the project shall be dedicated to the purpose of monitoring and maintaining the traffic control devices. The performance of other crafts or trades will be permitted, but shall be secondary to the performance of duties associated with traffic control.
- s. The Contractor shall provide prior to the installation of any traffic control devices on the project two to four telephone numbers where the Traffic Control Manager or an Assistant Traffic Control Manager may be reached 24 hours a day, seven days a week.
- t. The Traffic Control Manager or Assistant Traffic Control Manager shall have available at all times an approved, current version of the Traffic Control Plan.

- u. If corrective action is not taken by the Contractor within the times specified in Paragraph 2.q., the Engineer may suspend all work on the project until the problem is corrected. The Engineer shall make reasonable allowance for existing weather conditions in the case of materials whose installation is governed by temperature or other atmospheric conditions.

### **Construction Methods**

Subsection 422.03 of the Standard Specifications is amended to include the following:

- 20. The Traffic Control Manager's or Assistant Traffic Control Manager's duties shall include:
  - a. Insuring that all traffic control devices, including flagging operations, are functioning properly, are clean, and are correctly located as shown on the Traffic Control Plan or as directed by the Engineer. This provision in no way restricts the cleaning, repair and maintenance of traffic control devices to the Traffic Control Manager or his or her assistants.
  - b. Inspecting all traffic control devices on every calendar day that traffic control devices are in place, whether in use or covered. Inspections shall take place a minimum of twice daily, at least two inspections shall be eight hours apart, and at least one weekly inspection shall be during the hours of darkness. However, during or following periods of inclement weather or when the situation warrants for other reasons, inspections shall be done more frequently. Additionally, when flagger control is being utilized, at least one inspection each week shall be performed during flagging operations for monitoring purposes. The Traffic Control Manager or Assistant Traffic Control Manager shall perform the inspections.
  - c. Monitoring the cleaning and maintenance of all traffic control devices and the placement of temporary pavement markings.
  - d. Completing a Traffic Control Inspection Form provided by the Engineer at the completion of each inspection. These forms shall be submitted daily to the Engineer, either in person or via facsimile transmission.
  - e. Monitoring flagging operations on the project to insure signing and flagging techniques are in compliance with Department and ATSSA requirements (flagger location and proper spacing / signage as per the plans). The Traffic Control Manager or Assistant Traffic Control Manager shall not act as a flagger, except in an emergency or when providing relief for short periods of time.
  - f. Coordinating all traffic control operations, including those of subcontractors and suppliers.
  - g. Coordinating traffic-related activities with the appropriate law enforcement, fire, and emergency medical agencies.
  - h. Attending all project scheduling meetings.

## Method of Measurement

Subsection 422.04 of the Standard Specifications is amended to include the following:

- 21.(1) Traffic Control Management is measured by the day for the actual number of days management and inspection are required and provided. Payment will only be made for one day of Traffic Control Management during each midnight-to-midnight period regardless of the number of Traffic Control Managers or Assistants required to adequately perform the work.
- (2) No measurement will be made when the Engineer has suspended the need for Traffic Control Management and notified the Contractor accordingly.

## Basis of Payment

Paragraph 1. of Subsection 422.05 of the Standard Specifications is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Traffic Control Management	Day (d)

Paragraph 15. of Subsection 422.05 of the Standard Specifications is renumbered to be Paragraph 16. Subsection 422.05 of the Standard Specifications is amended to include the following:

15. With regard to inspection, maintenance and repair of temporary traffic control devices, an assessment in the amount of \$500 per occurrence per day shall be charged to the Contractor when any of the following occur (these assessments shall be in addition to any other liquidated damages which may be assessed):
  - a. The Contractor fails to respond within the timeframe specified in Paragraph 2.q. of the amended Subsection 422.01 of the Standard Specifications. Response time shall begin when:
    - 1) The Engineer notifies the Contractor of deficiencies in person;
    - 2) The Engineer makes notification of deficiencies via the 24-hour phone number(s) provided by the Contractor; or
    - 3) The Engineer leaves a message or receives no answer at the number(s) provided;
  - b. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of the completion of an inspection that uncovers deficiencies or within two hours of notification of deficiencies by the Engineer (including flagging operations).
  - c. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of documented notification by an official law enforcement agency (including flagging operations).
  - d. The Contractor fails to correct improper flagging procedures.

- e. The Contractor fails to make or report the inspections prescribed in this specification.
- f. The Engineer observes and documents any occurrence of the Contractor or his or her subcontractors flagrantly disregarding the necessary maintenance of traffic control devices that are in obvious need of attention.

**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.

**FHWA Luminance Factor**

Sheeting Type	Luminance Factor $Y_T$		Fluorescence Luminance Factor Limit, $Y_F$
	Min	Max	
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).

**TEMPORARY PAVEMENT MARKING  
(D-10-0811)**

Paragraph 4.f. of Subsection 422.01 in the Standard Specifications is void.

Paragraph 6.a.(2) of Subsection 422.03 is void and superseded by the following:

- (2) When the markings are no longer needed, the Contractor shall remove them. If removing markings from the final wearing surface, the removal process shall not mar or damage the surface. Removed markings shall no longer be visible on the final wearing surface.

Paragraph 6. of Subsection 422.03 in the Standard Specifications is amended to include the following:

This work shall consist of installing and removing reflectorized temporary pavement lines of the color, width and line configuration shown in the plans or as designated by the Engineer.

Temporary paint markings will be used on this project. The use of Type I tape will not be permitted and Type II tape may be used for short durations only, as directed by the Engineer. Temporary paint stripes shall be a minimum 4" (100 mm) wide, 10' (3 m) long with a 30-foot (9 m) gap or a minimum 4" (100 mm) wide solid line as shown on the plans.

Temporary pavement marking which is no longer applicable shall be removed as directed by the Engineer.

Paragraph 12.a. of Subsection 422.04 is void and superseded by the following:

- a. "Pavement Marking Removal" and "Temporary Pavement Marking Removal" shall be measured by the linear foot (meter) along the centerline of the traveled roadway for each line removed.

Subsection 422.04 is amended to include the following:

21. The use of paint for Temporary Pavement Marking shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type Paint".
22. Temporary pavement marking tape Type II shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type II".
23. Initial surface preparation requiring sand or shot blasting shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Surface Preparation". Surface preparation for repainting, consisting of air blasting and brushing, shall be subsidiary to other items for which payment is made.

Paragraph 1. of Subsection 422.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Temporary Pavement Marking Removal	Linear Foot (LF)
Temporary Pavement Marking, Type Paint	Linear Foot (LF)
Temporary Pavement Marking, Type II	Linear Foot (LF)
Temporary Pavement Marking, Surface Preparation	Linear Foot (LF)

Paragraph 9.c. of Subsection 422.05 is void.

Paragraph 13. of Subsection 422.05 is void and superseded by the following:

13. Removal of temporary pavement markings including overlay broken/solid lines will be paid for except:
  - a. When the temporary markings are intended to be covered up by permanent markings.
  - b. When surface preparation removes the temporary markings.

Section 1069 in the Standard Specifications is amended to include the following:

1. Prior to the initial placement of the markings, temporary paint, or Type II tape the pavement upon which the markings are to be placed shall be dry, cleaned and properly prepared by sand or shot blasting, as a minimum, and to the extent recommended by the manufacturer so that all contaminants, loose debris, and other foreign material are completely removed. Surface preparation for any subsequent application shall consist of air blasting and brushing the roadway surface to remove all loose dirt, mud or other debris and to dry the surface. Each additional application of paint shall be applied over the previously painted stripes.

Prior to placing the temporary pavement markings on the prepared surface, the Contractor shall layout, spot or string line the proposed temporary marking location. The temporary markings shall be aligned in such a way as to provide a smooth and gradual transition to and from the existing markings, and throughout both straight and horizontally curved sections of the project.

2. The material used for temporary paint marking shall be a commercially available acrylic resin Type II traffic paint that dries to no pickup in 4 minutes and shall be applied with a minimum of 6 pounds (0.7 kg) of glass beads per gallon (liter). The paint shall be applied at a minimum width of 4 inches (100 mm) and a wet thickness of approximately 15 mils (380  $\mu$ m) {approximately 16.5 gallons (39 liters) of paint per mile (kilometer) of solid line}. The equipment used to paint the line shall be a machine designed for the purpose of applying long line traffic lane markings of the type, width and thickness required, and shall be self-propelled or truck mounted and be equipped with an adjustable guide-on to assure proper placement of the line. Hand application, walk behind equipment or towing of the equipment will not be allowed.

Temporary paint lines shall be used on new or existing concrete pavement and asphaltic concrete pavement.

Any temporary painted line or segment of line, placed before December 1, which fails to adhere to the roadway surface for a minimum of 60 days under normal vehicular traffic or which appears wavy, nonuniform, thin, poorly applied, misaligned, beadless or nonreflective, shall be replaced as directed by the Engineer. For temporary painted pavement markings placed between December 1 and March 15, the minimum time requirement shall be 15 days with the same conditions applicable. No direct payment will be made for replacement within the 60 day or 15 day warranty periods.

After the minimum 60 day or 15 day warranty periods, the Contractor may be required to repaint the temporary traffic markings, as directed by the Engineer. Direct payment will be made for each additional application. However, should the additional application fail within the 60 day or 15 day warranty periods, the provisions as stated in the previous paragraph shall apply.

The Contractor must begin each additional repainting application within 72 hours after notification by the Engineer. Should the Contractor fail to begin repainting within this 72 hour period, the Engineer may use State forces or hire a private contractor to repaint the temporary traffic markings. The Contractor will be assessed any costs above the contract unit price "Temporary Pavement Marking, Type Paint" incurred by the State as a result of performing the corrective action by others, and the project will be shut down until the painting is completed.

When painting is required with air temperatures between 38° F (3° C) and 50° F (10° C), the paint shall be heated according to the manufacturer's recommendation prior to application on the dry, clean and properly prepared pavement. Any paint application made when the air temperature is below 38° F (3° C) will be paid for by the State, even if the application falls within either the 60 day or 15 day warranty periods previously described.

3. Temporary pavement marking tape Type II shall be a mixture of high quality polymeric materials and pigments, with glass beads throughout the pigmented portion of the film, and a reflective layer of high index of refraction glass beads bonded to the top surface. The film shall be precoated with a pressure-sensitive adhesive. Unless otherwise specified, the temporary pavement marking shall be 4 inches (100 mm) wide and the reflectorizing glass beads shall be incorporated to facilitate removal of the tape easily from asphalt and Portland cement concrete surfaces intact or in large pieces, at temperatures above 40° F (4° C), either manually or with a recommended roll up device. Removal shall be accomplished without the use of heat, solvents, grinding or sandblasting.

### **TEMPORARY TRAFFIC CONTROL FOR PERMANENT PAVEMENT MARKING (D-13-1007)**

Paragraph 4. of Subsection 423.04 in the Standard Specifications is void.

**INERTIAL BARRIER SYSTEM  
(D-14-0509)**

Paragraph 9.b.(5) of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- (5) All inertial barriers shall have 5 to 15 percent (by volume) rock salt mixed with the filler material.

**WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED  
(D-15-0711)**

**I. Description**

This work shall consist of furnishing and installing wet night retroreflective thermoplastic pavement markings in accordance with this provision and in conformance to the dimensions and lines shown on the plans or established by the Engineer.

This specification covers wet reflective thermoplastic materials suitable for use as reflecting pavement markings on asphalt pavements. A manufacturer recommended heat source fuses the markings to the asphalt pavements. Glass beads shall be pre-mixed into the material furnished. Both glass beads and wet beads shall be applied to the surface either before or after fusion to the pavement. Upon cooling, the material produces an adherent reflectorized marking of specified thickness and width, capable of resisting deformation by traffic.

The Contractor shall field verify the pavement marking quantities required for the project prior to purchasing materials. The Department will not be held responsible for the Contractor's shortage or surplus of material. The Contractor's verification of quantities and purchasing material shall not delay the project or the installation of pavement marking when required.

The thermoplastic pavement marking shall be applied in grooves cut into the surfacing. The grooves shall be made in a single pass dry cut; the equipment used shall be self vacuuming and leave the cut groove ready for thermoplastic pavement marking application. The equipment and method used shall be approved by the thermoplastic pavement marking manufacturer. The thermoplastic pavement marking shall be applied in the grooves the same day as the cut. Grooves shall be clean and dry prior to thermoplastic pavement marking application. All conflicting pavement markings remaining after thermoplastic pavement marking application shall be removed; this removal shall be subsidiary to the pavement marking.

- Groove width: pavement marking width + 1 inch to 2 inch max
- Groove depth: per manufacturer's recommendations
- Groove length: full length of marking + minimum required grooving transition
- Groove position: 2 inches off of joint line (per plan)

Grooving of the surfacing shall be performed in accordance with the thermoplastic manufacturer's recommendations. Grooving the surfacing shall not be measured and

paid for but shall be considered subsidiary to “Wet Reflective Thermoplastic Pavement Marking, Grooved”.

**II. Requirements**

**a. General.**

- (1) Provide the material in white and/or yellow as specified.
- (2) Provide material with a minimum thickness of 0.1 inch as supplied by the manufacturer.
- (3) Provide material that is resistant to deterioration due to exposure to sunlight, water, oil, gasoline, salt, or adverse weather conditions.
- (4) After application, the material must exhibit no appreciable deformation or discoloration, remain tack free, and not lift from the pavement under normal traffic conditions within a road temperature range of 20 to 150°F.
- (5) Provide material that is capable of conforming to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures.

**b. Color.**

Provide yellow material that meets the minimum chromaticity coordinates in **TABLE 1**.

<b>TABLE 1: MINIMUM CHROMATICITY COORDINATES FOR YELLOW</b>				
X	.470	.510	.485	.530
Y	.455	.485	.425	.456

**c. Retroreflectivity.**

Provide wet reflective thermoplastic that meets the minimum retroreflectivity requirements in **TABLE 2**, using an acceptable 30-meter retroreflectometer. Initial performance of pavement markings should be measured within 7-14 days after application.

<b>TABLE 2: RETROREFLECTIVITY REQUIREMENTS (mcd(ft<sup>2</sup>)(fc-1)</b>		
	White	Yellow
Dry (ASTM E1710)	400	325
Wet Recovery (ASTM E2177)	350	275
Wet Continuous (ASTM E2176)	100	75

**d. Thermoplastic Material and Premix Beads.**

- (1) Provide thermoplastic material that complies with AASHTO M 249 with exception of the relevant differences due to the material being supplied in a preformed state.
- (2) All pigments must be heavy metal free, including, but not restricted to lead, cadmium, and mercury.

**e. Glass Beads for Drop-on Application.**

Provide glass beads that are specifically manufactured to be compatible with the thermoplastic system, and comply with AASHTO M 247, Type I.

**f. Wet Reflective Media.**

Provide wet reflective media approved by the manufacturer. The wet reflective media that qualify for use are shown in the NDR Approved Products List.

**III. Test Methods**

**a. Thermoplastic Material and Premix Beads.** AASHTO T 250

**b. Glass Beads for Drop-On Application.** AASHTO M 247

**c. Field Evaluation.** KTMR-9, Field Evaluation of Pavement Marking Materials.

**IV. Observation Period**

Following initial completion of all pavement marking, there will be a 180-day observation period before final acceptance. During the observation period, the Contractor, at no expense to the Department of Roads, shall replace any marking that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. At the end of the observation period the minimum required retention percentage for marking installed shall be 90%.

Determination of Percentage Retained - The percentage retained shall be calculated as the nominal area of the strip less the area of loss divided by the nominal area and expressed as a percentage of the nominal area. A claim, made by the State against the Contractor, shall be submitted to the Contractor in writing within 30 days after the 180-day observation period. When such a claim is made prior to August 1, the replacement material shall be installed during that same construction season. Replacement material for any claim after August 1 shall be installed prior to June 1 of the following year. Marking replacement shall be performed in accordance with requirement specified herein for the initial application, including but not limited to surface cleaning, sealer application, etc.

Final acceptance of all marking will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

Final acceptance of the pavement marking will be: (1) 180 days after the initial completion of all work, or (2) upon completion of all corrective work, whichever occurs last.

**V. Certification of Compliance**

The Contractor shall furnish a manufacturer's certification that the material complies with the provisions of this specification.

**VI. Contract Units and Basis for Payment**

A. Linear pavement markings will be measured in linear feet complete-in-place for the width specified.

- B. Retroreflective markings will be paid for at the contract unit price, which shall be full compensation for cleaning and preparing the pavement surface, for furnishing and placing all materials, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Subsection 423.05 of the 2007 Standard Specifications is amended to include the item: "Wet Reflective Thermoplastic Pavement Marking, Grooved". The price shall be full compensation for grooving the pavement surface, furnishing and applying all markings, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
_____ Wet Reflective Thermoplastic Pavement Marking, Grooved	Linear Feet

### **WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED**

**I. Description**

This work shall consist of furnishing and installing wet night retroreflective polyurea pavement markings in accordance with this provision and in conformance to the dimensions and lines shown on the plans or established by the Engineer.

The wet reflective polyurea marking material shall be applied by spray method onto asphaltic cement concrete and Portland cement concrete surfaces. Following an application of glass beads or black aggregate, and upon curing, the resulting marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic.

The Contractor shall field verify the pavement marking quantities required for the project prior to purchasing materials. The Department will not be held responsible for the Contractor's shortage or surplus of material. The Contractor's verification of quantities and purchasing material shall not delay the project or the installation of pavement marking when required.

The polyurea pavement marking shall be applied in grooves cut into the surfacing. The grooves shall be made in a single pass dry cut; the equipment used shall be self-vacuuuming and leave the cut groove ready for polyurea pavement marking application. The equipment and method used shall be approved by the polyurea pavement marking manufacturer. The polyurea pavement marking shall be applied in the grooves the same day as the cut. Grooves shall be clean and dry prior to polyurea pavement marking application. All conflicting pavement markings remaining after polyurea pavement marking application shall be removed; this removal shall be subsidiary to the pavement marking.

Groove width: pavement marking width + 1 inch to 2 inch maximum  
 Groove depth: per manufacturer's recommendations to a minimum of 60 mils  
 Groove length: full length of marking + required grooving transition  
 Groove position: 2 inches off of joint line (per plan)

Grooving of the surfacing shall be performed in accordance with the polyurea manufacturer's recommendations. Grooving the surfacing shall not be measured and paid for but shall be considered subsidiary to "\_\_\_\_ Wet Reflective Polyurea Pavement Marking, Grooved".

## II. Materials

### A. Polyurea

#### Composition Requirements:

Composition requirements are per manufacturer's specifications. The Wet Reflective Polyurea Pavement Markings approved for use are shown on the NDR Approved Products List. Markings which have not been previously approved by the Department will not be permitted on the project until approved by the Traffic Engineer.

#### Properties:

1. **Color and Weathering Resistance:** The mixed polyurea compound, white, yellow and black, when applied to a 3" x 6" aluminum panels at 15±1 mil in thickness with no glass beads or elements and exposed for 500 hours in a Q.U.V. Environmental Testing Chamber, as described in ASTM-G154, Cycle #1, shall conform to the following minimum requirements. The color of the white polyurea system shall not be darker than Federal Standard No. 595A-17778. The color of the yellow polyurea system shall conform to Federal Standard No. 595A-13538. The color of the black polyurea system shall conform to Federal Standard No. 595A-17038.
2. **Track-Free Time (Laboratory):** When tested in accordance with ASTM D 711, the polyurea marking material shall reach a track-free condition in 10 minutes or less for a 15 mil thickness. This test shall be performed with AASHTO Type 1 beads coated at a rate of 0.099 pounds per square foot. The track-free time shall not increase substantially with decreasing temperature.
3. **Adhesion to Concrete:** The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified concrete surface that there shall be a 100% concrete failure in the performance of this test. The prepared specimens shall be conditioned at room temperature (75°± 2° F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.
4. **Adhesion to Asphalt:** The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified asphalt surface that there shall be a 100% asphalt failure in the performance of this test. The prepared specimens shall be conditioned at room temperature (75°± 2° F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.

B. Reflective Media

The reflective media application shall incorporate a double drop technique to maximize wet night reflectivity and color. The reflective media used shall ensure the wet reflective polyurea pavement markings meet the reflectance performance requirements in Section II.D.3. The glass beads for drop-on application shall conform to the following requirements *or be an approved equivalent*.

1. Glass Beads

The required glass beads shall be a 60/40 blend (60% sinkers and 40% floaters) of AASHTO M 247-81 Type I gradation 1.5 index glass beads. The glass beads shall have a minimum of 70% Rounds as measured according to ASTM D1155. Crush Resistance shall be measured according to the procedures of ASTM D1213 and shall be a minimum of 30 pounds retained on US #40 Mesh.

Acid Resistance: A sample of glass beads supplied by the manufacturer shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7 cc of concentrated acid into 1000 cc of distilled water. CAUTION: Always add the concentrated acid into the water, not the reverse. The test shall be performed as follows:

Take a 1" x 2" sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch, or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F (66° C) oven for approximately 15 minutes. Microscopic examination (20X) shall show not more than 15% of the beads having a formation of very distinct opaque white (corroded) layer on their entire surface.

2. Wet Reflective Media

Wet reflective media shall be approved for use by the polyurea manufacturer. The Wet Reflective Media approved for use are shown in the NDR Approved Products List.

C. Non-reflective Media

Black aggregate shall be broadcast to saturation on all black lines to provide a matte, non-reflective finish. The gradation of the black aggregate is as follows:

U.S. Sieve	Retained (%)
#20	17-37
#30	45-65
#40	14-25
Pan	0-1

D. Finished Markings

Because of normal variances in road surfaces, application processes and measurement, the properties of markings made from the materials specified herein will vary from one installation to the next. When the materials are applied according to the specifications in Section III, they shall be capable of forming markings with the following reproducibility of properties:

1. On-the-road Track-Free Time: When installed at 77° F and at a wet film thickness of 15±1 mils, the markings shall reach a no-track condition in less than 10 minutes. Track-free shall be considered as the condition where no visual deposition of the polyurea marking to the pavement surface is observed when viewed from a distance of 50 feet, after a free-rolling traveling vehicle's tires have passed over the line. The track-free time shall not increase substantially with decreasing temperature.
2. Skid Resistance: The average initial skid resistance shall be 45 BPN or greater when tested according to ASTM E303.
3. Retroreflectance – Initial retroreflectance are shown in the table below. Typical retroreflectivity averaged over many readings (mcd(ft-2)(fc-1)) metric equivalent (mcd(m-2)(lux-1)).

<b>Average Minimum Initial Reflectance</b>		
	White	Yellow
Dry (ASTM E1710)	500	350
Wet Recovery (ASTM 2177)	350	275
Wet Continuous (ASTM 2176)	100	75

- 3.1.1 Some reasonable variance should be expected (for example, application on very rough road surfaces or differences in glass beads).
- 3.1.2 The initial retroreflectance of a single installation shall be the average value determined to the measurement and sampling procedures outlined in ASTM D6359, using a 30-meter (98.4 feet) retroreflectometer. The 30-meter retroreflectometer shall measure the coefficient of retroreflected luminance,  $R_L$  at an observation angle of 1.05 degrees and an entrance angle of 88.76 degrees.  $R_L$  shall be expressed in units of millicandelas per square foot per foot-candle [mcd(ft<sup>2</sup>)(fc<sup>-1</sup>)]. The metric equivalent shall be expressed in units of millicandelas per square meter per lux [mcd(m<sup>2</sup>)(lux<sup>-1</sup>)].
- 3.1.3 Initial performance of pavement marking shall be measured within 14 days after application. The Traffic Engineer shall be notified prior to the placement of pavement markings.
- 3.1.4 Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be in accordance with ASTM E2176, and to reduce variability between measurements, the test method shall be performed in a controlled laboratory environment while the marking is positioned with a 3 to 5 degree

lateral slope. Measurements shall be reported as the average of the minimum of three locations. Samples of the completed finished product shall be applied to flat panels during application and brought back to the lab for testing.

### III. Application

The Contractor shall furnish equipment and apply the materials according to the following specifications:

#### A. Equipment

Application equipment shall be capable of producing markings that meet the specifications of the manufacturers listed on the NDR Approved Products List for Wet Reflective Polyurea Pavement Marking.

At any time throughout the duration of the project, the Contractor shall provide free access to his application equipment for inspection by the Engineer, his authorized representative or a materials representative.

When black and white polyurea are applied together to create a contrast pattern, they shall be applied from one truck in a single pass operation.

#### B. Application Conditions:

1. **Moisture:** The markings shall only be applied during conditions of dry weather and when the pavement surface is dry and free of moisture.
2. **Air Temperature:** The markings shall only be applied when road and air temperatures are above 40 degrees F, unless manufacturer's guidelines state otherwise.
3. **Surface Preparation:** Marking operations shall not begin until applicable surface preparation work is completed and approved by the Engineer.
  - 3.1 Prior to applying the markings, the Contractor shall remove any remaining existing markings to expose a minimum of 80% of the pavement surface.
  - 3.2 Prior to applying the markings, the Contractor shall remove all curing compounds on new Portland cement concrete surfaces.
  - 3.3 Prior to applying the markings, the Contractor shall remove all dirt, sand, dust, oil, grease and any other contaminants from the road surface.
  - 3.4 Application over temporary paint is not acceptable.
4. **Dimensions:** The pavement markings shall be placed only on properly prepared surfaces and at the widths and patterns as designated on the contract plans. The markings shall be applied in accordance with the "Manual on Uniform Traffic Control Devices" and in accordance with the Engineer's plans.

5. **Other Restrictions:** The Engineer and/or Contractor shall determine further restrictions and requirements of weather and pavement conditions necessary to meet the all other application specifications and produce markings that perform to the satisfaction of the Engineer.
6. **Binder Thickness:** The polyurea binder (mixed Part A and Part B) coating shall be applied at rates to achieve minimum uniform wet thicknesses as follows:

Surface Type	Recommended Polyurea Pavement Marking Thickness (1 inch=1000 mils)
Existing Smooth Asphalt or Concrete Surface	20±2 mils
New Concrete Surface <sup>1</sup>	20±2 mils
New Asphalt Surface (Standard Asphalt Mix)	20±2 mils
Open Grade Friction Course (OGFC) or Stone Matrix Asphalt (SMA) <sup>2</sup>	25±2 mils
Rough Concrete or Asphalt	22±2 mils
Concrete or Asphalt after Grinding Off Pavement Markings <sup>3</sup>	22±2 mils

- <sup>1</sup> Use thicker binder (20 mils) on new concrete surfaces with heavy tines.
- <sup>2</sup> Very large aggregate sizes for open grade friction course or stone matrix asphalt mixes may require a thickness of 25 mils for proper coverage.
- <sup>3</sup> Pavement marking thickness determined by the type of surface and roughness/texture created from grinding operation.

7. **Reflective Media Application:** The Contractor shall ensure that the reflective media are properly set in the polyurea coating so that their exposed portions are free of polyurea coating material. The specified reflective media shall be dropped per the manufacturer's specified rates to achieve their recommended coating weights:
8. **Volumetric Proportioning:** The Contractor shall ensure proper proportioning as required by manufacturer's specifications and mixing of the polyurea components so that the markings are adequately hardened throughout and are free of soft or uncured material. Typically, such areas will darken over time from dirt and tire residue.
9. **Overspray:** The Contractor shall ensure the polyurea coating does not exhibit excessive overspray.

10. **Adhesion:** The Contractor shall ensure that the polyurea coating is well adhered to the road surface, and that the reflective media are well adhered to the binder.

#### **IV. Observation Period**

Following initial completion of all pavement marking, there will be a 180-day observation period before final acceptance. During the observation period, the Contractor, at no expense to the Department of Roads, shall replace any marking that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. At the end of the observation period the minimum required retention percentage for marking installed shall be 90%.

Determination of Percentage Retained - The percentage retained shall be calculated as the nominal area of the strip less the area of loss divided by the nominal area and expressed as a percentage of the nominal area. A claim, made by the State against the Contractor, shall be submitted to the Contractor in writing within 30 days after the 180-day observation period. When such a claim is made prior to August 1, the replacement material shall be installed during that same construction season. Replacement material for any claim after August 1, shall be installed prior to June 1, of the following year. Marking replacement shall be performed in accordance with requirement specified herein for the initial application, including but not limited to surface cleaning, sealer application, etc.

Final acceptance of all marking will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

Final acceptance of the pavement marking will be: (1) 180 days after the initial completion of all work, or (2) upon completion of all corrective work, whichever occurs last.

#### **V. Contract Units and Basis for Payment**

- A. Linear pavement markings will be measured in linear feet complete-in-place for the width specified.
- B. Arrows and Legends are measured by the each.

Subsection 423.05 of the Standard Specifications is amended to include the item: "     Polyurea Pavement Marking, Grooved". Payment shall be full compensation for grooving the pavement surface, furnishing and applying all markings, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
____ Polyurea Pavement Marking, Grooved	Linear Feet
____ Wet Reflective Polyurea Pavement Marking, Grooved	Each

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

### RELOCATE STREET LIGHTING UNIT

There are five types of existing street lighting units to be relocated under this project:

Type "A"- Conventional lighting unit with single 6 ft. davit style mast arm, 45 ft. mounting height, mounted to an in ground concrete foundation, with break-a-way transformer base, 200 watt HPS cobra head luminaire. Relocate and re-install using a new power foundation.  
(Lighting units EP-65 thru EP-68) Total: 4 units

Type "B"- Conventional lighting unit with single 6 ft. davit style mast arm, 45 ft. mounting height, mounted to an in ground power foundation, with break-a-way transformer base, 200 watt HPS cobra head luminaire. Relocate and re-install using the existing power foundation.  
(Lighting units EP-1 thru EP-19, EP-21 thru Ep-38, EP-40, EP-41, EP-43, EP-45 thru EP-64 )  
Total 60 units

Type "C"- Conventional lighting unit with dual 6 ft. davit style mast arms, 45 ft. mounting height, anchor base, 200 watt HPS cobra head luminaires, presently mounted to an in ground concrete foundation. This unit has a special narrow base plate for median barrier or concrete barrier curb mounting and on this project will be mounted on the concrete barrier curb at sta. 1290+90 as pole RP-68. The final mounting height of this unit when mounted on the new 3'-6" high concrete barrier curb will be an acceptable 48'-6". Relocate and re-install on the new concrete barrier curb.  
(Lighting unit EP-69) Total: 1 unit

Type "D" –Conventional lighting units with dual 6 ft. davit style mast arms, 45 ft. mounting height, anchor base, 200 watt HPS cobra head luminaires, presently mounted to an in ground concrete foundation. These units have a special narrow base plate for median barrier or concrete barrier curb mounting but on this project will be mounted to an in ground concrete foundation between the concrete barrier curbs as poles RP-69 thru RP-72 at the stations listed on the "Pole Relocation Schedule". Relocate and re-install on a new concrete foundation.  
(Lighting units EP-70 thru EP-73) Total; 4 units

Type "E" –Conventional lighting unit with single 4 ft. davit style mast arm, 45 ft. mounting height, bridge mounted, 200 watt HPS luminaire. Relocate and re-install on new bridge foundation.  
(Lighting units EP-20, EP-42 and EP-44) Total: 3 units

The Contractor shall relocate the existing lighting units as indicated in the pole relocation schedule and these Special Provisions. Lighting units to be relocated shall be carefully dismantled, salvaged, stored, and protected from damage until installed at their new location. The Engineer may designate specific areas for temporary storage of the salvaged material. It will be the Contractor's responsibility to protect all material from damage during removal and storage.

Unless shown or stated otherwise, all type "A", type "C" and type "D" lighting units under this provision shall have their existing concrete foundations removed in their entirety; either in sections or as one complete unit. (Lighting units EP-65 thru EP-73) Total: 9 units

The void resulting from concrete or power foundation removals shall be filled with clean soil and compacted to the density requirements of the project.

All debris resulting from the foundation removals shall be taken from the project and disposed of by the Contractor.

The luminaire(s) on each of the relocated lighting units shall be cleaned and provided with a new 200 watt HPS lamp.

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

Relocated lighting units will be measured for payment as individual units. Each relocated lighting unit, in place and accepted by the Engineer, shall be paid for at the contract unit price, per each, for the item "Relocate Street Lighting Unit, Type \*\*\*". This price and payment shall be full compensation for the removal, salvage, storage, preparation and reinstallation of the salvaged unit; for the complete removal and disposal of the existing concrete foundation (where required); for the furnishing and installation of a new power foundation (where required); for the construction of a new concrete foundation (where required); for the cleaning of the luminaire(s) of each relocated unit; for the furnishing and installation of a new 200 watt HPS lamp for the luminaire(s) of each relocated unit; for the termination and proper abandonment of existing unused circuits and for all materials, labor, equipment, tools and incidentals necessary to complete the work.

### **UNDERDECK LUMINAIRES**

Contractor shall furnish and install two new underdeck luminaires on the 42<sup>nd</sup> Street bridge. These luminaires shall be of the type, wattage, voltage and manufacture shown on the plans in order to match the six existing underdeck luminaires presently on the bridge. A conduit system to feed the two new underdeck luminaires and the six existing luminaires will be installed by the bridge contractor and will be in place for use by the lighting contractor. The lighting contractor shall install the two new luminaires; shall install new conductors in the existing bridge conduit system to the two new luminaires and shall electrically connect the two new luminaires to the six existing luminaires.

The six existing under deck luminaires plus the two new luminaires will be fed from the new No.6 AWG street lighting circuit in the north bridge curb. Tap the new No. 6 AWG street lighting circuit in the two existing 10"x6"x6" junction boxes in the north bridge curb.

Furnish and install new electrical conductors in the ¾" conduit from the two junction boxes in the north bridge curb to the two new underdeck luminaires. Electrically connect these two new luminaires to the six existing underdeck luminaires. Use No. 10 AWG, type THW or THWN, stranded, copper conductors for the phase conductors and No. 10 AWG stranded, copper conductor (bare or green insulation) for the equipment grounding conductor to match the existing conductors. Fuse each circuit in its junction box in the bridge curb with 15 amp KTK fuses.

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

New underdeck luminaires with lamp, in place and accepted by the Project Manager, shall be measured for payment as a single unit and paid for at the contract unit price, per each, for the item "Underdeck Luminaire, Type UD-100." This price and payment shall be full compensation for furnishing and installing the luminaires as detailed in the plans; for furnishing and installing the required No. 10 AWG electrical conductors from the junction boxes in the bridge curb to the new underdeck luminaires; for the No. 10 AWG conductors and work required to electrically connect the two new luminaires to the six existing underdeck luminaires and for all labor, equipment, tools, material and incidentals necessary to complete the work.

### **REMOVE LIGHTING UNIT**

Existing lighting unit EP-39, Sta. 1235+06, 88'Lt is a type SL-BT-45-6-0.20 lighting unit which is in direct conflict with the project's roadway widening and must be removed.

The Contractor shall remove the lighting unit by disassembling the luminaire from the mastarm, the mastarm from the pole and the pole from its power foundation.

All components of the existing lighting unit, including the power foundation, shall be delivered to the Omaha Public Power District's Elkhorn yard at 1101 North 180<sup>th</sup> Street (Approx. 2 miles north of West Dodge Street on 180<sup>th</sup>). Contact Jan Robbins at (402) 552-5887 two days prior to delivery.

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

The item "Remove Lighting Unit" will be measured and paid for as a complete unit for each lighting unit removed and accepted by the Engineer. This work shall include, but not be limited to, the following: Removing, salvaging, storing and transporting the existing lighting unit including power foundation to the OPPD Elkhorn supply yard; for all necessary excavation backfilling and compaction; for disposal of surplus material; for the termination and abandonment of existing underground feeders and for all materials, labor equipment, tools and incidentals necessary to complete the work.

### **RELOCATE PULL BOX**

There are two types of pull boxes to be relocated under this project (1)- Nebraska type PB-5 composite pull box and (2)- Nebraska type PB-2 concrete pull box with cast iron ring and cover.

Relocate the existing pull box to its new location as shown in the plans. Re-install the pull box in accordance with standard plan 914-R6. Only pull boxes in good condition will be relocated. The Project Manager will determine which pull boxes are acceptable for relocation. Replace all non-acceptable pull boxes with a new pull box of like type.

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

Relocated pull boxes will be measured for payment as individual units. Each relocated pull box, in place and accepted by the Engineer, will be paid for at the contract unit price, per each, for the item "Relocate Pull Box, Type \*\*\*\*". This price and payment shall be full compensation for the removal and re-installation of the pull box; for all required conduit bends; for all necessary

excavation and backfilling; and for all labor, equipment, tools and incidentals necessary to complete the work.

Any pull box scheduled to be relocated but found un-useable, as determined by the Engineer, shall be replaced with a new pull box of like kind. Payment to the Contractor shall be the unit relocation bid price plus the Contractor's cost of the new pull box plus ten percent.

### **REMOVE PULL BOX**

There are two types of pull boxes to be removed under this project (1)- Nebraska type PB-5 composite pull box and (2))-Nebraska Type PB-2 concrete pull box with cast iron ring and cover.

When the pull box is no longer needed, as determined by the Project Manager, the Contractor shall excavate the pull box, fill the resulting void with clean soil and compact the fill soil to the density requirements of the project. The removed pull boxes shall not be salvaged but will become the property of the Contractor and must be taken from the project site.

Abandon unused conduit and cable in place.

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

The item "Remove Pull Box" shall be paid for as a complete unit for each pull box of that type being removed. This work shall include but not be limited to the following: Removal of the existing pull box; disposal of the removed pull box together with all surplus material and debris; all necessary excavation, backfill and compaction and for all labor, equipment, tools, transportation and incidentals necessary to complete the work.

### **REMOVE AND REINSTALL UNDERDECK LUMINAIRE**

Widening of the westbound I-80 bridge (Sta. 1295+42) over the I-480 northbound ramp will cause a conflict with one existing under deck luminaire and the possible conflict with a second.

All under deck luminaires to the I-80 EB and I-80 WB bridges over the I-480 northbound ramp are mounted to the cast-in-place concrete coping of a MSE wall on either side of the I-480 ramp roadway. Sections of the MSE wall coping will need to be removed from both the east and west MSE walls in order to place a new girder to the inside of the westbound bridge. Available information indicates that the coping removal from the east wall will cause the removal of under deck luminaire WL-8 (see lighting plan sheet showing under deck luminaire placement). There is a slight chance that under deck luminaire WL-6, which is mounted to MSE wall coping on the west wall, will also need to be removed.

Remove and salvage wall mounted under deck luminaire WL-8 and under deck luminaire WL-6 if needed. Store each luminaire on site and protect from damage until the new bridge girder is installed, the bridge widening is complete and the new sections of MSE wall coping with new conduit (both east and west side) are in place. Re-install the salvaged under deck luminaires WL-6 and WL-8 on the new sections of MSE wall coping, each at its original location. Furnish and install new electrical conductor in the required sections of conduit and make needed electrical connections using approved methods and connectors.

It is estimated that it will take a total of approximately 26 Lin. ft. of 3/4" conduit to be cast in the west wall coping; 26 Lin. ft. of 3/4" conduit to be surface mounted on the west wall; 35 Lin. ft. of No. 12 AWG bare conductor and 70 Lin. Ft. of No. 12 AWG type THW or THWN phase conductors for the west wall to electrically connect re-installed under deck wall mounted luminaire WL-6 to the existing electrical circuit.

It is estimated that it will take a total of approximately 26 Lin. ft. of 3/4" conduit to be cast into the east wall coping; 35 Lin. ft. of No. 12 AWG bare conductor and 70 Lin. ft. of No. 12 AWG type THW or THWN phase conductors for the east wall to electrically connect re-installed under deck wall mounted luminaire WL-8 to the existing electrical circuit. It is believed that no surface mounted conduit will be in conflict on the east wall.

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

Under deck luminaires, removed and re-installed as indicated in the plans and these Special Provisions, shall be measured for payment as individual units. Each removed and re-installed under deck luminaire, in place and accepted by the Engineer, shall be paid for at the contract unit price, per each, for the item "Remove And Reinstall Underdeck Luminaire". This price and payment shall be full compensation for removing, salvaging and storing the under deck luminaire; for furnishing and installing the new 3/4" conduit as detailed in the plans and these Special Provisions; for furnishing and installing the No. 12 AWG ground and phase conductors as detailed; for making all required electrical connections and for all materials, labor, equipment, tools and incidentals necessary to complete the work.

### **REMOVE DYNAMIC MESSAGE SIGN SYSTEM**

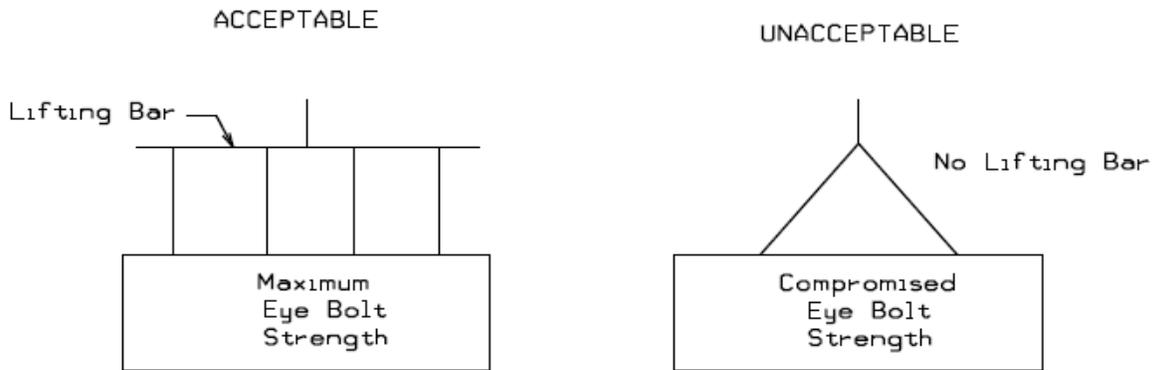
Contractor shall remove and salvage DMS system including sign, controller and cabinet as shown in the plans.

#### **Lifting Requirements**

All material and equipment necessary to lift the sign shall be furnished by the Contractor. A crane with lifting bar, rated to handle the weight of the board, shall be used. The lifting bar shall be secured to the board using eyebolts rated to handle the weight of the board. The Contractor shall consult the sign manufacturer for the proper procedure and material needed to lift the board. Any damage incurred while lifting the sign shall be the responsibility of the Contractor.

#### **Details**

The following details are for reference only. Contractor shall consult sign manufacturer and field check details before removing signs. After removal, eyebolt openings shall be plugged and sealed as per manufacturer's specification. Any damage incurred by improperly sealed openings shall be the responsibility of the Contractor.



**Method of measurement**

“Remove Dynamic Message Sign System” shall be measured by the each (ea), and shall include DMS board, controller and cabinet.

**GROUNDING CONDUCTOR  
#6 AWG CU CONDUCTOR**

Paragraph 1. of Subsection 402.05 in the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
___ Grounding Conductor	Linear Foot (LF)
#6 AWG CU Conductor	Linear Foot (LF)

**REMOVABLE WET REFLECTIVE TAPE, TYPE 4**

**I. Description**

This work shall consist of furnishing and installing retroreflective preformed patterned pavement markings in accordance with this provision and in reasonably close conformance to the dimensions and lines shown on the plans and/or required by the Engineer.

**II. Materials - General**

The preformed patterned markings shall consist of white or yellow films with clear microcrystalline ceramic beads incorporated to provide immediate and continuing retroreflection during both wet and dry conditions. This film shall be manufactured without the use of lead chromate pigments or other similar, lead-containing chemicals.

The quality of the pavement marking shall be such that the performance requirements for the marking shall be met. The markings shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to Asphalt concrete or Portland cement concrete at temperatures as low as 50°F (10°C) in accordance with the manufacturer's

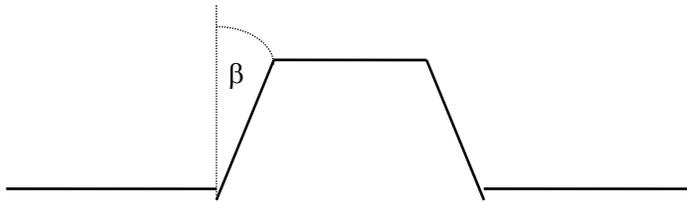
recommendations. When stored in a cool dry area indoors, the materials shall be suitable for use for one year after the date of purchase.

### III. Classification

The removable retroreflective pavement marking tape must be designed and constructed in such a manner that it can be readily removed when the markings are no longer applicable. The tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large pieces. The tape shall be wet and dry reflective throughout its useful life. (A normal construction season is defined as the time after the last snowplowing in the spring and before the first snowplowing in the fall/winter.)

### IV. Composition and Retroreflectivity Requirements

Composition: The retroreflective pliant polymer pavement markings shall consist of a mixture of high-quality polymeric materials, pigments and glass beads distributed throughout its base cross-sectional area, with a reflective layer of microcrystalline ceramic beads bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately  $20\% \pm 10\%$  of the surface area raised and presenting a near vertical face ( $\beta$  angle of  $0^\circ$  to  $60^\circ$ ) to traffic from any direction. (See diagram below.) The channels between the raised areas shall be substantially free of exposed beads or particles.



Retroreflectance: The white and yellow markings shall have the initial expected retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions. The photometric quantity to be measured shall be coefficient of retroreflected luminance ( $R_L$ ) and shall be expressed as millicandelas per square foot per foot-candle [ $(\text{mcd} \cdot \text{ft}^{-2}) \cdot \text{fc}^{-1}$ ]. The metric equivalent shall be expressed as millicandelas per square meter per lux [ $(\text{mcd} \cdot \text{m}^{-2}) \cdot \text{lx}^{-1}$ ].

Retroreflectance values shall be measured under dry conditions in accordance with the testing procedures of ASTM D4061.

Retroreflectance values shall be measured under wet conditions in accordance with ASTM E2176 or ASTM E2177. Wet retroreflectance values measured under a "condition of continuous wetting" (simulated rain) shall be in accordance with ASTM E2176, and to reduce variability between measurements, test method shall be performed in controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. A wetting agent shall be used to improve wetting of the pavement marking by the water. It is recommended that a 0.1% by volume liquid soap solution be used. Measurements shall be reported as an average for each roll tested, in a minimum of three locations.

Wet retroreflectance values measured under a “condition of wetness” shall be in accordance with ASTM E2177, and the test may be performed with the marking installed on the road. New markings shall be tested using a wetting agent, as previously described. Laboratory measurements shall be performed using a 3 to 5 degree lateral slope. Measurements shall be reported as an average for each roll tested, in a minimum of three locations

**Table 1**  
**Expected Initial  $R_L$  under dry, wet, and rainy conditions**

<b>White</b>	<b>Dry</b>	<b>Wet &amp; Rainy</b>
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	500	250

<b>Yellow</b>	<b>Dry</b>	<b>Wet &amp; Rainy</b>
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	300	200

Note: The test instrument shall use an Entrance Angle of 88.76° and Observation Angle of 1.05° which represents a simulated driver viewing geometry at a 30 meter distance.

Beads: Index of Refraction: All “dry-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 1.70 when tested using the liquid oil immersion method. All “wet-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 2.30 when tested using the liquid oil immersion method. The glass beads mixed into the pliant polymer shall have a minimum index of refraction of 1.5 when tested by the liquid oil immersion method.

**Testing Procedure For Refractive Index of Beads By Liquid Immersion**

**Equipment Required:**

1. Microscope (minimum 100X magnification)
2. Light source - preferably sodium light or other monochromatic source, but not absolutely essential
3. Refractive index liquids
4. Microscope slide and slide cover
5. Mortar and pestle

**Procedure:**

1. Using the mortar and pestle, crush a few representative beads and place a few of these crushed particles on a microscope slide.
2. Place a drop of a refractive index liquid, with an index as close to that of the glass as can be estimated, on the particles.
3. Cover the slide with a microscope slide cover and view the crushed particles by transmitted light normal to the slide surface (illuminated from the bottom).
4. Adjust the microscope mirror to allow a minimum light intensity for viewing. This is particularly important if sodium light is not used.
5. Bring a relatively flat and transparent particle into focus.
6. By slightly raising and lowering the objective (microscope tube), look for one or both of the following:
  - a. Becke Line - This light line will appear to move either into the particle or away from it. In general, if the objective is raised, the line will move toward the material of higher refractive index; if the objective is lowered, the line will move toward the material of lower index.
  - b. Variation in Particle Brightness - When raising the object from a sharp focus, the particle will appear to get brighter or darker than the surrounding field. If it becomes brighter, the glass has a higher refractive index than the liquid. If it becomes darker, the glass has a lower refractive index than the liquid. In both cases, the opposite will be true if the object is lowered.
7. This test can be used to confirm that the beads are above or below a specified index. It can also be used to give an accurate determination of the index ( $\pm 0.001$ ). This is done by using several refractive index liquids until a match or near match of indices occurs. The index of the glass will equal that of the liquid when no Becke line and no variation in bead brightness can be observed.

The size and quality of the beads shall be such that the performance requirements for the retroreflective pliant polymer shall be met.

**Acid Resistance:** The beads shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7cc of concentrated acid into 1000cc of distilled water. **CAUTION:** Always add the concentrated acid into the water, not the reverse. The test shall be performed as follows:

Take a 1-inch x 2-inch sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F. (66° C.) oven for approximately 15 minutes.

Microscopic examination (20X) shall show no more than 15% of the beads having a formation of a very distinct opaque white (corroded) layer on their entire surface.

**Color:** The preformed markings shall consist of white film with pigments selected and blended to conform to standard highway colors.

**Removability:** The pavement markings shall be removable from Asphalt concrete and Portland cement concrete intact or in large pieces, at temperatures above freezing without the use of heat, solvents, grinding or blasting without permanently scarring the roadway surface.

**Skid Resistance:** The patterned surface of the retroreflective pliant polymer shall provide an initial average skid resistance value upon manufacturing of 45 BPN when tested according to ASTM E303 except values shall be taken in one direction and then at a 45° angle from that direction. These two values shall then be averaged to find the skid resistance of the patterned surface.

**Patchability:** The pavement marking material shall be capable of use for patching worn areas of the same type in accordance with manufacturer's instructions.

**Thickness:** The patterned material without adhesive shall have a minimum caliper of 0.075 inches (1.651mm) at the thickest portion of the patterned cross-section and a minimum caliper of 0.020 inches (.508mm) at the thinnest portion of the cross-section.



## V. **Installation**

The markings shall be applied in accordance with the manufacturer's installation instructions. Marking configurations shall be in accordance with the "Manual on Uniform Traffic Control Devices." Tape shall not be installed unless the surface and air temperatures are in compliance with the manufacturer's specifications. Pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's installation instructions or a method approved by the Engineer.

The Contractor shall have on the project at all times during the application of the removable pavement markings at least one employee with a valid American Traffic Safety Services Association (ATSSA) certification. The ATSSA certification may be for either a "Certified Pavement Marking Technician" or a "Certified Pavement Marking Specialist." The Contractor shall provide the Engineer a copy of the employee's certification prior to the beginning of work.

## VI. **Observation**

During the project phase the markings are intended for, the contractor, at no expense to the Department of Roads, shall replace any markings that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. The installation of all markings will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

**VII. Removal**

Upon completion of the project or phase, the contractor shall remove the tape in whole. The removal procedure shall not damage the roadway surface.

**VIII. Contract Units and Basis For Payment**

Subsection 422.01 of the 2007 Standard Specifications is amended to include the item: "Removable Wet Reflective Tape, Type 4". The price shall be full compensation for furnishing, installing, and removing all markings, and for all materials (including adhesive), labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
**** Inch Removable Wet Reflective Tape, Type 4	Linear Foot

**TYPE C SIGNS**

**1.0 Description**

This work shall consist of all materials and labor necessary to provide, fabricate, and install highway signs at the locations shown in the plans.

**2.0 Material Requirements**

2.1 Materials for highway signs shall conform to the requirements of Section 1070 and the *Manual on Uniform Traffic Control Devices for Streets and Highways*.

2.1.1 "Type C Signs" are large guide and information signs mounted on overhead structures and constructed of molded extruded panels or reinforced aluminum, horizontally joined panels having a retroreflectorized background and direct applied letters, numerals, symbols and border.

2.2 Type C overhead signs are to be mounted over the roadway on sign structures, including cantilever structures, with vertical supports installed on reinforced concrete foundations or on sign brackets attached to existing roadway bridges.

2.3 Reflective background sheeting, letters, numerals, symbols, and the border for "Type C Signs" shall be reflective materials meeting the requirements of ASTM D4956 Type XI.

**3.0 Construction Methods**

The construction methods shall follow the methods for Type B overhead signs as stated in Subsection 417.03

#### 4.0 Method of Measurement

Providing, fabricating, and installing Type C signs shall be measured by the square foot.

#### 5.0 Contract Units and Basis for Payment

Section 417 of the 2007 Standard Specifications is amended to include the item: "Type C Signs". The price shall be full compensation for providing, fabricating, and installing Type C Signs, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Type C Sign	Square Foot (SF)

### **RELOCATE INERTIAL BARRIER SYSTEM**

Paragraph 19. b. of Subsection 422.04 in the Standard Specifications is void and superseded by the following:

- b. "Relocate Inertial Barrier System" is the pay item for moving the inertial barrier system to a new location after initial installation and operation.

Paragraph 1. of Subsection 422.05 is amended to include the following:

- |    |                                  |                 |
|----|----------------------------------|-----------------|
| 1. | <b>Pay Item</b>                  | <b>Pay Unit</b> |
|    | Relocate Inertial Barrier System | Each (ea)       |

### **SURFACING UNDER GUARDRAIL (E-3-1212)**

Amend Section 503 in the Standard Specifications to include Surfacing Under Guardrail.

At the Contractor's option, the surfacing may be constructed using Class "47B-3000" Concrete, Class "AX-3000" Concrete, Class "PR-3000" Concrete (Class 47B-20 Concrete, Class AX-20 Concrete, Class PR-20 Concrete), or any commercially produced hot mix asphaltic concrete, which has been approved by the Engineer. These materials may be used interchangeably during the course of the work except that surfacing at any individual location must be completed with the same material with which the work was begun.

If concrete is used in the surfacing, it shall reach a minimum strength of 3000 psi (20 Mpa) before opening to traffic.

Amend Subsection 302.04 in the Standard Specifications to provide that the work of subgrade preparation for surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 304.04 in the Standard Specifications is amended to provide that the work of earth shoulder construction associated with surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail."

Subsection 503.05 in the Standard Specifications is amended to provide that P.G. Binder used in the asphaltic concrete will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 504.04 in the Standard Specifications is amended to provide that the application of a tack coat, including furnishing emulsified asphalt, will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for any drainage curb placed on surfacing under guardrail will not be measured and paid for, but will be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for surfacing under guardrail will be paid for at the contract unit price per square yard (square meter) for the item "Surfacing Under Guardrail". Payment will be full compensation for the work prescribed in these Special Provisions and the Standard Specifications.

### **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**

1. 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>PF = <math>\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>PF = <math>\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.

**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**

<b>Control Strip Sampling</b>			
<b>Sample No.</b>	<b>Ton (Mg)</b>	<b>Air Voids for SPH</b>	<b>Air Voids for SPR</b>
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-8-0609)**

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

2. When materials do not meet plan and specification requirements, deductions will be made according to Table 504.01.

Section 504 is amended to include the following Table:

**Table 504.01**

<p style="text-align: center;"><b>Emulsion Pay Factor Schedule</b></p> <p style="text-align: center;"><b>Test of Residue Percentage</b></p> <p style="text-align: center;">1.00 for a deviation of minus less than or equal to 1%</p> <p style="text-align: center;">0.75 for deviation of minus greater than 1% to less than or equal to 5%</p> <p style="text-align: center;">0.40 or Reject for deviation of minus greater than 5%</p> <p style="text-align: center;"><b>Tests for ALL other properties Specified</b></p> <p style="text-align: center;">1.00 for a deviation of <math>\pm</math> less than or equal to 10%</p> <p style="text-align: center;">0.75 for a deviation of <math>\pm</math> greater than 10% to less than or equal to 25%</p> <p style="text-align: center;">0.40 or Reject for deviation of <math>\pm</math> greater than 25%</p> <p><b>Note 1:</b> Largest Pay Factor Reduction will be applied.</p>
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**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 \_\_\_\_."
  - (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  $\frac{1}{2}$  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.

### **COLD MILLING CLASS 4**

Void Paragraph 9.a. of Subsection 510.04 of the Standard Specifications and replace it with the following:

The remaining salvaged bituminous material produced from the cold milling operation not used in production of asphaltic concrete on the project shall become the property of the Contractor and removed from the project.

### **ASPHALTIC CONCRETE PLACEMENT**

The three inch Asphaltic Concrete Type SPH overlay shall be placed in one 2 inch lift over one 1 inch bottom lift.

### **CONCRETE PAVEMENT CORING (F-17-0110)**

Paragraphs 3.a. and 3.b. of Subsection 603.05 of the Standard Specifications are void and superseded by the following:

3. a. (1) A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24.
- (2) Concrete cores must have a minimum age of 28 days before testing.
- (3) The paved area shall be divided into units, and each unit will be considered separately.
- (4) Units are 750 linear feet (230 m) of pavement for each separately placed width or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.
- b. (1) When any unit core fails to have the required minimum compressive strength, the Contractor will have the option to obtain, at no cost to the Department, two additional cores from that unit provided that:
  - (i) The cores shall be cut by the contractor. (The cutting to be witnessed by the Engineer)
  - (ii) The cores shall be cut within seven (7) days of being notified of the strength deficiency, and
  - (iii) The cores shall be cut within 6 inches of the original unit core in the longitudinal direction.

- (2) The Engineer will take possession of the cores and have them tested within 24 hours at the Materials and Research laboratory.
- (3) The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.
- (4) The Department may agree to cut the additional cores if requested to do so by the Contractor, but will do so only if the Department's coring crew is available on the project and has sufficient time to cut and transport the cores for testing during normal working hours within seven (7) days of the Contractor being notified of the strength deficiency.

Paragraph 4.a.(4) of Section 603.05 in the Standard Specifications is void and replaced by the following:

A separately placed width is the width between field constructed longitudinal joints, between a longitudinal construction joint and the edge, or between two pavement edges. A separately placed width may include more than one pay class of concrete, such as doweled and non-doweled.

**PORTLAND CEMENT CONCRETE PAVEMENTS  
GENERAL REQUIREMENTS  
(F-20-0611)**

Paragraph 7.b. of Subsection 601.02 in the Standard Specifications is void and superseded by the following:

- b. The finishing machine shall travel at a controlled speed such that it produces a uniform, well consolidated pavement that does not contain large voids.

Paragraph 10.d. of Subsection 601.02 is void and superseded by the following:

- d. The Contractor shall always have a tachometer available to monitor vibrator frequency. The vibrator frequency shall be within the manufacturer's specifications not to exceed 9,000 vpm.

Paragraph 12.d.(1) of Subsection 601.02 is void and superseded by the following:

- (1) The mechanical joint saw shall have an adjustable guide to insure a true line is cut. The mechanical joint saw blade shall be water-cooled, or specifically designed for early-entry sawing if air cooled.

Paragraph 12.d.(2) of Subsection 601.02 is void.

Paragraph 12.d.(3) of Subsection 601.02 is void and superseded by the following:

- d. (3) The joint cut shall be made with a diamond-toothed blade.

**CONCRETE PAVEMENT  
(F-21-0611)**

Paragraph 2.a. of Subsection 603.03 in the Standard Specifications is amended to include the following:

- (6) The base material shall be moistened through a uniform, lightly applied spray pattern prior to concrete placement as directed by the Engineer.

Paragraphs 2.d. and e. of Subsection 603.03 are void and superseded by the following:

- d. After being consolidated with internal mechanical vibration, the concrete shall be struck off to a uniform height approximately 0.5 inch (12 mm) above the finished surface and then finished to the final elevation by means of a vibrating mechanical or vibrating hand operated screed.
- e. Finished concrete shall be of uniform density with no segregation, honeycombing, or large voids.

Paragraph 3.f. of Subsection 603.03 is void and superseded by the following:

- f. (1) A wet burlap, carpet, or canvas drag will be drawn over the entire surface in a longitudinal direction for a final finish, dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.
- (2) The drag shall be suspended from a mandrel, or similar device, to insure a uniform texture.
- (3) The drag shall be lifted from the surface of the concrete pavement when the paving train is not in motion for 30 minutes or more and carefully reset before resuming the dragging operations.
- (4) Drags shall be rinsed or washed as necessary to obtain a uniform surface. Drags that cannot be cleaned shall be replaced.

Paragraphs 4.e., f., g., and h. of Subsection 603.03 are void and superseded by the following:

- e. For areas with pavement widening, dowel baskets shall be placed in all transverse contraction joints which are 6 feet (1.8 mm) or wider.
- f. If normal vibration is found inadequate to thoroughly consolidate the plastic concrete within and around the dowel basket assemblies, adjustments to the material and/or operations shall be made.
- g. Precautions shall be taken to assure that the sawed contraction joint is located directly over the center of the dowel bars.
- h. Transverse cracks which form in the concrete pavement panels between load transfer joints shall be stitched as shown in the plans, described in the Special Provision or repaired as directed by the Engineer. No payment will be made for this work.

Paragraph 6.b.(7)(i) of Subsection 603.03 is void and superseded by the following:

- (7) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 6.c.(4)(i) of Subsection 603.03 is void and superseded by the following:

- (4) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 7.a.(3) of Subsection 603.03 is void and superseded by the following:

- (3) (i) The curing compound shall be applied in 2 equal applications immediately following each other or other methods approved by the Engineer.
- (ii) The total rate of applications shall be at a minimum of 1 Gal/100 SF (0.3 L/m<sup>2</sup>) of surface area for tined surfaces or 1 Gal/150 SF (0.2 L/m<sup>2</sup>) of surface area for all other finishes.

Paragraph 8.a.(6) of Subsection 603.03 is voided and superseded by the following:

- (6) Any panels that contain random cracking will be considered unacceptable. The Engineer will decide whether to replace or repair the panel. The Contractor shall replace or repair these panels at the direction of the Engineer at no cost to the Department. A 20% deduction will be assessed on any repaired panel. Any panel that is replaced will not be assessed a 20% deduction.

Paragraph 8.d.(3) of Subsection 603.03 is void.

Paragraphs 8.d.(4), (5) and (6) of Subsection 603.03 are void and superseded by the following:

- (4) Before sealing, the joint wall (not the bottom of joint) surfaces shall be sandblasted or water-blasted to remove all dirt, curing compound residue, laitance, and any other foreign material. After sandblasting, the entire joint shall be cleaned with compressed air having a minimum pressure of 90 psi (620 kPa). The compressed air shall be free of oil, water, and other contaminants. The joints shall be dry at the time of sealing.
- (5) (i) Transverse contraction joints in Portland cement concrete pavements shall be sealed so that the joint is filled to approximately 1/8" to 3/8" (3 to 9 mm) below the top of the joint with an approved hot poured sealant.
- (ii) All overflow material shall be removed from the surface of the pavement.
- (iii) If adhesion is not satisfactory, the material shall be rejected.
- (6) The Contractor shall give the Engineer one copy of the hot pour manufacturer's sealing recommendations.

Paragraph 9.b. of Subsection 603.03 in the 2007 edition of the NDOR Standard Specifications for Highway Construction is void and superseded by:

- b. When the pay item "Portland Cement Concrete Smoothness Testing" is not included in the contract, the Contractor shall test the hardened concrete for surface irregularities with a California Profilograph. Areas showing high spots (bumps) in excess of 0.30 inches in a 25 foot span will be plainly marked on the pavement and on the printed pavement profile trace. All identified high spots shall be ground to the required profile. The grinding shall be performed so that the cement-aggregate bond is not broken. The equipment and profilograph test procedure requirements of Section 602 of the Standard Specifications for Highway Construction shall apply to this surface testing.

Paragraph 9.c of Subsection 603.03 is amended to include:

- c. At the Engineer's option, the use of a 10 foot straightedge to locate high spots in excess of 1/8 inch may be allowed in lieu of bump detection using a profilograph testing.

Paragraphs 11.c., d. and e. of Subsection 603.03 are void and superseded by the following:

- c. The Contractor's forces may be allowed on the concrete pavement when the concrete has reached a minimum age of 14 days or when the concrete has reached a compressive strength of 3000 psi (24 MPa) when tested in accordance with ASTM C 39.
- d. With the approval of the Engineer, the Contractor may elect to increase the early strength of the concrete by adding cement and/or reducing the water/cement ratio, and then the pavement may be opened to traffic provided it has attained a compressive strength of 3500 psi (24 MPa). The concrete in the area where the early strength is required shall be paid for at the bid price.
- e. When required by the Special Provisions or when requested by the Contractor, the maturity method, as provided for in ASTM C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraph 10.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Materials and Research Engineer. The Contractor shall be responsible to coordinate with the Materials & Research Division to develop the maturity curve.

Paragraph 3.a. and b. of Subsection 603.05 is void and superseded by the following:

- 3. a. A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24. Concrete cores must have a minimum age of 28 days before testing. The Contractor will have the option to obtain two additional cores for any unit core that fail to have the required minimum compressive strength provided that the cores are:
  - (1) Obtained and tested within seven (7) days of being notified of the strength deficiency, under the supervision of the Engineer.
  - (2) Cut within 6 inches of the original unit core in the longitudinal direction.

The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.

- b. The paved area shall be divided into units. Each unit will be considered separately. Units are 750 linear feet (230 m) of pavement for each separately placed width, or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.

Paragraph 4.a.(7) of Subsection 603.05 is void and superseded by the following:

- (7) At the option of the Engineer, cores may not be required from irregular areas with widths less than 8 feet (2.4 m) or from an individual pavement type that involve less than 5,000 square yards (4200 m<sup>2</sup>) of pavement.

Paragraph 4.c.(4) of Subsection 603.05 is void and superseded by the following:

- (4) If the average thickness of the cores is deficient by more than 0.25 inch (6 mm) but not more than 0.50 inch (12.5 mm) an adjusted unit price will be paid in accordance with Table 603.04. Cores deficient by more than 0.50 inch (12.5 mm) will be treated as prescribed in Paragraph 4.d. of this Subsection.

### **TEMPORARY SURFACING 10"**

The work shall consist of the construction of the temporary surfacing on this project in accordance with plans, Standard Specifications and these Special Provisions.

The Temporary Surfacing depth shall be as shown in the plans. This provision is applicable to all Temporary Surfacing depths shown in the plans.

The finished surface shall not vary more than 1/8" as determined by using a ten foot straightedge, or other devices approved by the Engineer. The Contractor shall correct any depressions or high areas in excess of 1/8".

Prior to placing the Temporary Surfacing, prepare the underlying subgrade in accordance with the requirements of Section 302 of the Standard Specifications.

At the Contractor's option the surfacing may be constructed using Class 47B-3500 Concrete or Class "BX-3000" Concrete. These materials may be used interchangeably during the course of the work except that surfacing at any individual location must be completed with the same material with which the work was begun.

Subsection 302.04 is amended to provide that the work of subgrade preparation, as well as all water applied as directed by the Engineer, will not be measured for payment, but shall be considered subsidiary to the item "Temporary Surfacing\_\_\_".

Subsection 304.04 is amended to provide that the work of shoulder construction, as well as all water applied as directed by the Engineer, will not be measured for payment, but shall be considered subsidiary to the item "Temporary Surfacing\_\_\_".

Paragraph 11. of Subsection 603.03 is amended to provide that concrete used in the temporary surfacing, reach a minimum strength of 3000 psi before opening to traffic.

When the need for the temporary surfacing is no longer required, the Contractor shall remove the temporary surfacing and it shall become the property of the Contractor and removed from

the project. All the work necessary to accomplish this requirement is considered subsidiary to the item "Temporary Surfacing\_\_\_\_".

Measure temporary surfacing by the square yard of completed and accepted work.

The work and materials required for temporary surfacing will be paid for at the contract unit price per square yard for the item "Temporary Surfacing\_\_\_\_". Payment will be full compensation for the work prescribed in these Special Provisions and the Standard Specifications.

#### Temporary Surfacing Thickness Cores

The Contractor will be required to core the Temporary Surfacing for final thickness determination. The cores will be cut prior to opening the temporary surfacing to traffic. One core shall be taken for each 3500 square yards, or fraction thereof, of temporary surfacing placed with a minimum of 1 core taken per project. The Engineer shall select the site where the core shall be taken. All work, materials and incidentals necessary to complete the work shall be considered subsidiary to the item "Temporary Surfacing \_\_\_\_".

### **MEDIAN BARRIER TRANSITION**

The Contractor will be allowed to shorten up the median barrier transition (typically 30 feet) to be a minimum of 3 feet from the centerline of the existing light pole base at Sta. 1195+46 and to avoid conflict with the re-steel in existing sign base at Sta. 1195+00, as directed by the Engineer.

### **1 ½ INCH CONDUIT IN BRIDGE (G-1-0508)**

#### **Description**

This work will consist of furnishing and installing a complete electrical conduit system and anchor bolt assembly as shown in the plans. The anchor bolt assembly will include nuts, washers, anchor bolts and miscellaneous hardware. The electrical conduit system will include all conduit, junction boxes, expansion fittings, drains, liquid-tight flexible conduit, couplings and all other miscellaneous hardware. This work will also include all equipment, tools, labor, excavation, backfill, materials and incidentals necessary to complete the work.

#### **Material Requirements & Construction Methods**

The material requirements and construction methods shall be in accordance with the general note for electrical conduit installation shown on the plans.

#### **Method of Measurement**

The electric conduit system will be measured for payment by the number of feet (meters) shown in the plans within the limits defined for the system.

**Basis of Payment**

The electrical conduit system, in place and accepted by the Engineer, will be paid for at the contract unit price per foot (meter) for the item, "1 ½ inch CONDUIT in BRIDGE" ("38 mm CONDUIT in BRIDGE").

Payment is full compensation for all work prescribed in this provision.

**MECHANICALLY STABILIZED EARTH (MSE)  
WALLS WITH CONCRETE FACING PANELS  
(G-3-0307)**

Table 714.03 in the Standard Specifications is void and superseded by the following:

Table 714.03	
Facing Panel Select Granular Backfill Gradation	
Sieve Size	Percent Passing
4" (100 mm)*	100
#40 (4.75 mm)	0-60
#200 (75 µm)	0-15
*for geosynthetic reinforcement reduce from 4" (100 mm) to ¾" (19 mm)	

Paragraph 5.d. of Subsection 714.02 in the Standard Specifications is void and superseded by the following:

- 5. d. (1) A copy of all test results performed by the Contractor, which includes: AASHTO T 27, AASHTO T 90, AASHTO T 99, AASHTO T 104, AASHTO T 236, AASHTO T 288, AASHTO T 289, AASHTO T 290 and AASHTO T 291, shall also be furnished to the Engineer 30 days prior to beginning construction.
- 5. d. (2) The construction of MSE Wall structures shall not begin until the Certification(s) of Compliance for Select Granular Backfill(s) has been reviewed and verified by the NDR Geotechnical Section of the Materials and Research Division.
- 5. d. (3) Representative samples of select granular backfill shall be sampled in accordance with NDOR Materials Sampling Guide and submitted to NDOR Materials and Research Division.
- 5. d. (4) For cohesionless soils such as Select Granular Backfill, if the moisture density curve shows a well defined peak, the maximum dry density and optimum moisture content shall be determined based upon this peak. If no well-defined peak in the moisture density curve is observed, the soil shall be compacted at increasing intervals of moisture content until the maximum water content that can be retained in the compaction mold is achieved (saturation). The maximum dry density and optimum moisture content shall then be determined based on the point on the curve 1 percent below the point of saturation. The direct shear test specimen

shall then be fabricated and tested at 95% compaction and at optimum moisture based on the moisture density relationship. Adequate moisture content of the backfill is necessary in the field to prevent post-construction settlements.

- 5. d. (5) The direct shear tests performed shall be based on wall heights for each specific project. All select granular backfill submittals from the Contractor shall be from tests made specifically for each project. No test data from previous or multiple projects will be allowed.
- 5. d. (6) The direct shear test is a drained test and therefore shall be sheared at a rate between 0.004 to 0.008 in/min. The rate of shear shall also be noted on the direct shear test report. Testing procedures that do not follow these guidelines will not be accepted.
- 5. d. (7) In addition to the Certification of Compliance for Select Granular Backfill, a 60-lb sample of the proposed material shall be submitted to NDOR 30 days prior to construction of the MSE Wall.
- 5. d. (8) If the Select Granular Backfill material changes or a new material is used, construction of the MSE Wall shall be halted until the material has been approved by NDOR.

Paragraph 2. of Subsection 714.05 is void and superseded by the following:

- 2. Excavation for the MSE Walls and leveling pads will not be measured and paid for separately, but shall be subsidiary to the appropriate pay item requiring the excavation.

### **STEEL STRUCTURES (G-4-0509)**

Paragraphs 2.a. and 2.b. of Subsection 708.01 in the Standard Specifications are void and superseded by the following:

- a. Category "SBR" certification is required to fabricate main members of Simple Steel Bridge Structures.
- b. Category "CBR" certification is required to fabricate main members of Major Steel Bridges (other than rolled beam structures).

Paragraph 10.h. of Subsection 708.03 is amended as follows:

- h. Bolt Tension Method

High strength fasteners must be installed using the turn-of-nut method.

Paragraph 10.h.(2) of Subsection 708.03 is void.

Paragraph 15.f.(2) of Subsection 708.03 in the Standard Specifications is void and superseded by the following:

- (2) Camber and blocking tolerances shall be according to the AWS Standard Specifications, Section 3.5.1.3. The span length is the length of girder between the end support and a field splice or between field splices.

## **CONCRETE CONSTRUCTION (G-5-1111)**

Section 704 in the Standard Specifications is amended to include the following:

All concrete rails on bridges and approach slabs shall be cast-in-place. Slip-forming will not be permitted for concrete rails on bridges and approach slabs.

Paragraph 8. of Subsection 704.03 is amended to provide that forms for 42 inch bridge rails shall be made of steel.

The fourth subparagraph of Paragraph 8.j. of Subsection 704.03 is void and superseded by the following:

Steel stay-in-place form material shall conform to the requirements of ASTM A 653/A 653M Coating Designation G165/Z500.

Paragraphs 8.a., b. and c. of Subsection 704.05 are void and superseded by the following:

8. Payment Deductions:
  - a. The 28-day compressive strength is determined by the average strength of all cylinders made on a specific day to determine the 28-day compressive strength of all of a group's class of concrete poured that day. Concrete with a 28-day compressive strength not meeting the design compressive strength is subject to removal.
  - b. If the 28-day compressive strength is less than the design compressive strength, cores may be taken within 45 days after the concrete was poured. The average of the cores will be used to determine the compressive strength. If the average of the cores is equal to or greater than 85% of the design compressive strength, the concrete is acceptable for use and is not subject to removal or a pay reduction. Cores will be taken by the Department at no cost to the Contractor.
  - c. If either the 28-day compressive strength or the average core strength is less than the design strength and the Engineer determines that the concrete is acceptable for use, the concrete is subject to a payment deduction. The pay deduction is shown below:

$$\frac{2 \times (\text{Design Compressive Strength} - 28\text{-day Compressive Strength})}{\text{Design Compressive Strength}} = \text{Percent Reduction}$$

Or

$$\frac{2 \times (\text{Design Compressive Strength} - \text{Average Core Compressive Strength})}{\text{Design Compressive Strength}} = \text{Percent Reduction}$$

## **PILES AND PILE DRIVING**

Paragraph 1.m.(1) of Subsection 703.03 of the Standard Specifications for Highway Construction is void and superseded by the following:

All welding to be done on steel piles shall be in accordance with the plans and the applicable requirements of Section 708 in the Standard Specifications. Welder qualification certification is required and must be submitted to the Bridge Fabrication Manager for approval prior to any welding.

All field welding on steel piles shall be done in the SMAW process using electrode E7018.

## **REINFORCING STEEL SUPPORTS (G-8-0508)**

Paragraph 3.b.(2) of Subsection 707.03 of the Standard Specifications is void and superseded by the following:

Reinforcing steel in concrete slabs shall be positioned on plastic coated supports or chairs to accurately maintain the specified clearance to the surface of the concrete. Supports shall be spaced at distances not greater than 3 feet for #4 top bars or 4 feet for all other reinforcing.

## **PREFORMED EXPANSION JOINT (G-11-1212)**

Section 734 of the Standard Specifications is void and superseded by the following:

### **Description**

1. This work shall consist of furnishing and installing a Preformed Expansion Joint in a preformed gap at the locations and limits shown on the plans.
2. The Preformed Expansion Joint shall be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint, as indicated in the plans.
  - a. When the item is "Precompressed Polyurethane Foam Joint, Type \_\_\_\_" the joint shall be a Precompressed Polyurethane Foam Joint of the type indicated in the plans.
  - b. When the item is "Preformed Silicone Joint, Type \_\_\_\_", the joint shall be a Preformed Silicone Joint of the type indicated in the plans.
  - c. When the item is "Preformed Expansion Joint, Type \_\_\_\_", the joint may be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint of the type indicated in the plans.

## **Material Requirements**

1. Precompressed Polyurethane Foam Joints:
  - a. PPF Joint shall be precompressed self-expanding polyurethane foam with factory applied silicone facing on top of the foam.
  - b. PPF joints shall be ordered for the joint material dimension shown in the plans.
  - c. Approved PPF Joint systems are shown on the NDOR Approved Products List under Precompressed Polyurethane Foam Joint, Type A or B.
2. The approved Preformed Silicone Joint systems are shown on the NDOR Approved Products List under Preformed Silicone Joint, Type A or B.
3. Primers, epoxy adhesives, and silicone sealants shall comply with the manufacturer's recommendations.
4. Materials shall be resistant to ozone, ultraviolet rays, petroleum products, solvents, industrial cleaners, corrosive vapors and acids.
5. Joint material shall be delivered to the Contractor's storage area and to the job site in the Manufacturer's original undamaged containers with wrapping intact. Storage of joint material shall be in a dry, enclosed area, off the ground, between 60°F (16°C) and 75° F (24°C) and out of direct sunlight until immediately prior to installation.

## **Construction Methods**

1. The installation of the Preformed Expansion Joint and the adhesives shall be completed according to the manufacturer's specifications. Additional field applied silicone is required on both sides of the top of the joint. Any installation that fails to meet the manufacturer's specifications shall be removed and replaced at no cost to the Department.
2. The installation instructions and specifications shall be given to the Engineer 7 days prior to the installation.
3. The Preformed Expansion Joint shall be installed in the presence of the Engineer.
4. The joint opening in the concrete shall be cleaned by sandblasting and shall be dry and free of oil and other deleterious materials before the installation of the Preformed Expansion Joint.
5. The installation of the Preformed Expansion Joint shall be completed between 45°F (7°C) and 90°F (32°C).
6. Any joint material damaged during corrective grinding shall be replaced at no cost to the Department.

## **Method of Measurement**

1. The Preformed Expansion Joint shall be measured for payment by the linear foot (meter) of the joint properly installed and accepted by the Engineer.

2. Pay limits for the Preformed Expansion Joints shall be the horizontal distance from end to end along the centerline of the joint assembly at the locations shown in the plans and 1 foot (0.3 m) upward at the gutter line if shown.

**Basis of Payment**

- |    |  |                              |
|----|--|------------------------------|
| 1. | <b>Pay Item</b>                                  | <b>Pay Unit</b>              |
|    | Preformed Expansion Joint, Type ____             | Linear Foot (LF) [Meter (m)] |
|    | Precompressed Polyurethane Foam Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
|    | Preformed Silicone Joint, Type ____              | Linear Foot (LF) [Meter (m)] |
2. Payment is full compensation for furnishing and installing the Preformed Expansion Joint and for all labor, equipment, tools and incidentals necessary to complete the work.

**EXPANSION BEARINGS, TFE TYPE  
(G-16-0612)**

Paragraph 2.a. of Subsection 712.02 of the Standard Specifications is void and superseded by the following:

2. Expansion Bearings, TFE Type:
  - a. (1) The upper assembly shall consist of a sole plate conforming to the requirements of ASTM A709/A709M grade 50W (345W) weathering steel with an ASTM A240/A240M Type 304 stainless steel plate (13 gage) attached to the lower surface. As an alternate, the sole plate may be grade 36 (250) steel, metallized. If the grade 36 alternate is used, all flame cut edges of the sole plate shall be ground to reduce hardness and facilitate blast cleaning. All corners of the sole plate shall be rounded to a 1/16 inch (1.5 mm) radius. All exposed plain steel surfaces shall be blast cleaned to a near white finish and zinc metallized with a minimum thickness of 8 mils (200 mm). Zinc metallizing must be performed in accordance with the American Welding Specification AWS C2.2.

**EXCAVATION FOR MECHANICALLY STABILIZED EARTH (MSE) WALLS WITH  
CONCRETE FACING PANELS**

Subsection 714.04 is amended to include the following:

6. The quantity of "Excavation For MSE Wall" is measured by the cubic yard and computed using the plan dimensions. No adjustment in the pay quantity will be made if the computed quantity, based on the working drawings, varies from the plan quantity.

Subsection 714.05 is amended to include the following:

Pay Item	Pay Unit
Excavation For MSE Wall	Cubic Yards (CY)

## EXPANSION DEVICE INSTALLATION

Any expansion device installation that fails to meet manufacturer's installation specifications will be removed and replaced with a properly installed joint at the expense of the Contractor. No payment will be made unless the manufacturer's representative certifies the installation.

### PROTECTIVE SYSTEM FOR ABUTMENTS, BENTS AND PIERS (FOR BRIDGES WITH WEATHERING STEEL GIRDERS)

Subsection 704.03 Paragraph 22. in the Standard Specifications is amended to include the following:

d. The stain resisting coating shall be one of the following products or an approved equal:

1. Carbocrete Sealer WB manufactured by Carboline Company. Contact: Preferred Products Corporation, Burlington , IA (319-754-4823)
2. PolyShield Graffiti Preventer for Unpainted Masonry-Type B manufactured by American Building Restoration Products, Inc., Franklin, WI (800-346-7532)
3. SWD D.O.T. Bridge and Highway Concrete Sealer B97-Series (B97W10) manufactured by The Sherwin-Williams Company. Contact: Joe Wishard, Omaha, NE (402-699-6994)
4. PERMA-CRETE Aqua-Pel Clear Water Repellent (applied at 1:9 dilution ratio) manufactured by PPG Industries, Inc. Contact: Ron Wolfe, Council Bluffs, IA (712-355-1954)

The protective system is only required for bridges with weathering steel girders.

### EXISTING REINFORCEMENT ENCOUNTERED DURING REPAIR

When existing reinforcing steel is broken or has a section loss greater than 20%, the contractor shall lap splice the existing bar with a bar of matching size. Lap splices shall be as given in the following table:

Bar #	Non-epoxy Length (in.)	Epoxy Length (in.)
4	15	18
5	20	24
6	26	31
7	33	39
8	45	54
9	59	71
10	74	89
11	95	139

The bar used to splice, shall lap, by the length given above, with a portion of the existing bar of which 80% or more of the full section is present, on either side of a break or deteriorated or damaged segment. All existing reinforcing steel exposed, during removal of defective concrete,

and to be incorporated into the new work, shall be blast cleaned to remove all rust and corrosion and reformed, as required, to assume its original (intended) shape. For any reinforcing bar that has more than 2/3 of its diameter exposed, the existing concrete shall be removed so that a minimum clearance of 3/4" is provided all around the bar for the placement of new concrete. All material, labor, tools, equipment and incidentals shall be subsidiary to other work for which payment is made.

## PENETRATING CONCRETE SEALERS

### Description

This work shall consist of furnishing and applying Concrete Sealers to Portland Cement Concrete at the locations shown in the plans or ordered by the Engineer in accordance with the requirements of these Specifications.

### Material Requirements

The concrete sealer must be from Nebraska's Approved Products List listed as "Epoxy Penetrating Sealers" or have had the following tests completed by an independent lab in the last 5 years.

Property	Requirements	Test Methods
Physical Properties		
VOC content	Less than 350 g/l	EPA Method 24
Flash Point	Greater than 200 degrees F	ASTM D3278, SETA
Resistance to Chloride Ion Penetration	Less than 0.55 pounds/yd <sup>3</sup> at ½ inch. 0.00 pounds/ yd <sup>3</sup> at 1 inch level	AASHTO T 259 & T 260
Scaling Resistance of Concrete Surfaces	No scaling	ASTM C 672 (100 cycles)
NCHRP 244		
Series II – Cube Test		
Water Weight Gain	85% reduction min.	
Absorbed Chloride	85% reduction min.	
Series IV – Southern Climate		
Absorbed Chloride	95% reduction min.	

### Application Methods

#### Prior to Application

1. Concrete to be sealed shall have cured for a minimum of 28 days.
2. All surfaces shall be cleaned of sand, surface dust, dirt, oil, grease, chemical films, cure compounds or coatings and other contaminants with a high pressure water washer capable of delivering water at not less than 2,000 psi. If high pressure water does not remove surface contaminants, then sand blasting will be required at the engineer's discretion.
3. Surfaces shall be allowed to air dry for a minimum of 48 hours.

4. A 2ft x 2ft clear plastic sheet shall be taped around all of its edges to a representative region of the cleaned concrete for not less than 20 minutes. If upon removal of the plastic sheet, moisture is observed on its surface, additional drying time shall be required before application of Concrete Sealer.
5. The Engineer shall consult NDOR Materials and Research Division to determine if a Rilem Tube Absorption Test should be performed.
6. Test applications of the Concrete Sealer may be required at the discretion of the Engineer.

### **Application**

1. Air, Material and surface temperatures shall be 40° F (4° C) or higher during application. Concrete Sealers shall not be applied when temperatures are expected to fall below 30° F (-1 C°) within 12 hours or when rain is expected within 6 hours. Do not apply sealer materials during wet weather conditions or if adverse weather conditions are anticipated within 12 hours of the completion of sealer application.
2. The limits of Application
  - i) All bridges: Entire deck and approach sections from End of Paving to End of Paving.
  - ii) Open Rail Bridges, Concrete Sealer shall be applied to:
    - (1) Outside edge of deck
    - (2) Underside of deck for a minimum of 8 inches from the outside edge
  - iii) Closed Rail Bridges, Concrete Sealer shall be applied to:
    - (1) Inside faces of rail
    - (2) Top face of rail
    - (3) Inside face of concrete deck drains
    - (4) Underside of deck for at least 8 inches around perimeter of open concrete deck drains
  - iv) Bridges over non-gravel roadways, Concrete Sealer shall be applied to all surfaces of any substructure within 20ft of edge of traffic lane to a height of 10ft.
3. Horizontal Application: Concrete Sealer shall be applied with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface. Sufficient quantity is indicated when Concrete Sealer stands for a few seconds before completely penetrating the concrete surface.
4. Vertical Application: Apply from bottom up with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface and create a uniform wet appearance.
5. Precise Application Rates will vary with concrete mix, porosity, finish and environment, but may be estimated at 200 – 300 sq. ft. per gallon.
6. Drying time shall be a minimum of 2 hours for light traffic or by manufactures recommendation and maybe extended at the discretion of the Engineer.

### **Method of Measurement**

1. “Penetrating Concrete Sealer” is measured by the Square Foot

**Basis of Payment**

1. Pay Item	Pay Unit
Penetrating Concrete Sealer	SQ. FT.

**PREPARATION OF BRIDGE AT STATION 1200+17.28**

The Pay Item, "Preparation of Bridge at Station 1200+17.28" shall be in accordance with the pertinent provisions of Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing bridge for widening and rehabilitating including the following:

- The removal of the existing concrete bridge rail, expansion joint, and part of the slab.
- The saw cutting and breaking back of the existing slab, grade beam, and abutments to the limits shown on the plans.
- The removal of part of the existing abutment wings.
- The breaking back of the existing concrete slope protection to the limits shown on the plans.
- The drilling of holes for dowel bars and the furnishing and placing of epoxy compounds for the dowel bars as shown or noted on the plans.
- The field drilling of holes in the existing girders and the installation of the plates and angles necessary for attaching new bent plate separators to the some of the existing girders as shown on the plans.
- The cleaning and roughening of the existing concrete that comes into contact with the new work.
- The cleaning, straightening and extending of the existing reinforcing steel into the new work.

**PREPARATION OF BRIDGE AT STATION 1241+04.53**

The Pay Item, "Preparation of Bridge at Station 1241+04.53" shall be in accordance with the pertinent provisions of Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing bridge for widening and rehabilitating including the following:

- The removal of the existing concrete bridge rail, grade beam, approaches and part of slab.
- The saw cutting and breaking back of the existing slab to the limits shown on the plans.

- The removal of part of the existing abutment wings.
- The breaking back of the existing concrete slope protection to the limits shown on the plans.
- The drilling of holes for dowel bars and the furnishing and placing of epoxy compounds for the dowel bars as shown or noted on the plans.
- The field drilling of holes in the existing girders and the installation of the plates and angles necessary for attaching new bent plate separators to the some of the existing girders as shown on the plans.
- The cleaning and roughening of the existing concrete that comes into contact with the new work.
- The cleaning, straightening and extending of the existing reinforcing steel into the new work.

## **PAINTING WEATHERING STEEL**

Standard Specification 709.03 Paragraph 4 is amended to require Steel Structures Painting Council Specification SSPC-SP10. The painting of the new girder to the limits shown on the plans is subsidiary to the pay item "Steel Superstructure at Sta. \_\_\_\_".

## **PREPARATION OF BRIDGE AT STATION 1295+80.87**

The Pay Item, "Preparation of Bridge at Station 1295+80.87" shall be in accordance with the pertinent provisions of Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing bridge for widening and rehabilitating including the following:

- The removal of the existing concrete bridge rail, approaches, sleeper slabs, and part slab.
- The saw cutting and breaking back of the existing slab and abutments to the limits shown on the plans.
- The removal of part of the existing abutment wings.
- The breaking back of the existing concrete slope protection to the limits shown on the plans.
- The drilling of holes for dowel bars and the furnishing and placing of epoxy compounds for the dowel bars as shown or noted on the plans.
- The field drilling of holes in the existing girders and the installation of the plates and angles necessary for attaching new bent plate separators to the some of the existing girders as shown on the plans.
- The cleaning and roughening of the existing concrete that comes into contact with the new work.
- The cleaning, straightening and extending of the existing reinforcing steel into the new work.
- The cleaning and repainting of the ends of the existing girders at the abutments.

## **BRIDGE SHORING**

Paragraph 1. of Subsection 701.02 in the 2007 Standard Specifications is void and superseded by the following:

1. a. The Contractor shall excavate and place shoring, as necessary, to insure safe access to work areas.
- b. (1) Adequate shoring must be installed by the Contractor during phased construction to retain the existing and proposed roadway fill.

- (2) The shoring shall be in place before starting the grading work for the first phase of construction.
- (3) The shoring shall not be exposed to traffic at any time.
- (4) Shoring shall be designed by a Professional Engineer registered in the State of Nebraska.
- (5) The calculations and shoring plans shall bear the seal of the designer and four copies of each shall be submitted to the Engineer before construction. These calculations and plans will be for informational purposes only. The Contractor is solely responsible for the satisfactory construction and performance of the shoring.
- (6) Shoring indicated in the plans as bridge shoring will not be pulled. Any removal required shall be made by flame cutting unless approved otherwise by the Engineer. Flame cutting will be to a minimum of 4 in. below the bottom of the roadway paving or approach slabs and as required to allow construction of the abutments or grade beams.
- (7) Shoring indicated in the plans as temporary bridge shoring shall be removed by the Contractor.
- (8) Bridge shoring and temporary shoring shall be measured for payment by the lump sum and paid for as "Bridge Shoring" and "Temporary Bridge Shoring". This price shall be full compensation for designing, furnishing, installing, maintaining and removing the temporary shoring and for all labor, materials, equipment, tools and incidentals necessary to complete the work.

## MULTI-LAYER EPOXY POLYMER OVERLAY

### DESCRIPTION

The work shall consist of preparing the surface of the reinforced concrete bridge deck, approach slabs and furnishing and placing a multi-layer epoxy polymer overlay (EPO).

### MATERIALS

The EPO shall be comprised of a two component epoxy (resin and hardener), combined with aggregate as described in the following:

#### 1. Epoxy:

- a. The epoxy shall be Type III, for use in bonding skid resistant materials to hardened concrete.
- b. Type III epoxy shall comply with AASHTO M 235 (ASTM C 881), and shall meet additional requirements shown in Table 1.0, and is the class appropriate for the temperature at the time of application, as designated by the manufacturer.
- c. Provide Grade 1 or 2, 100 percent solids, thermosetting, moisture-insensitive epoxy.
- d. The engineer will collect a 16 oz. sample of each component for quality acceptance testing.

**Table 1.0**

<b>ADDITIONAL REQUIREMENTS FOR TYPE III EPOXY POLYMER OVERLAY</b>		
<b>Property</b>	<b>Requirement</b>	<b>Test Method</b>
Viscosity	7-25 poises	ASTM D2393, Brookfield RVT, Spindle 3 at 20 RPM
Gel Time	15-45 min.	ASTM C 881, ¶ 11.2.1 modified, 50 to 100 ml sample.
Compressive Strength*, 3 hr.	1000 psi min.	ASTM C 109, w/ plastic inserts
Compressive Strength*, 24 hr.	5000 psi min.	ASTM C 109, w/ plastic inserts
Tensile Strength, 7 days	2000-5000 psi	ASTM D 638
Elongation, 7 days	30-70%	ASTM D 638
Pull-Off Strength, after 24 hr. min. Cure Time of Layer 2.	250 psi min.	ASTM C1583 (using 50mm disks)

\*Mixed with aggregate.

- e. The contractor shall submit for approval the following information to the Engineer:
  - (1) Name, address and telephone number of the epoxy manufacturer. Include the name of the preferred contact person.
  - (2) Brand name of the material.
  - (3) Type, Grade and Class of the material.
  - (4) Manufacturer's certificate of compliance stating that epoxy components consist of 100% solids.
  - (5) Information regarding recommended usage and application instructions.
  - (6) Material Safety Data Sheets.
  - (7) Test results shall be submitted by a Cement and Concrete Reference (CCRL) or AASHTO Materials Reference (AMRL) accredited Laboratory. The certified lab will

show test results of AASHTO M 235 (ASTM C 881) and requirements of Table 1.0., except for pull-off strength per ASTM C1583.

- (8) A Fourier Transform Infrared Spectrophotometry (FTIR) spectrum in transmittance mode must be included for each component.
- (9) Verification that the testing apparatus used for bond tests has been calibrated within the last year according to ASTM C900-06, Annex A1.

**2. Aggregate:**

- a. Provide a singly crushed siliceous gravel or chat that is free of dirt, clay and foreign of organic material.
- b. The Engineer shall collect a 60 lb. sample of the aggregate for use in quality assurance testing and acceptance. This sample shall be collected from the material delivered to the jobsite.
- c. The aggregates provided shall meet the requirements of Tables 2.0 & 3.0 below:

**Table 2.0**

<b>QUALITY REQUIREMENTS FOR EPOXY POLYMER OVERLAY</b>		
<b>Property</b>	<b>Requirement</b>	<b>Test Method</b>
Sodium Sulfate Soundness, Maximum Loss	12%	AASHTO T104
Maximum Wear	30%	AASHTO T96
Acid Insoluble Residue, Minimum	55%	NDOR C25
Fine Aggregate Angularity, Minimum	40%	AASHTO T304, Method C
Moisture Content, Maximum	0.20%	AASHTO T255

**Table 3.0**

<b>GRADATION REQUIREMENTS FOR AGGREGATES (percent passing)</b>				
<b>Sieve</b>	<b>4</b>	<b>8</b>	<b>16</b>	<b>30</b>
<b>% Passing</b>	100	30-75	0-5	0-1

**EQUIPMENT**

The Contractor may request the use of other equipment or methods. The Contractor shall submit a list to the Engineer of all equipment to be used at least two weeks prior to construction. Equipment must comply with the following requirements.

- 1. Surface Preparation Equipment:** Steel Shot-blasting equipment capable of producing a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) 6 to 7. The shot-blast equipment shall be capable of providing a uniform surface texture. The equipment shall be inspected before use, and worn blasting wheels and liners are required to be replaced. Loose shot shall be collected using a magnet, magnetic broom, air blast, vacuum or stiff bristle broom. Wet sand blasting is not allowed.
- 2. Mechanical Distribution Equipment:**
  - a. All equipment to enter or cross the prepared surface, such as work vehicles, trailers, carts, etc., that contain motor oil, transmission fluid, gear oil, radiator fluid, lubricants, etc. shall be accompanied by a protection membrane such as plastic tarps or rolled

plastic placed on the prepared surface(s) under equipment to protect the prepared deck surface from contamination.

- b. An epoxy distribution system shall be capable of accurate and complete mixing of the epoxy resin and hardening agent, verification of the mix ratio and uniform and accurate distribution of the epoxy at the specified rate on 100% of the prepared surface.
- c. To minimize the formation of air bubbles produced during mechanical mixing of the epoxy components, the mixer shall only use "Jiffy" or "Sika" paddle types, or approved equal.
- d. An aggregate spreader shall be capable of uniform and accurate application of the dry aggregate over 100% of the prepared surface.
- e. An air compressor shall be capable of producing a sufficient amount of oil-free and moisture-free compressed air to remove all dust and loose material.

**3. Hand Application Equipment:**

- a. Calibrated containers for accurate measurement of epoxy components shall be used.
- b. To minimize the formation of air bubbles produced during mechanical mixing of the epoxy components, the mixer shall only use paddle types "Jiffy" or "Sika" paddle types, or approved equal.
- c. Notched squeegees and brooms shall be capable of spreading the epoxy material according to this specification and the manufacturer's recommendations.
- d. Adequate additional hand tools may be used to facilitate the placement of the EPO according to this specification and the manufacturer's recommendations.

- 4. Do not use power driven tools heavier than a 15 pound chipping hammer, during surface preparation.

**CONSTRUCTION METHOD**

**1. Preparation of Surface:**

- a. The Contractor shall determine the size of shot, flow of shot, forward speed of shot blast machine and number of passes to achieve a surface preparation that will satisfy the required pull-off strength of the EPO.
- b. Deteriorated and/or delaminated concrete shall be removed and repaired with EPO slurry (epoxy and aggregate combined) or approved patch material. No Magnesium Phosphate patch materials will be permitted.
- c. In all cases, the EPO shall not be placed on any Portland cement concrete less than 28 days old.
- d. The bridge deck and approach slabs will require, at minimum, a single-pass shot blast of the preparation surface. The Contractor shall produce a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile 6 to 7. The width of overlap of successive passes of the machine shall be as minimal as possible to limit double exposure. The contractor must make available to the Engineer, a set of ICRI surface profile cards to verify the shot blast profile. Inaccessible areas shall be abrasive blasted.
- e. Metal deck drains and areas of the curb or railing above the proposed surface from the shot blast shall be protected.

- f. All dirt, paint, oil, asphalt, laitance, carbonation, curing materials and other deleterious material from the surface of the deck and bridge rails (6" above deck or first break in the case of a continuous rail) shall be removed.
  - g. The Contractor shall clean all prepared surfaces by air blasting with dry, oil free air or vacuuming. Sweeping with brooms for final cleaning is not acceptable.
  - h. Any contamination of the prepared deck surface or surface of subsequent layers shall be removed. Contaminated areas shall be sand-blasted or bush hammered to produce an acceptable surface for placement of the EPO.
  - i. The Contractor shall prevent rain water from transporting objectionable materials from surrounding paving onto the bridge deck and approach slabs.
  - j. Visible moisture on the prepared surfaces at the time of placing the EPO is unacceptable. The Contractor shall identify moisture in the concrete by taping an 18"x18" plastic sheet to the deck per ASTM D4263. The plastic sheet test shall be performed only when surface temperatures and ambient conditions are within the established parameters for application of the overlay system. In the event of rain, the concrete shall be allowed to air dry for a minimum of 24 hours prior to performing the plastic sheet test. This test shall be performed by the contractor and observed by the Engineer. The NDOR will allow a 6 hour test duration in lieu of the 16 hours specified in ASTM D4263.
  - k. The first layer shall be placed within 24 hours of preparing the deck surface. Surfaces exposed for more than 24 hours must be abrasive blasted or sand blasted prior to application of the EPO.
- 2. Proportioning:** All epoxy materials shall be proportioned according to the manufacturer's recommendations.
- 3. Placing the Epoxy Polymer Overlay:**
- a. The EPO shall be placed in two separate layers to the surfaces shown in the Contract at application rates shown in Table 4.0:

**Table 4.0**

<b>EPOXY POLYMER OVERLAY APPLICATION RATES</b>		
<b>Layer</b>	<b>Epoxy Rate</b>	<b>Aggregate Rate*</b>
<b>1</b>	Not Less Than .22 gal./sq. yd.	10 lb./ sq. yd. min.
<b>2</b>	Not Less Than .45 gal./sq. yd.	14 lb./ sq. yd. min.

\*Apply enough aggregate to completely cover the epoxy.

- b. Notched squeegees or mechanical application equipment shall be used to place the mixed epoxy on the deck surfaces immediately and uniformly at the prescribed rate.
- c. The Contractor shall continually monitor the gel time of the mixed epoxy. The EPO shall not be placed if conditions are such that gel time is less than 10 minutes.
- d. Deck drains shall be closed so the epoxy and aggregate shall not enter the drains.
- e. A paintbrush or roller shall be used to apply the epoxy on the face of curbs to the top of the curb. On bridges and approaches with continuous concrete barrier rails, apply the epoxy to the first break in the geometry of the barrier or 6 inches above the deck or existing overlay whichever is greater. On bridges with open concrete barriers, apply the epoxy to the following surfaces:

- (1) All 4 faces of the posts a minimum of 6 inches above the deck or existing EPO.
- (2) The outside edge of deck.
- (3) A minimum of 8 inches on the underside of the deck or slab overhangs.
- f. A single layer of Epoxy and aggregate shall be applied to curbs, barriers or posts during placement of layer 1. No aggregate is required for the outside edge or underside of deck overhangs.
- g. The bridge deck approaches and all mixed epoxy and aggregate components must be a minimum of 60°F at the start of application. See paragraph 4.a.
- h. The dry aggregate shall be applied to cover the epoxy completely within 10 minutes of application.
- i. Any first layer surfaces of epoxy that do not receive enough aggregate before gelling of the epoxy occurs must be removed and replaced.
- j. Excess aggregate from the first layer after sufficiently cured shall be vacuumed or swept. If damage or tearing occurs, halt sweeping or vacuuming operation.
- k. Traffic must not be allowed on the first EPO layer.
- l. The epoxy and aggregate for the second layer shall be placed at the prescribed rate and in the same manner as the first layer and placed within 24 hours after the placement of the first layer.
- m. Second layer surfaces that do not receive enough aggregate before gelling of the epoxy may be re-coated with epoxy and aggregate.
- n. All longitudinal joints will be at the edge of one lane or as indicated by the Engineer. No joints will be allowed on the wheel path.
- o. The EPO shall be produced and placed within the specified limits in a continuous and uniform operation.
- p. All construction joints shall be taped to provide a clean straight edge for adjacent EPO placement. This includes joints between previously placed EPO materials and at centerline.
- q. The exposed edges at the ends of the approaches and at expansion joints shall be finished to minimize bridge deck roughness.
- r. A bond breaker shall be applied to all expansion joints.

**4. Curing:** Minimum curing times are noted in Table 5.0:

**Table 5.0**

<b>EPOXY POLYMER OVERLAY CURE TIMES</b>							
	<b>Average Temperature of Deck, Mixed Epoxy, and Aggregate, F deg.</b>						
<b>Layer</b>	55-59	60-64	65-69	70-74	75-79	80-85	85+
	<b>Minimum Cure Time (hours)</b>						
<b>1</b>	5	4	3	2.5	2	1.5	1
<b>2</b>	6.5	6.5	5	4	3	3	3

- a. The average temperatures listed in Table 5.0 are to be taken immediately prior to placement of epoxy on deck surfaces. The second layer shall be cured for 8 hours if the air temperature falls below 55°F during the curing period. The cure times listed for the 55-59°F temperature range are provided for the case where the surface, mixed

epoxy, and aggregate satisfy the 60°F min. temperature at the start of placement and subsequently decrease during placement.

- b. The work shall be planned and performed in such a way as to provide for the minimum curing times specified in this provision or as specified by the epoxy manufacturer.

**5. Temperature Limitations:**

- a. The minimum temperature of surfaces, mixed epoxy, and aggregate at the start of placement of the EPO shall be 60°F.
- b. If the manufacturer's temperature requirements are more restrictive than provided in this provision they will govern.
- c. The EPO must not be placed when conditions are such that the deck temperature will exceed 100°F.
- d. The EPO must not be placed if conditions are such that gel time is less than 10 minutes.
- e. The EPO must not be placed if the air temperature is expected to drop below 55°F within 8 hours of placement.

- 6. Correction of Unbonded or Damaged Areas:** Any areas of the EPO discovered to be unbonded by sounding or chaining and areas of the EPO damaged by the contractor's operation shall be repaired before payment is made. A squared perimeter of areas to be repaired shall be saw cut to the top of the concrete surface and the EPO shall be removed with small air tools (15 pounds maximum) or shot blasting. The underlying concrete area shall be shot blasted to remove contaminants, and the EPO shall be replaced according to standard placement procedures. There is no additional cost to the department for unbonded or damaged areas.

**BOND (PULL-OFF) TESTING**

1. The Contractor shall record the results of the pull-off tests.
2. The Contractor shall perform pull-off tests of three specimens on each lot of the completed overlay in accordance with ASTM C1583 (using 50mm pull-off disks) under the observation of the Engineer. **A lot shall be defined as 1200 square feet of EPO per lane of traffic of the bridge and approach (if applicable), with the following stipulations:**
  - a. Shoulders 8 feet and under shall be included in the lot containing the adjacent lane.
  - b. Shoulders exceeding 8 feet shall be considered a separate lot.
  - c. For lots less than 1200 square feet, no less than 3 specimens shall be tested.

Each phase of an approach (paving and approach section) shall constitute a lot.

3. The location of the three pull-off specimens per lot shall be determined by the Engineer.
4. The loading disk used in the pull-off tests shall be adhered to the finished surface of the EPO following core drilling operation to a depth at least ½" into the concrete substrate.
5. The pull-off tests shall not start any sooner than 24 hours after placement of the second layer of the EPO.
6. The pull-off test shall not be performed when the deck temperature exceeds 85° F.

**METHOD OF MEASUREMENT**

1. Epoxy Polymer Overlay will be measured for payment by the square yard of deck surface and bridge approach surface area overlaid as determined by field measurement.
2. Epoxy Polymer Overlay applied to bridge rails or barriers and epoxy applied to the deck edge or deck underside will not be measured directly and will be considered subsidiary to the Multi-Layer Epoxy Polymer Overlay.

**BASIS OF PAYMENT**

1. **Pay Item**  
Multi-Layer Epoxy Polymer Overlay
- Pay Unit**  
Square Yard (yd<sup>2</sup>)
2. For each lot, the EPO unit price is multiplied by bond strength pay factor for the item “Multi-Layer Epoxy Polymer Overlay”
3. The bond strength of the three (3) pull-off specimens will be averaged to determine the pay factor for each lot with the following exception:

If the tensile strength of a specimen is less than 250 psi and failure is in the concrete at a depth of at least 1/4 inch over more than 50% of the test surface, then the tensile strength used for that single specimen will be 250 psi.

4. The pay factors for the average bond strength test are as shown in Table 6.0:

**Table 6.0**

<b>BOND STRENGTH PAY FACTORS</b>	
<b>Average Bond Strength of Lot *</b>	<b>Percent Pay</b>
Greater than 245 psi	100%
235 psi - 245 psi	90%
225 psi - 234 psi	75%
Less than 225 psi	40% or Reject

\*245 psi allows for a 2% margin of error (with 250 psi required)

5. Any lot rejected by the Engineer will be removed and replaced at no additional cost to the Department.
6. Payment is full compensation for all work in this Section.

**PREPARATION OF EXISTING STRUCTURE AT MSE WALL 1**

The item “Preparation of Structure WALL 1” shall be in accordance with the pertinent provisions of Section 203 and Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing MSE retaining wall for modification including the following:

- The removal of a portion of the existing MSE wall along the I-480 northbound ramp between the eastbound and westbound I-80 bridges as detailed in the plans. This removal includes the face panels, coping, any surfacing behind the coping, reinforcing strips/bars and granular material to the limits described in the plans. The Contractor shall remove the face panels to a neat line by saw cut method.

- The removal or modification of any part of the existing MSE wall at the north end where the new MSE wall begins which may be necessary for the construction of the new wall as specified by the vendor.
- The removal of a portion of the existing MSE wall from Sta. 1294+03 to Sta. 1295+38 for the purpose of widening the westbound lanes of I-80. This removal includes the face panels, coping, reinforcing strips/bars, granular material, and the concrete barrier atop the wall. The limits of removal shall be to a minimum depth of 3' below the top of existing pavement but not below 5', or as directed by the Engineer. The removal of the face panels may be accomplished by saw cut method or to an existing joint if it falls within the specified range of removal.

The Contractor shall exercise caution to not damage any part of the existing wall outside the limits of removal. Any portion of the wall that is damaged as a result of this work shall be repaired or replaced at the Contractor's expense.

The work and materials required to perform the described items above shall be paid for at the contract unit price per each for the item "Preparation of Structure Wall 1". The price bid shall be full compensation for any materials, tools, labor and incidentals required to complete the work.

## **PREPARATION OF EXISTING STRUCTURE AT MSE WALL 2**

The item "Preparation of Structure WALL 2" shall be in accordance with the pertinent provisions of Section 203 and Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing MSE retaining wall for modification including the following:

- The removal of a portion of the existing MSE wall along the I-480 northbound ramp between the eastbound and westbound I-80 bridges as detailed in the plans. This removal includes the face panels, coping, any surfacing behind the coping, reinforcing strips/bars and granular material to the limits described in the plans. The Contractor shall remove the face panels to a neat line by saw cut method.
- The removal or modification of any part of the existing MSE wall at the north end where the new MSE wall begins which may be necessary for the construction of the new wall as specified by the vendor.
- The removal of a portion of the existing MSE wall from Sta. 1296+61 to Sta. 1297+70 for the purpose of widening the westbound lanes of I-80. This removal includes the face panels, coping, reinforcing strips/bars, granular material, and the concrete barrier atop the wall. The limits of removal shall be to a minimum depth of 3' below the top of existing pavement but not below 5', or as directed by the Engineer. The removal of the face panels may be accomplished by saw cut method or to an existing joint if it falls within the specified range of removal.

The Contractor shall exercise caution to not damage any part of the existing wall outside the limits of removal. Any portion of the wall that is damaged as a result of this work shall be repaired or replaced at the Contractor's expense.

The work and materials required to perform the described items above shall be paid for at the contract unit price per each for the item "Preparation of Structure Wall 2". The price bid shall be full compensation for any materials, tools, labor and incidentals required to complete the work.

## EROSION CONTROL

Subsection 807.02 in the Standard Specifications is amended to include the following:

Erosion Control	Minimum Purity	Application Rate in lb of Pure Live Seed/1000 sq. yard
Perennial ryegrass – Linn	85	1.5
Canada wildrye – Mandan, Neb. native	85	1
Western wheatgrass – Barton, Flintlock	85	0.75
Slender wheatgrass	85	1
Kentucky fescue	85	0.5
Blue grama – NE, KS, CO, MN	30	0.15
Sideoats grama – Butte, El Reno, Trailway	75	0.75
Little bluestem – Aldous, Blaze, Camper	80	0.5
Switchgrass – Trailblazer, Blackwell, Pathfinder	90	0.25
Plains coreopsis ( <i>Coreopsis tinctoria</i> )	90	0.05
Blue flax ( <i>Linum lewisii</i> )	85	0.25
Oats	90	5

**All seed shall be origin Nebraska, adjoining states, or as specified. A Contractor proposing to use a substitute variety, or origin shall submit for the Engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.**

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per 1000 SY (Minimum)
Available Nitrogen (N <sub>2</sub> )	4 or 9 lb.
Available Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	23 or 24 lb.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lb.
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## EROSION CONTROL

Subsection 807.01 is void and superseded by the following:

This work shall consist of the preparation of slopes and waterways and the furnishing and application of soil retention blankets at the locations shown in the plans.

Subsection 807.02

Paragraphs 2., 2.a., 2.b. and 2.c. are void and superseded by the following:

Wire staples shall be used for anchoring the soil retention blanket. The staples shall be a minimum of 13 gauge U-shaped steel wire with a 1 inch or larger throat with at least 6 inch long legs.

Paragraph 5. is void.

Subsection 807.03

Paragraph 6.c. is void.

Paragraphs 7.a.i. and 7.a.ii. are void.

Paragraph 8. is void.

Paragraph 1. of Subsection 807.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Erosion Control, Class_____	Square Yard (SY)

### **EROSION CHECKS**

Subsection 808.01 is void and superseded by the following:

This work shall consist of seeding, trenching, furnishing and placing soil retention blankets, and furnishing and placing hay bales to construct erosion checks at the locations shown in the plans. There are two separate and distinct types of erosion checks – “Erosion Checks” which are permanent and placed as shown in the plans or as directed by the Engineer after final grading is complete; and “Temporary Silt Checks” which are temporary and placed as shown in the plans or as directed by the Engineer when rough grading is begun or as necessary.

Subsection 808.02

Paragraph 4. is void.

Paragraph 5.a. is void and superseded by the following:

The “Temporary Silt Checks” shall be on the NDR Approved Products List.

Paragraph 5.b. is void and superseded by the following:

The wire staples for “Temporary Silt Checks” shall be a minimum of 13 gauge steel wire with a 1 inch (25 mm) or larger throat and 6 inch (150 mm) legs.

Subsection 808.03

Paragraph 3. is void.

Paragraph 4. is void.

Paragraph 6.b. is void.

Paragraph 7. is void and superseded by the following:

The hay bales shall then be placed in the trench over the soil retention blanket with bale ties up and backfilled to the level of the finished ditch elevation.

Paragraphs 12., 12.a., 12.b., 12.c. and 12.d. are void and superseded by the following:

Paragraph 12. Temporary Silt Checks

- a. The "Temporary Silt Checks" shall be installed at the locations shown in the plans, and as directed by the Engineer. The upstream edge shall be slightly buried and pinned with wire staples on approximately 24 inch (600 mm) spacings. The pins may be may be left slightly exposed for easier removal. The triangular portion shall be pinned on 3 foot (1 m) centers.
- b. The "Temporary Silt Check" shall be in place immediately after the rough grading is completed in that area.
- c. The "Temporary Silt Check" shall be left in place until the finish grading begins. Reinstall the "Temporary Silt Checks" as soon as finish grading is complete unless the permanent erosion control is initiated immediately after finish grading. "Temporary Silt Checks" should be in place at all times after finish grading until the permanent "Erosion Checks" are in place.
- d. At the completion of the project, the "Temporary Silt Checks" shall remain the property of the Contractor.

Subsection 808.04

Paragraph 2. is void and superseded by the following:

"Temporary Silt Checks" shall be measured by the linear foot (meter) for the initial installation. The removing or relocating of the "Temporary Silt Checks" will not be measured for payment, but will be considered subsidiary to the initial installation.

Subsection 808.05

Paragraphs 1., 2. and 3. are void and superseded by the following:

- | 1. | <b>Pay Item</b>                | <b>Pay Unit</b>              |
|----|--------------------------------|------------------------------|
|    | Erosion Check                  | Bale                         |
|    | Erosion Checks, Type _____     | Bale                         |
|    | Erosion Checks, Type Wattle    | Linear Foot (LF) [Meter (m)] |
|    | Erosion Check "Type Synthetic" | Linear Foot (LF) [Meter (m)] |
|    | Temporary Silt Check           | Linear Foot (LF) [Meter (m)] |
|    | Erosion Checks, Type _____     | Linear Foot (LF) [Meter (m)] |
2. If cleanout of an "Erosion Check" or "Temporary Silt Check" is required, it will be paid as equipment rental as prescribed in Subsections 809.04 and 809.05.
  3. Payment for "Temporary Silt Checks" includes any costs incurred to reinstall the "Temporary Silt Checks" once the area is finished graded.

## **COVERCROP SEEDING**

### Subsection 812.01

Paragraph 2. is void and superseded by the following:

Cover crop seeding shall be applied to any disturbed area requiring erosion protection. It is intended to be used in staged construction areas, surcharge areas, or other disturbed areas that have not been permanently seeded.

### Subsection 812.02

Paragraph 4. is void.

Subsection 812.04 is void and superseded by the following:

### Subsection 812.04

1. Cover crop seeding is measured by the acre of ground surface seeded. The areas will be calculated from surface measurements of the length and width  $\pm 1$  yard ( $\pm 900$  mm).

## **FABRIC SILT FENCE (HIGH POROSITY AND LOW POROSITY)**

Paragraph 3. of Subsection 809.03 in the Standard Specifications is amended to include the following:

Silt Fence may be installed mechanically with a silt fence plow in lieu of the trenching procedures.

Paragraph 4. of Subsection 809.03 in the Standard Specifications is amended to include the following:

At the completion of the project, the silt fence shall be left in good working condition.

## **PRESERVATION OF TREES (H-11-0911)**

Paragraph 3 of Subsection 107.09 is amended to include the following:

Trees are an asset to the roadside corridor and shall be protected from immediate and long term damage such as trunk scarring, soil compaction, injury or destruction of roots and all forms of damage from vehicles, equipment or materials too close to the trees.

“No materials, vehicles or equipment shall be stored or parked within 25 feet of existing trees 4” caliper or larger, whether standing alone or in groups, throughout the length of the project.”

The Contractor shall protect from disturbance or damage, all trees as described above by installing adequate protection for all trees and tree groupings. Within the interchanges, protection shall be either snow fence, orange barrier fence or caution tape, all supported on metal posts, to prevent parking or storage of materials within these sensitive areas. This protection will not be paid for separately but considered the duty of the Contractor to fulfill the requirements described in Subsection 107.09 of the Standard Specifications and this special provision.

All materials used to establish protection for the trees shall remain the property of the Contractor and shall be removed by the Contractor at the end of the contract or as directed by the Engineer.

### **GUARDRAIL END TREATMENT, TYPE I (I-1-0813)**

Section 902 in the Standard Specifications is amended to include "Guardrail End Treatment, Type I".

This work consists of furnishing and installing a guardrail end treatment system according to the details and at the locations shown in the plans.

The Contractor has the option of installing one of the following systems:

- |                |   |
|----------------|---|
| 1.) ET-31      | Manufactured by Trinity Industries, Inc.<br>2525 N. Stemmons Freeway<br>Dallas, TX 75207<br>(800) 644-7976      |
| 2.) SKT-SP-MGS | Manufactured by Road Systems, Inc.<br>3616 Old Howard County Airport<br>Big Springs, TX 79720<br>(915) 263-2435 |

The Contractor will be required to furnish two sets of shop plans to the Department of the system to be installed. The guardrail end treatment shall be installed in accordance with the recommendations of the manufacturer.

Payment shall be full compensation for all work required to provide and install the system.

### **IMPACT ATTENUATOR SYSTEM (I-3-0307)**

Paragraph 18. of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

The Contractor shall furnish and install impact attenuator systems at the locations shown in the plans. The systems shall meet NCHRP 350 standards for test-level 3 (TL-3). The systems shall be non-gating redirective crash cushions.

Approved Impact Attenuator Systems are shown on the NDR "Approved Products List."

The system shall be furnished and installed as specified by the manufacturer. The system installation Contractor shall certify, in a letter to the Engineer, that the system was installed correctly. Along with the certification, the Contractor shall send maintenance instructions for the installed system.

The item "Impact Attenuator" shall be measured by the each and shall include furnishing and installing the impact attenuator system and any attachment materials, barrier transition sections, replacement cartridge kits, the certification letter, and the maintenance instructions.

### **GRANULAR SUBDRAINS & LONGITUDINAL SUBDRAIN**

Subsection 915.02 of the Standard Specifications is void and superseded by the following:

Aggregate that is used in granular subdrains shall consist of crushed gravel or crushed rock and shall conform to the requirements of Paragraphs 1. and 2. of Subsection 1033.02.

Crushed gravel shall have a fine aggregate angularity value of 43.0 or greater. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve as defined in AASHTO T 304 Method A, except the specific gravity material shall be washed over the No. 100 (150 µm) sieve. Gravel aggregate shall have a soundness loss of not more than 12 percent by weight at the end of 5 cycles using sodium sulfate solution.

Crushed rock shall conform to the requirements of paragraph 7.f. of Subsection 1033.02. Crushed rock shall have a percentage loss of not more than 14 at the end of 16 cycles of the freezing and thawing test.

The crushed gravel or crushed rock shall meet the following gradation requirements.

Granular Subdrains Gradation Requirements		
Sieve Size	Target Value (Percent Passing)	Tolerance
1 inch	100	0
No. 4	40	±20
No. 10	15	±15
No. 200	4	±4

Paragraph 2. of Subsection 915.03 of the Standard Specifications is void and superseded by the following:

The Contractor shall provide and place aggregate in the trench as prescribed in the plans but shall be placed at the midpoint of the adjacent concrete slab (midway between contraction joints) or as directed by the Engineer.

Paragraph 5. of Subsection 915.03 of the Standard Specifications is void and superseded by the following:

Excavated material shall become the property of the Contractor and removed from the project or used for shoulder construction on the project.

Earth Shoulder Construction shall be completed prior to granular subdrains installation.

Section 915 in the Standard Specifications is amended to include Longitudinal Subdrains. Longitudinal Subdrains shall be constructed as shown in the plans and in accordance with applicable portions of Section 915 and these Special Provisions. The filter fabric and work required to place it will not be measured for payment but shall be considered subsidiary to item Longitudinal Subdrains.

Paragraph 1. of Subsection 915.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Longitudinal Subdrain	Linear Foot (LF)

### **END ANCHORAGE ASSEMBLY**

Section 902 in the Standard Specifications is amended to include the item "End Anchorage Assembly".

Paragraph 1. of Subsection 902.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
End Anchorage Assembly	Each (ea)

### **CONCRETE SLOPE PROTECTION**

The Contractor shall verify the elevations of the existing abutment drain pipes prior to constructing the slope protection to ensure that the new slope protection does not block the drain pipes.

The item "Concrete Slope Protection" shall be measured and paid for by the square yard. The price bid shall be full compensation for any materials, tools, labor and incidentals required to build the concrete slope protection, remove the existing filter fabric, rebar and rip rap, and any extra earthwork necessary.

### **TEMPORARY RIGHT OF WAY FENCE**

If the existing right of way fence is removed before the new one is built, the Contractor shall install and maintain a temporary right of way fence.

In areas where the new right of way fence can be constructed without conflicts, the new fence shall be completed before the existing fence is removed.

New Right of Way (ROW) fence, temporary ROW fence and removal of ROW fence shall be accomplished one section or area of the project at a time. The Contractor shall not remove more fence in one day than can be replaced in that same day.

The temporary right of way fence can be let down to allow access during a day's construction but shall be replaced if work crews are not in the area. The temporary right of way fence must be in place at the end of each day's operation.

The Contractor shall furnish the temporary right of way fence and fence materials. The fence material shall be a lightweight orange colored plastic and be at least 4 feet high. The Contractor will also furnish metal "T" posts and ties. The post shall be set at approximately 10-foot intervals and the fabric tied with 3 ties per post.

After the new right of way fence is in place, the temporary right of way fence may be removed.

The work of installing, maintaining and removing the temporary right of way fence will not be paid for directly, but will be subsidiary to the item "5 Foot Chain-Link Fence".

### **POSTS AND FASTENERS FOR HIGHWAY SIGNING (J-3-0411)**

Paragraph 1.G.(3) of Subsection 1071.02 in the Standard Specifications is void and superseded by the following:

- (3) Light-duty posts shall be painted black or dark green.

### **TIMBER AND LUMBER (J-5-0711)**

Paragraphs 2.a. and 2.b. of Subsection 1075.02 in the Standard Specifications are void and superseded by the following:

2. a. The creosote, pentachlorophenol and copper naphthenate preservative treatment for timber and lumber shall be by the Empty-cell (Rueping) Process; and, where allowed, the ammoniacal copper arsenate (ACA), chromated copper arsenate (CCA), and ammoniacal copper zinc arsenate (ACZA) preservative treatment for timber and lumber shall be by the Full-cell (Bethel) Process. Treatment shall conform to the requirements as specified in T1-Use Category System: User Specification for Treated Wood of the American Wood-Preservers' Association Standards and AASHTO M 133. Preservatives shall meet the requirements of Section 1076.
- b. Preservative Treatment. The preservative treatment and minimum retentions for timber and lumber shall conform to the requirements as specified in U1-Use Category System: User Specification for Treated Wood of the American Wood Preservers' Association Standards as amended herein. Minimum retentions for all timber and lumber shall conform to Use Category UC4C. Minimum retentions for fence posts shall conform to Use Category UC4A. Timber and lumber to be treated with ammoniacal copper arsenate or ammoniacal copper zinc arsenate shall be dried to the fiber saturation point required to put the timber into satisfactory condition to accept the preservative and attain the required

preservative retention and penetration. After treatment, with the exception of offset blocks and posts for guardrail terminals systems, the material shall be redried and have a moisture content of not more than 30 percent at the time of shipment to the job site.

Paragraph 1.b. of Subsection 1075.05 is void and superseded by the following:

- b. Species. Unless otherwise specified, sawn wood guardrail posts shall be either Douglas Fir (Coast Region) or Southern Yellow Pine.

Wood offset blocks shall be either Douglas Fir (Coast Region), Southern Yellow Pine (major or minor species), or Ponderosa Pine.

## **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 52-34 for Asphaltic Concrete, Type SPS and P.G. Binder 64-34 for Asphaltic Concrete, Type SPH 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**

<b>PG+ Specifications</b>	<b>Spec Base</b>			<b>Spec w/Tol.<sup>2</sup></b>		
	<b>92</b>	<b>98</b>	<b>104</b>	<b>92</b>	<b>98</b>	<b>104</b>
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**

	<b>Pay Factor of 0.75 or Removal<sup>1</sup></b>		
Temperature Spread	<b>92</b>	<b>98</b>	<b>104</b>
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**

	<b>Range of Average</b>	<b>Pay Factor Applied</b>
<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.

**SUPERPAVE ASPHALTIC CONCRETE**

Section 1028 in the Standard Specifications is amended to provide that Asphaltic Concrete, Type SPH shall use the 0.5 inch gradation band.

**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)**

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

\* Denotes two faced crushed requirements

- l. 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 µm) 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**

English Sieve (Metric)	0.75 Inch (19 mm) Control Points (percent passing)		0.5 Inch (12.5 mm) Control Points (percent passing)	
	Minimum	Maximum	Minimum	Maximum
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 μm)				
No. 50 (300 μm)				
No. 200 (75 μm)	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% (±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% (±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 ± 5
	26-50	280 ± 5
SPR	0-35	280 ± 5
	36-50	290 ± 5
SPH	0-35	300 ± 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% (± 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 (± 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**

$\text{Gmb}(\text{corr})@N_{any} = \text{Gmb}(\text{meas})@N_{max} \times (\text{height}@N_{max} \div \text{height}@N_{any})$ $\%G_{mm}(\text{corr})@N_{any} = 100 \times (\text{Gmb}(\text{corr})@N_{any} \div \text{Gmm}(\text{meas}))$ $\% \text{ Air Voids}@N_{any} = 100 - \%G_{mm}(\text{corr})@N_{any}$ $\text{VMA}@N_{des} = 100 - (\text{Gmb}(\text{corr})@N_{des} \times P_s \div \text{Gsb})$ $\text{VFA}@N_{des} = 100 \times ((\text{VMA}@N_{des} - \% \text{ Air Voids}@N_{des}) \div \text{VMA}@N_{des})$ $\text{Measured} = (\text{meas})$ $\text{Corrected} = (\text{corr})$
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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 Gyrotory 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**

<b>Sieve Size</b>	<b>Tolerance</b>
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<sub>des</sub>**

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-7-1013)**

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, 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”.

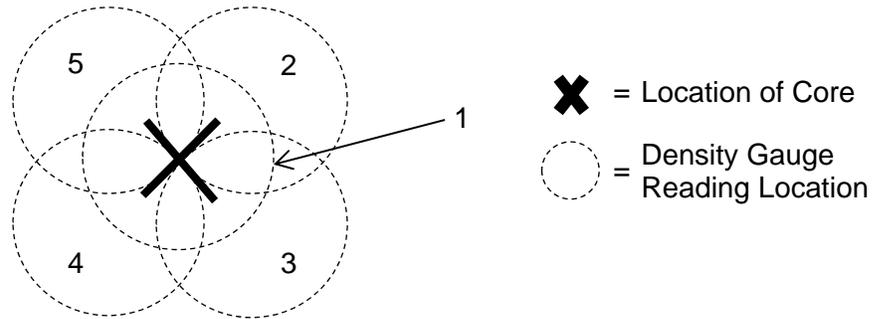


Figure 1: Asphalt density gauge reading

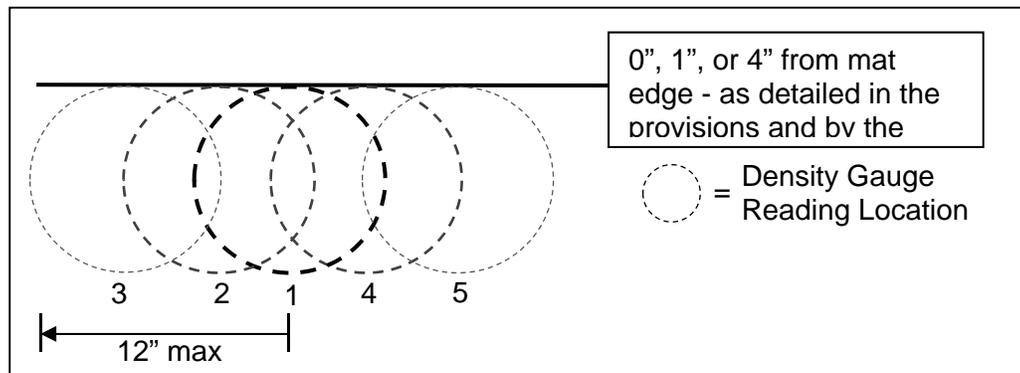


Figure 2: Asphalt density gauge reading pattern less than 6” from mat edge

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:

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

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

**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 Contractors 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-15-0813)**

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

- b. 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 1PF and 1PN cement shall be used for all classes of concrete except for pavement repair. 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. Type 1P cement shall meet all requirements of ASTM C 595.

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

**ENGLISH  
TABLE 1002.02**

**Concrete Mixes (Cubic Yard Batch)**

Class of Concrete (1)	Base Cement Type*	Portland Cement (Min. lb/cy)	Pre-Blended Class F Fly Ash or Pozzolan* (Min. lb/cy)	Slag Cement (Min. lb/cy)	Class C Fly Ash (Min. lb/cy)	Silica Fume (Min. lb/cy)	Total Cementitious Materials (Min. lb/cy)	Total Agg. (Min. lb/cy)	Total Agg. (Max. lb/cy)	Coarse Agg. (%) (3)	Type of Coarse Agg.****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. psi) (7)
47B**	1PF/1PN	423	141	0	0	0	564	2850	3150	30±3	Limestone	7.5 -10.0	0.48	3500
47B***	1PF/1PN	423	141	0	0	0	564	2850	3150	30±3	Limestone	6.0 - 8.5	0.48	3500
47BD	1PF/1PN	494	164	0	0	0	658	2500	3000	30±3	Limestone	6.0 - 8.5	0.42	4000
PR1	I/II	752	0	0	0	0	752	2500	2950	30±3	Limestone	6.0 - 8.5	0.36	3500
PR3	III	799	0	0	0	0	799	2500	2950	30±3	Limestone	6.0 - 8.5	0.45	3500
SF	I/II	564	0	0	0	25	589	2850	3200	50±3	Limestone	6.0 - 8.5	0.36	4000
47BHE	1PF/1PN	564	188	0	0	0	752	2500	3000	30±3	Limestone	6.0 - 8.5	0.40	3500
BX <sub>(8)</sub>	1PF/1PN	423	141	0	0	0	564	2850	3150	0	0 (5)	6.0 - 8.5	0.48	3500
47BFS** <sub>(6)</sub>	1PF/1PN	338	113	113	0	0	564	2850	3150	30±3	Limestone	7.5 -10.0	0.48	3500
47BFS*** <sub>(6)</sub>	1PF/1PN	338	113	113	0	0	564	2850	3150	30±3	Limestone	6.0 - 8.5	0.48	3500
47BDFS <sub>(6)</sub>	1PF/1PN	396	131	131	0	0	658	2850	3000	30±3	Limestone	6.0 - 8.5	0.42	3500

- (1) Each class shall identify the minimum strength requirement. (For example, 47B-3500, where the last four digits indicate the strength in pounds per square inch. In the chart, strength of 3500 psi is indicated for 47B-3500; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)  
All classes of concrete shall be air-entrained, and a water-reducing admixture shall be used.  
A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.  
A water reducer admixture shall be used at the manufacturer's recommendations.
- (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) Coarse aggregate shall be limestone unless otherwise specified.
- (4) 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 obtains written approval from the NDR Materials & Research Division prior to any placement on the project. The Contractor may request approval from Materials & Research in writing to change the water/cement ratio to 0.36.
- (5) Single aggregate (sand-gravel) used for these classes of concrete.
- (6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.
- (7) For acceptance of each class of concrete, refer to the specifications.
- (8) For temporary surfacing, straight Type I/II cement is allowed.
- (\*) Mixes with Type 1PF and 1PN are pre-blended or interground with Class F fly ash or Class N Pozzolan by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash or Class N Pozzolan is added at the batch plant. Lithium Nitrate may be used in place of Class F fly ash or Class N Pozzolan, see Section 1007 of the Standard Specifications as modified in these Special Provisions.
- (\*\*) For slip form applications.
- (\*\*\*) For hand-pours and substructures applications.
- (\*\*\*\*) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3.b. of Subsection 1033.02.

**METRIC  
TABLE 1002.02**

**Concrete Mixes (Cubic Meter Batch)**

Class of Concrete (1)	Base Cement Type*	Portland Cement (Min. kg/m <sup>3</sup> )	Pre-Blended Class F Fly Ash or Pozzolan* (Min. kg/m <sup>3</sup> )	Slag Cement (Min. kg/m <sup>3</sup> )	Class C Fly Ash (Min. kg/m <sup>3</sup> )	Silica Fume (Min. kg/m <sup>3</sup> )	Total Cementitious Materials (Min. kg/m <sup>3</sup> )	Total Agg. (Min. kg/m <sup>3</sup> )	Total Agg. (Max. kg/m <sup>3</sup> )	Coarse Agg. (%) (3)	Type of Coarse Agg.****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. Mpa) (7)
47B**	1PF/1PN	251	84	0	0	0	335	1691	1869	30±3	Limestone	7.5 -10.0	0.48	25
47B***	1PF/1PN	251	84	0	0	0	335	1691	1869	30±3	Limestone	6.0 - 8.5	0.48	25
47BD	1PF/1PN	293	97	0	0	0	390	1483	1780	30±3	Limestone	6.0 - 8.5	0.42	30
PR1	I/II	446	0	0	0	0	446	1483	1750	30±3	Limestone	6.0 - 8.5	0.36	25
PR3	III	474	0	0	0	0	474	1483	1750	30±3	Limestone	6.0 - 8.5	0.45	25
SF	I/II	335	0	0	0	15	349	1483	1899	50±3	Limestone	6.0 - 8.5	0.36	30
47BHE	1PF/1PN	335	112	0	0	0	446	1483	1780	30±3	Limestone	6.0 - 8.5	0.40	25
BX <sub>(8)</sub>	1PF/1PN	251	84	0	0	0	335	1691	1869	0	0 (5)	7.5 - 8.5	0.48	25
47BFS** <sub>(6)</sub>	1PF/1PN	201	67	67	0	0	335	1691	1869	30±3	Limestone	7.5 -10.0	0.48	25
47BFS*** <sub>(6)</sub>	1PF/1PN	201	67	67	0	0	335	1691	1869	30±3	Limestone	6.0 - 8.5	0.48	25
47BDFS <sub>(6)</sub>	1PF/1PN	234	78	78	0	0	390	1483	1780	30±3	Limestone	6.0 - 8.5	0.42	30

- (1) Each class shall identify the minimum strength requirement. (For example, 47B-25, where the last two digits indicate the strength in MPa. In the chart, strength of 25 MPa is indicated for 47B-25; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)  
 All classes of concrete shall be air-entrained, and a water-reducing admixture shall be used.  
 A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.  
 A water reducer admixture shall be used at the manufacturer's recommendations.
- (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) Coarse aggregate shall be limestone unless otherwise specified.
- (4) 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 obtains written approval from the NDR Materials & Research Division prior to any placement on the project. The Contractor may request approval from Materials & Research in writing to change the water/cement ratio to 0.36..
- (5) Single aggregate (sand-gravel) used for these classes of concrete.
- (6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.
- (7) For acceptance of each class of concrete, refer to the specifications.
- (8) For temporary surfacing, straight Type I/II cement is allowed.
- (\*) Mixes with Type 1PF and 1PN are pre-blended or interground with Class F fly ash or Class N Pozzolan by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash or Class N Pozzolan is added at the batch plant. Lithium Nitrate may be used in place of Class F fly ash or Class N Pozzolan, see Section 1007 of the Standard Specifications as modified in these Special Provisions.
- (\*\*) For slip form applications.
- (\*\*\*) For hand-pours and substructures applications.
- (\*\*\*\*) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3.b. of Subsection 1033.02.

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

Paragraph 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 (0.54 Kg) of Grade 2 or 6.2 pounds (0.74 Kg) of Grade 1 calcium chloride per gallon (liter) of water to provide a solution of approximately 32 percent by weight.
  - b. The 7.4 pounds (10.89 Kg) of water in each gallon (liter) 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) [3.13 L/100 Kg of cement (1.4 Kg calcium chloride per 100 Kg 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.
  - f. Where continuous batching equipment is employed, such as a concrete mobile mixer, the calcium chloride solution and Type F high range water-reducer admixture shall be incorporated in the concrete through a flow meter.

6. Class High Early (HE) Concrete
  - a. High Early (HE) strength 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 (25 MPa) 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 or Engineer.

Subsection 1002.02 is amended to include the following:

11. 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.

Paragraph 1. and 2. of Subsection 1002.03 is 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 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 immediately seal the split sample after splitting and before testing has begun. The cloth sample bag shall be supplied by the Contractor.
    - 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.
    - v. 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 Associations *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 handwritten tickets. The concrete batch tickets shall show batch weights, aggregate moisture, 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. Aggregate from a dry pit and coarse aggregate shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours before concrete mixing to allow complete saturation.

Paragraph 1.b. of Subsection 1002.04 is void.

Paragraph 6 of Subsection 1002.04 is void and superseded by the following:

6. Compressive strength tests shall be made in accordance with ASTM C 39. Compressive strength cylinders shall be cured in accordance with ASTM C 31 paragraph 10. The compressive strength requirements shall be as specified. In general, 7-day compressive strength should be 70 percent of the 28-day compressive strength.

Subsection 1002.04 is amended to include the following:

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 1002.5

Table 1002.05

Aggregate Class	Lot	Sublot
E and F	3000 tons	1000 tons
A, B and C	6000 tons	2000 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 gradation 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 Contractor's laboratory to conduct IA review of 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 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.
  
- g. 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 Materials Sampling Guide.

## **PORTLAND CEMENT (J-15-0812)**

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 ( $\text{Na}_2\text{O}_e$ ) and the potassium oxide ( $\text{K}_2\text{O}$ ) calculated as sodium oxide (equivalent alkali as  $\text{Na}_2\text{O}_e = \text{Na}_2\text{O} + 0.658 \text{K}_2\text{O}$ ).

### **1004.02 – Material Characteristics**

- 1. Type I, Type 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. Type 1PF or 1PN shall be a Type 1P made exclusively with Class "F" fly ash or Class N as the pozzolan. Type 1P cement shall conform to the requirements as prescribed in ASTM C 595 and the following requirements:
  - a. The pozzolan content shall be 25±2 percent of the cementitious materials by weight.
  - b. The pozzolan shall be Class F fly ash or Class N pozzolan.
  - c. Additional fly ash substitution shall not be allowed with Type 1P cement containing Class F fly ash or Class N pozzolan.

#### **1004.03 – Procedures**

1. The Contractor shall provide adequate protection for the cement against dampness.
  - a. 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 cement against moisture will not be allowed.
2. No cement which has become caked or lumpy shall be used.
3. Cement which has been spilled shall not be used.
4. Accepted cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.
5. Cement coming directly from the manufacturer shall not be used until the temperature is 150°F (66°C) or less.

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

1. a. Cements for use on NDR projects must be on the NDR Approved Products List.
  - b. Cements will be placed on the NDR Approved Products List based on conformance with the NDR Acceptance Policy for Portland and Blended Cements. This information can be found on the NDR Materials and Research website.
2. Portland cement chemical and physical test requirements shall conform to NDR Acceptance Policy for Portland and Blended Cements contained in the NDR's Materials Sampling Guide.
3. All cements shall be sampled and tested at the rate as described in the NDR's Materials Sampling Guide.
  - a. NDR 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 NDR 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, NDR will take custody of the sample.
4. a. Blended cements shall be tested according to the provisions of ASTM C 1567. The mortar bars shall be composed of the Type 1PF/1PN cement and sand/gravel from a Platte River Valley source approved by NDR Materials and Research Division. The mortar bars for the ASTM C 1567 shall not exceed 0.10% expansion at 28-days. 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 will be noncompliant.
- b. Noncompliant material from the terminal or mill will be temporarily removed from the Approved Products List pending further investigation.
5. If the noncompliant 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 NDR Acceptance Policy for Portland and Blended Cements in the NDR's Material Sampling Guide.

### **WATER FOR CONCRETE (J-15-0512)**

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

#### **1005.01 – Description**

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.

#### **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 ASTM C 1603, ASTM C 114 and ASTM C 1602.
- 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 fresh concrete, only in mixes using 1P under the following conditions:
  - a. Wash water shall conform to the requirements in NDR's Material Sampling Guide.
  - 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-15-0307)**

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 as shown in ASTM D 98.

#### **1006.03 – Acceptance Requirements**

Acceptance shall be based on sampling and testing in accordance with AASHTO T 143 and requirements contained in the NDR Materials Sampling Guide.

### **SECTION 1007 -- CHEMICAL ADMIXTURES (J-15-0211)**

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, imperviousness, 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.
- 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 a 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 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 (5L) 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;
  - b. Approval for use must be given by the NDR Materials and Research Division.

**FLY ASH AND CALCINED NATURAL POZZOLAN  
(J-15-0512)**

Subsection 1008.02 in the Standard Specifications is void and superseded by the following:

### **1008.02 – Material Characteristics**

1. All fly ash and calcined clay natural pozzolan will be acceptance tested by the NDR Materials and Research Division. This includes production plant samples and field samples.
2. Fly ash shall conform to the requirements of Class C, Class F, and Class N pozzolan as defined in ASTM C 618 except that the maximum loss on ignition for Class F pozzolan shall be 3.0 percent. Either class of fly ash shall not contain more than 1.5 percent of available alkalis as  $\text{Na}_2\text{O}_e$ .
3. Fly ash produced in furnace operations utilizing liming materials or soda ash (sodium carbonate) as an additive will not be acceptable.

### **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 or 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.
  - 1. 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.
  - 1. 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)
3. Resin adhesives for embedding dowel bars, threaded rods, rebars and other fixtures in hardened concrete are shown on the NDR Approved Products List.

**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-15-1112)**

Table 1033.02B of Subsection 1033.02 in the Standard Specifications is void and superseded by the following:

<b>Table 1033.02B</b>	
<b>Aggregate Classes and Uses</b>	
<b>Aggregate Class</b>	<b>Concrete Description</b>
A	Overlay Concrete SF
B	47B, 47B-HE, 47BD, PR 1, and PR 3
C	BX

Table 1033.03B of Subsection 1033.03 in the Standard Specifications is void and superseded by the following:

<b>Table 1033.03B</b>	
<b>Aggregate Classes and Uses</b>	
<b>Aggregate Class</b>	<b>Concrete Description</b>
E	47B, and 47B-HE 47BD, PR 1, and PR 3
F	Overlay Concrete SF

Paragraph 3.a.(3) of Subsection 1033.02 is void and superseded by the following:

- (3) Aggregates from a dry pit shall be washed and have a sand equivalent not less than 90 percent.

## **SLAG CEMENT (J-15-0512)**

### **Description**

Slag cement shall meet the requirements of ASTM C 989, Grade 120.

### **Material Characteristics**

1. All Slag cement will be acceptance tested by the NDR Materials and Research Division. This includes production plant samples and field samples.

### **Procedures**

1. Slag cement shall be protected, stored, handled, and sampled in the same manner as specified for Portland Cement in Sections 1002 and 1004 and the NDR *Materials Sampling Guide*.
2. Each shipment of Slag cement sent to the project or ready mix plant shall be accompanied with a certificate of compliance from the supplier or manufacturing plant. The certificate must include the following information:
  - a. Name of the supplier or manufacturer.
  - b. Source of the Slag cement.
  - c. Consignee and destination of the shipment.
  - d. Project number to be used on, if available, and date shipped.
  - e. Railroad car number or truck identification number.
  - f. Weight of the shipment.
  - g. Certified test number representing the material being shipped.
  - h. An unrepeatable order number or other identification number so that each shipment is separately identified.
  - i. The NDR specifications that the product is in compliance with.
3. The following signed certification statement, or similar wording, must also be included on the form:

"This is to certify that this shipment of Slag Cement meets the Specification Requirements of the Nebraska Department of Roads for Slag Cement, Grade 120."

Signed \_\_\_\_\_

For \_\_\_\_\_  
(Supplier)

4. Two copies of the certificate of compliance shall be sent with the shipment for the Engineer. The Engineer will retain one copy for his/her file and send the other copy to the NDR Materials and Research Division to serve as notification of receipt and identification of the Slag cement.
5. Slag cement may be used as soon as it is received; provided it is accompanied by the proper certificate of compliance and the results of previous tests indicate a satisfactory product.

#### Acceptance Requirements

1.
  - a. Approved Slag cement will be on the NDR Approved Products List.
  - b. Slag cement may be added to the NDR Approved Products List if it is in conformance with the NDR Acceptance Policy for Slag cement. This information is available upon request from the Department's Concrete Materials Section.
2.
  - a. Should any sample indicate noncompliance with the specifications, use of material from that source based on certification only may be withheld. It will be necessary that the Slag cement be held in special silos or bins at the plant or some facility under control of the company furnishing the Slag cement until such time that test results show compliance.
  - b. When it can be shown that continuing production from that plant has a high assurance of meeting specifications, material acceptance may once again be based on certification only.
3.
  - a. If tests made on field samples taken by the Department fail to meet any of the specification requirements, all shipments from the supplier will be held until tests have been completed by the NDR Materials and Research Division and approval for use is issued.
  - b. This procedure will be continued until it can reasonably be assured that the Slag cement from the supplier will again continue to meet contract requirements.

**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.

**REINFORCED CONCRETE PIPE, MANHOLE RISERS,  
AND FLARED END SECTIONS  
(J-21-0108)**

The AASHTO reference made in paragraphs 4.a. and 4.b. of Subsection 1037.02 in the Standard Specifications is amended to read AASHTO M 170 / M 170M-95.

The AASHTO reference made in paragraph 5. of Subsection 1037.02 is amended to read AASHTO M 206 / M 206M-95.

The AASHTO reference made in paragraph 6. of Subsection 1037.02 is amended to read AASHTO M 207 / M 207M-95.

Paragraph 8. of Subsection 1037.02 is void and superseded by the following:

8. Concrete flared-end sections shall be of the design shown in the plans and in conformance with the applicable requirements of AASHTO M 170 / M 170M-95, Class II pipe, AASHTO M 206 / M 206M-95, Class A-II pipe, or AASHTO M 207 / M 207M-95, Class HE-II pipe for the diameter of pipe on which it is to be installed.

**INCENTIVE PAYMENT FOR THE USE OF  
RECYCLED ASPHALTIC PAVEMENT (RAP) FOR ASPHALTIC MIXTURES  
(J-22-1013)**

**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 and LC	5.8% 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>	<b>Pay Unit</b>
RAP Incentive Payment	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*

**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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S-80-9(1187)  
S-80-9(1188)  
OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 GROUP 1 GRADING						
0001	0030.10 MOBILIZATION	LUMP	LUMP			.
0002	1009.00 GENERAL CLEARING AND GRUBBING	LUMP	LUMP			.
0003	1010.00 EXCAVATION	19598.000 CY		.		.
0004	1010.10 EXCAVATION, BORROW	31164.000 CY		.		.
0005	1011.00 WATER	508.000 MGAL	30.00000		15240.00	
0006	1101.00 REMOVE PAVEMENT	18091.000 SY		.		.
0007	1101.25 SAWING PAVEMENT	407.000 LF		.		.
0008	1102.00 REMOVE ASPHALT SURFACE	317.000 SY		.		.
0009	1109.20 REMOVE CONCRETE BARRIER	1163.000 LF		.		.

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0010	1111.00 REMOVE FENCE	177.000 LF	.		.	
0011	1122.01 REMOVE CONCRETE MEDIAN SURFACING	1354.000 SY	.		.	
0012	1123.26 REMOVE CONCRETE SLOPE PROTECTION	30.000 SY	.		.	
0013	7017.00 REMOVE GUARDRAIL	743.000 LF	.		.	
0014	L006.00 COVER CROP SEEDING	7.000 ACRE	.		.	
0015	L019.13 EROSION CONTROL, CLASS 1D	62759.000 SY	.		.	
0016	L019.20 EROSION CONTROL, CLASS 2A	3094.000 SY	.		.	
0017	L021.40 EROSION CHECKS, TYPE 2A	193.000 BALE	.		.	
0018	L021.51 EROSION CHECKS, TYPE WATTLE	567.000 LF	.		.	
0019	L022.11 FABRIC SILT FENCE-LOW POROSITY	3564.000 LF	.		.	
	SECTION 0001 TOTAL				.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0002 GROUP 1A MSE WALL						
0020	0030.10 MOBILIZATION	LUMP	LUMP			.
0021	1010.26 EXCAVATION FOR MSE WALL	334.000 CY	.			.
0022	4044.23 PREPARATION OF STRUCTURE WALL 1	1.000 EACH	.			.
0023	4044.24 PREPARATION OF STRUCTURE WALL 2	1.000 EACH	.			.
0024	4095.00 CONCRETE FACE PANELS	3361.000 SF	.			.
0025	4095.10 CONCRETE LEVELING PADS	212.000 LF	.			.
0026	4095.20 COPING	270.000 LF	.			.
0027	4350.24 24" CORRUGATED METAL PIPE	249.500 LF	.			.
0028	8024.75 SELECT GRANULAR BACKFILL FOR MSE WALL	1691.000 CY	.			.
	SECTION 0002 TOTAL					.

SECTION 0003 GROUP 3 CONCRETE PAVEMENT

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0029	0030.30 MOBILIZATION	LUMP	LUMP			
0030	1020.01 DELINEATOR, TYPE I	32.000 EACH	.		.	
0031	1020.02 DELINEATOR, TYPE II	58.000 EACH	.		.	
0032	3008.05 TIE BARS	4630.000 EACH	.		.	
0033	3013.13 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE B	1016.000 LF	.		.	
0034	3013.14 CONCRETE CLASS 47BD-4000 BARRIER CURB TRANSITION W/LIGHT POLE BASE	68.000 LF	.		.	
0035	3013.16 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE A	390.000 LF	.		.	
0036	3013.30 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE A	1.000 EACH	.		.	
0037	3017.40 CONCRETE CLASS 47B-3000 MEDIAN SURFACING	743.000 SY	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0038	3027.04 CONCRETE CLASS 47BD-4000 MEDIAN BARRIER TRANSITION SECTION	6.000 EACH	.		.	
0039	3031.33 13" CONCRETE BASE COURSE	28689.000 SY	.		.	
0040	3031.88 13" CONCRETE BASE COURSE CLASS PR-3500	265.000 SY	.		.	
0041	3075.82 13" CONCRETE PAVEMENT, CLASS 47B-3500	5962.000 SY	.		.	
0042	3075.86 13" DOWELED CONCRETE PAVEMENT, CLASS 47B-3500	8690.000 SY	.		.	
0043	3089.25 TEMPORARY SURFACING 10"	278.000 SY	.		.	
0044	4020.30 CONCRETE DITCH LINING	400.000 LF	.		.	
0045	4764.35 4" PERFORATED PIPE UNDERDRAIN	1407.000 LF	.		.	
0046	7515.03 5" BLACK POLYUREA PAVEMENT MARKING, GROOVED	10800.000 LF	.		.	
0047	7515.35 5" WHITE WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED	26500.000 LF	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0048	7515.36 5" WHITE WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	10800.000 LF	.		.	
0049	7515.38 12" WHITE WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	2300.000 LF	.		.	
0050	7515.42 12" WHITE WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED	5800.000 LF	.		.	
0051	7516.35 5" YELLOW WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	5500.000 LF	.		.	
0052	7516.36 5" YELLOW WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED	11500.000 LF	.		.	
0053	8022.20 HYDRATED LIME/WARM MIX ASPHALT	4630.000 EACH	.		.	
0054	8029.25 FOUNDATION COURSE 4"	28954.000 SY	.		.	
0055	8029.26 FOUNDATION COURSE 5"	14652.000 SY	.		.	
0056	8060.05 GRANULAR SUBDRAIN	56.000 EACH	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0057	8060.06 LONGITUDINAL SUBDRAIN	9276.000 LF	.		.	
0058	9005.23 ASPHALTIC CONCRETE, TYPE SPS	1150.000 TON	.		.	
0059	9005.90 ASPHALTIC CONCRETE, TYPE SPH (0.5)	4630.000 TON	.		.	
0060	9021.12 PERFORMANCE GRADED BINDER (52-34)	36.800 TON	.		.	
0061	9021.13 PERFORMANCE GRADED BINDER (64-34)	175.940 TON	.		.	
0062	9053.00 TACK COAT	7150.000 GAL	.		.	
0063	9111.00 WATER	170.000 MGAL	.		.	
0064	9170.00 EARTH SHOULDER CONSTRUCTION	149.934 STA	.		.	
0065	9173.20 SUBGRADE PREPARATION	43838.000 SY	.		.	
0066	9179.34 COLD MILLING, CLASS 4	8085.000 SY	.		.	

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CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0067	9188.50 SURFACING UNDER GUARDRAIL	846.000 SY	.		.	
0068	9300.38 RAP INCENTIVE PAYMENT	9826.000 EACH	1.00000		9826.00	
0069	9300.52 ASPHALT PAVEMENT SMOOTHNESS TESTING I/D	LUMP	LUMP		.	
0070	A069.15 1 1/2-INCH CONDUIT IN MEDIAN BARRIER	225.000 LF	.		.	
	SECTION 0003 TOTAL				.	

SECTION 0004 GROUP 4 CULVERTS

0071	0030.40 MOBILIZATION	LUMP	LUMP		.	
0072	1117.00 REMOVE MANHOLE	4.000 EACH	.		.	
0073	1119.00 REMOVE INLET	10.000 EACH	.		.	
0074	4002.00 CAST IRON COVER AND FRAME	1500.000 LB	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0075	4004.50 CAST IRON GRATE AND FRAME	37096.000 LB	.		.	
0076	4005.00 CAST IRON RING AND COVER	1380.000 LB	.		.	
0077	4015.50 RECONSTRUCT MANHOLE	1.000 EACH	.		.	
0078	4016.00 MANHOLE AT STA. 1180+82 LT.	1.000 EACH	.		.	
0079	4016.01 MANHOLE AT STA. 101+29 RT.	1.000 EACH	.		.	
0080	4016.02 MANHOLE AT STA. 104+40 RT.	1.000 EACH	.		.	
0081	4016.03 MANHOLE AT STA. 107+40 RT.	1.000 EACH	.		.	
0082	4018.00 TAPPING EXISTING STRUCTURE	4.000 EACH	.		.	
0083	4035.00 REMOVE FLARED-END SECTION	13.000 EACH	.		.	
0084	4043.50 REMOVE SEWER PIPE	1271.000 LF	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0085	4105.59 CLASS 47B-3000 CONCRETE FOR INLET AND JUNCTION BOX	116.300 CY	.		.	
0086	4107.07 CLASS 47B-3000 CONCRETE FOR CONCRETE COLLARS	10.460 CY	.		.	
0087	4130.06 CLASS 47B-3000 CONCRETE FOR PIPE CULVERT PLUG	0.280 CY	.		.	
0088	4155.50 REINFORCING STEEL FOR INLET AND JUNCTION BOX	10770.000 LB	.		.	
0089	4157.00 REINFORCING STEEL FOR COLLARS	824.000 LB	.		.	
0090	4310.18 18" FLARED-END SECTION	5.000 EACH	.		.	
0091	4310.36 36" FLARED-END SECTION	1.000 EACH	.		.	
0092	4360.18 18" METAL FLARED-END SECTION	13.000 EACH	.		.	
0093	4360.36 36" METAL FLARED-END SECTION	1.000 EACH	.		.	
0094	4460.18 18" CONCRETE FLARED-END SECTION	2.000 EACH	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0095	4460.24 24" CONCRETE FLARED-END SECTION	2.000 EACH	.		.	
0096	4460.36 36" CONCRETE FLARED-END SECTION	1.000 EACH	.		.	
0097	4460.48 48" CONCRETE FLARED-END SECTION	1.000 EACH	.		.	
0098	P120.24 24" CULVERT PIPE, TYPE 2	20.000 LF	.		.	
0099	P369.18 18" SLOTTED CULVERT PIPE, TYPE 3,4 OR 5	287.000 LF	.		.	
0100	P700.18 18" STORM SEWER PIPE, TYPE 1,7 OR 8	818.000 LF	.		.	
0101	P700.30 30" STORM SEWER PIPE, TYPE 1,7 OR 8	911.000 LF	.		.	
0102	P700.36 36" STORM SEWER PIPE, TYPE 1,7 OR 8	655.000 LF	.		.	
0103	P702.18 18" STORM SEWER PIPE, TYPE 1	281.000 LF	.		.	
0104	P702.24 24" STORM SEWER PIPE, TYPE 1	12.000 LF	.		.	

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0105	P702.30 30" STORM SEWER PIPE, TYPE 1	34.000 LF	.		.	
0106	P702.36 36" STORM SEWER PIPE, TYPE 1	24.000 LF	.		.	
0107	P702.48 48" STORM SEWER PIPE, TYPE 1	30.000 LF	.		.	
0108	P704.18 18" STORM SEWER PIPE, TYPE 3,4,5 OR 6	697.000 LF	.		.	
0109	P704.36 36" STORM SEWER PIPE, TYPE 3,4,5 OR 6	168.000 LF	.		.	
	SECTION 0004 TOTAL				.	

SECTION 0005 GROUP 6 BRIDGE AT STA. 1200+17.28 LT.  
181' 3 SPANS CONTINUOUS ROLLED BEAM GIRDER BRIDGE, WIDENING

0110	0030.60 MOBILIZATION	LUMP	LUMP		.	
0111	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	90.500 CY	.		.	
0112	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	10365.000 LB	.		.	

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CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0113	6000.10 ABUTMENT NO.1 EXCAVATION	LUMP	LUMP			.
0114	6000.11 ABUTMENT NO.2 EXCAVATION	LUMP	LUMP			.
0115	6000.20 PIER NO.1 EXCAVATION	LUMP	LUMP			.
0116	6000.21 PIER NO.2 EXCAVATION	LUMP	LUMP			.
0117	6005.33 PREFORMED EXPANSION JOINT, TYPE B	202.800 LF		.		.
0118	6005.83 FIXED BEARING	2.000 EACH		.		.
0119	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	74.800 CY		.		.
0120	6010.26 CLASS 47BD-4000 CONCRETE FOR BRIDGE	98.100 CY		.		.
0121	6016.20 MULTI-LAYER EPOXY POLYMER OVERLAY	3009.000 SY		.		.
0122	6030.00 PREPARATION OF BRIDGE AT STATION 1200+17.28 LT.	1.000 EACH		.		.

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OTHERS

CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0123	6071.12 STEEL SUPERSTRUCTURE AT STATION 1200+17.28 LT.	LUMP	LUMP			.
0124	6100.00 FLOOR DRAINS	1.000 EACH		.		.
0125	6107.00 CONCRETE SLOPE PROTECTION	279.000 SY		.		.
0126	6131.23 PENETRATING CONCRETE SEALER	3083.000 SF		.		.
0127	6131.50 EPOXY COATED REINFORCING STEEL	36610.000 LB		.		.
0128	6139.50 SUBSURFACE DRAINAGE MATTING	25.000 SY		.		.
0129	6210.14 HP 12 INCH X 53 LB STEEL PILING	1060.000 LF		.		.
0130	6601.15 1 1/2" CONDUIT IN BRIDGE	269.000 LF		.		.
0131	8091.00 GRANULAR BACKFILL	60.000 CY		.		.
	SECTION 0005 TOTAL					.

SECTION 0006 GROUP 6A BRIDGE AT STA. 1241+04.53 LT.  
201' 2.5" 4 SPANS ROLLED BEAM GIRDER BRIDGE WIDENING

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S-80-9(1188)  
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CALL ORDER NO. : 200

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0132	0030.60 MOBILIZATION	LUMP	LUMP			.
0133	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	523.700 CY	.		.	.
0134	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	99360.000 LB	.		.	.
0135	6000.10 ABUTMENT NO.1 EXCAVATION	LUMP	LUMP			.
0136	6000.11 ABUTMENT NO.2 EXCAVATION	LUMP	LUMP			.
0137	6000.20 PIER NO.1 EXCAVATION	LUMP	LUMP			.
0138	6000.21 PIER NO.2 EXCAVATION	LUMP	LUMP			.
0139	6000.22 PIER NO.3 EXCAVATION	LUMP	LUMP			.
0140	6005.32 PREFORMED EXPANSION JOINT, TYPE A	243.500 LF	.		.	.
0141	6005.78 EXPANSION BEARING, TFE TYPE	8.000 EACH	.		.	.

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0142	6005.83 FIXED BEARING	2.000 EACH	.		.	
0143	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	214.600 CY	.		.	
0144	6010.26 CLASS 47BD-4000 CONCRETE FOR BRIDGE	186.700 CY	.		.	
0145	6016.20 MULTI-LAYER EPOXY POLYMER OVERLAY	3835.000 SY	.		.	
0146	6030.00 PREPARATION OF BRIDGE AT STATION 1241+04.53	1.000 EACH	.		.	
0147	6071.12 STEEL SUPERSTRUCTURE AT STATION 1241+04.53	LUMP	LUMP		.	
0148	6107.00 CONCRETE SLOPE PROTECTION	335.000 SY	.		.	
0149	6131.23 PENETRATING CONCRETE SEALER	6828.000 SF	.		.	
0150	6131.50 EPOXY COATED REINFORCING STEEL	84645.000 LB	.		.	
0151	6139.50 SUBSURFACE DRAINAGE MATTING	82.000 SY	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0152	6210.14 HP 12 INCH X 53 LB STEEL PILING	4320.000 LF	.		.	
0153	6601.15 1 1/2" CONDUIT IN BRIDGE	303.000 LF	.		.	
0154	8091.00 GRANULAR BACKFILL	535.000 CY	.		.	
	SECTION 0006 TOTAL				.	

SECTION 0007 GROUP 6B BRIDGE AT STA. 1295+80.87 LT.  
128'2.5" SINGLE SPAN WELDED PLATE GIRDER BRIDGE WIDENING

0155	0030.60 MOBILIZATION	LUMP	LUMP		.	
0156	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	305.300 CY	.		.	
0157	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	53845.000 LB	.		.	
0158	6000.10 ABUTMENT NO.1 EXCAVATION	LUMP	LUMP		.	
0159	6000.11 ABUTMENT NO.2 EXCAVATION	LUMP	LUMP		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0160	6005.33 PREFORMED EXPANSION JOINT, TYPE B	199.000 LF	.		.	
0161	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	118.900 CY	.		.	
0162	6010.26 CLASS 47BD-4000 CONCRETE FOR BRIDGE	125.700 CY	.		.	
0163	6016.20 MULTI-LAYER EPOXY POLYMER OVERLAY	955.000 SY	.		.	
0164	6030.00 PREPARATION OF BRIDGE AT STATION 1295+80.87 LT.	1.000 EACH	.		.	
0165	6071.12 STEEL SUPERSTRUCTURE AT STATION 1295+80.87 LT.	LUMP	LUMP		.	
0166	6107.00 CONCRETE SLOPE PROTECTION	59.000 SY	.		.	
0167	6131.50 EPOXY COATED REINFORCING STEEL	43890.000 LB	.		.	
0168	6139.50 SUBSURFACE DRAINAGE MATTING	39.000 SY	.		.	
0169	6210.14 HP 12 INCH X 53 LB STEEL PILING	2850.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0170	6510.55 TEMPORARY BRIDGE SHORING	LUMP	LUMP			.
0171	8091.00 GRANULAR BACKFILL	200.000 CY				.
	SECTION 0007 TOTAL					.

SECTION 0008 GROUP 7 GUARDRAIL

0172	0030.70 MOBILIZATION	LUMP	LUMP			.
0173	7011.20 W-BEAM GUARDRAIL	1731.250 LF				.
0174	7019.50 IMPACT ATTENUATOR	1.000 EACH				.
0175	7020.00 BRIDGE APPROACH SECTIONS	4.000 EACH				.
0176	7022.00 END ANCHORAGE ASSEMBLY	2.000 EACH				.
0177	7024.25 GUARDRAIL END TREATMENT, TYPE I	4.000 EACH				.
	SECTION 0008 TOTAL					.

SECTION 0009 GROUP 7B FENCE

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0178	0030.71 MOBILIZATION	LUMP	LUMP			.
0179	7110.05 5 FOOT CHAIN-LINK FENCE	140.000 LF	.		.	.
0180	7115.05 END POST FOR 5 FOOT CHAIN-LINK FENCE	2.000 EACH	.		.	.
	SECTION 0009 TOTAL					.

SECTION 0010 GROUP 8B ELECTRICAL

0181	0030.81 MOBILIZATION	LUMP	LUMP			.
0182	7319.90 INSTALL DYNAMIC MESSAGE SIGN	1.000 EACH	.		.	.
0183	7319.95 REMOVE DYNAMIC MESSAGE SIGN SYSTEM	1.000 EACH	.		.	.
0184	A001.01 PULL BOX, TYPE PB-1	1.000 EACH	.		.	.
0185	A001.05 PULL BOX, TYPE PB-2	2.000 EACH	.		.	.

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0186	A010.60 UNDERDECK LUMINAIRE, TYPE UD-100	2.000 EACH	.		.	
0187	A070.10 1 1/2-INCH CONDUIT IN TRENCH	10425.000 LF	.		.	
0188	A070.14 2-INCH CONDUIT IN TRENCH	188.000 LF	.		.	
0189	A070.18 3-INCH CONDUIT IN TRENCH	175.000 LF	.		.	
0190	A072.10 1 1/2-INCH CONDUIT UNDER ROADWAY	375.000 LF	.		.	
0191	A079.32 #6 AWG CU CONDUCTOR	1050.000 LF	.		.	
0192	A079.43 #8 GROUNDING CONDUCTOR	175.000 LF	.		.	
0193	A080.10 STREET LIGHTING CABLE, NO. 2 USE	2970.000 LF	.		.	
0194	A080.22 STREET LIGHTING CABLE, NO. 6 BARE	12835.000 LF	.		.	
0195	A080.24 STREET LIGHTING CABLE, NO. 6 USE	22160.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0196	A081.00 6 PAIR COMMUNICATION CABLE	188.000 LF	.		.	
0197	A600.00 REMOVE LIGHTING UNIT	1.000 EACH	.		.	
0198	A630.20 REMOVE PULL BOX	7.000 EACH	.		.	
0199	A679.56 REMOVE SERVICE CABLE	1318.000 LF	.		.	
0200	A699.90 REMOVE CONCRETE PAD	1.000 EACH	.		.	
0201	A699.91 REMOVE AND REINSTALL UNDERDECK LUMINAIRE	2.000 EACH	.		.	
0202	A699.98 REMOVE CONDUIT	869.000 LF	.		.	
0203	A700.20 RELOCATE STREET LIGHTING UNIT TYPE A	4.000 EACH	.		.	
0204	A700.21 RELOCATE STREET LIGHTING UNIT TYPE B	60.000 EACH	.		.	
0205	A700.22 RELOCATE STREET LIGHTING UNIT TYPE C	1.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0206	A700.23 RELOCATE STREET LIGHTING UNIT TYPE D	4.000 EACH	.		.	
0207	A700.24 RELOCATE STREET LIGHTING UNIT TYPE E	3.000 EACH	.		.	
0208	A706.00 RELOCATE PULL BOX TYPE PB-5	5.000 EACH	.		.	
0209	A706.01 RELOCATE PULL BOX TYPE PB-2	7.000 EACH	.		.	
	SECTION 0010 TOTAL				.	

SECTION 0011 GROUP 8C SIGNING

0210	0030.82 MOBILIZATION	LUMP	LUMP			.
0211	7308.00 REMOVE SIGN, STRUCTURE, AND FOUNDATION	5.000 EACH	.		.	
0212	7311.00 CONCRETE FOR FOUNDATION	79.000 CY	.		.	
0213	7311.10 REINFORCING STEEL	5500.000 LB	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0214	7311.20 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO.15	1.000 EACH	.		.	
0215	7311.21 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO.16	1.000 EACH	.		.	
0216	7311.22 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO.17	1.000 EACH	.		.	
0217	7311.23 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO.18	1.000 EACH	.		.	
0218	7311.24 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO.20	1.000 EACH	.		.	
0219	7312.00 OVERHEAD SIGN SUPPORT, LOCATION NO.15	1.000 EACH	.		.	
0220	7312.01 OVERHEAD SIGN SUPPORT, LOCATION NO.16	1.000 EACH	.		.	
0221	7312.02 OVERHEAD SIGN SUPPORT, LOCATION NO.17	1.000 EACH	.		.	
0222	7312.03 OVERHEAD SIGN SUPPORT, LOCATION NO.18	1.000 EACH	.		.	
0223	7312.04 OVERHEAD SIGN SUPPORT, LOCATION NO.20	1.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0224	7312.05 OVERHEAD SIGN SUPPORT, LOCATION NO.22	1.000 EACH	.		.	
0225	7312.06 OVERHEAD SIGN SUPPORT, LOCATION NO. 23	1.000 EACH	.		.	
0226	7312.07 OVERHEAD SIGN SUPPORT, LOCATION NO. 24	1.000 EACH	.		.	
0227	7312.08 OVERHEAD SIGN SUPPORT, LOCATION NO. 26	1.000 EACH	.		.	
0228	7322.05 INSTALL TYPE B SIGN	105.000 SF	.		.	
0229	7323.00 TYPE C SIGN	1600.000 SF	.		.	
0230	7340.00 STRUCTURAL STEEL FOR SIGN SUPPORTS	1500.000 LB	.		.	
0231	7360.24 24" SIGN SUPPORT FOOTING	4.000 EACH	.		.	
0232	7360.36 36" SIGN SUPPORT FOOTING	2.000 EACH	.		.	
0233	7390.10 REMOVE SIGN, POST, AND FOOTING	3.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0234	A600.50 REMOVE LUMINAIRE	7.000 EACH	.		.	
	SECTION 0011 TOTAL					

SECTION 0012 GROUP 10 GENERAL ITEMS

0235	0001.08 BARRICADE, TYPE II	62530.000 BDAY	0.50000		31265.00	
0236	0001.10 BARRICADE, TYPE III	4090.000 BDAY	.		.	
0237	0001.75 TEMPORARY SIGN DAY	2000.000 EACH	.		.	
0238	0001.90 SIGN DAY	35180.000 EACH	.		.	
0239	0001.99 CONTRACTOR FURNISHED SIGN DAY	440.000 EACH	.		.	
0240	0002.18 4" WHITE REMOVABLE WET REFLECTIVE TAPE, TYPE 4 TYPE 4	34600.000 LF	.		.	
0241	0002.19 4" YELLOW REMOVABLE WET REFLECTIVE TAPE, TYPE 4 TYPE 4	2900.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0242	0002.28 TEMPORARY PAVEMENT MARKING REMOVAL	97000.000 LF	.		.	
0243	0002.30 PAVEMENT MARKING REMOVAL	34000.000 LF	.		.	
0244	0002.44 TEMPORARY PAVEMENT MARKING, TYPE PAINT	76000.000 LF	.		.	
0245	0002.47 TEMPORARY PAVEMENT MARKING SURFACE PREPARATION	76000.000 LF	.		.	
0246	0002.97 FLASHING ARROW PANEL	330.000 DAY	.		.	
0247	0003.10 FLAGGING	50.000 DAY	.		.	
0248	0003.51 INSTALL CONCRETE PROTECTION BARRIER	15900.000 LF	.		.	
0249	0003.56 RELOCATE CONCRETE PROTECTION BARRIER	10650.000 LF	.		.	
0250	0003.57 RELOCATE INERTIAL BARRIER SYSTEM	15.000 EACH	.		.	
0251	0003.58 INERTIAL BARRIER SYSTEM	10.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0252	0003.64 REPLACEMENT MODULE	28.000 EACH	.		.	
0253	0005.10 TRAFFIC CONTROL MANAGEMENT	390.000 DAY	.		.	
0254	0010.04 FIELD OFFICE	1.000 EACH	.		.	
0255	0030.00 MOBILIZATION	LUMP		LUMP		.
0256	9110.01 RENTAL OF LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0257	9110.03 RENTAL OF DUMP TRUCK, FULLY OPERATED	50.000 HOUR	.		.	
0258	9110.07 RENTAL OF SKID LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0259	9110.27 RENTAL OF CRAWLER MOUNTED HYDRAULIC EXCAVATOR, FULLY OPERATED	50.000 HOUR	.		.	
0260	L022.75 TEMPORARY SILT CHECK	1000.000 LF	.		.	
0261	L022.90 TEMPORARY SILT FENCE	1000.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0262	L022.92 TEMPORARY EARTH CHECK	500.000 LF	.		.	
0263	L032.70 TEMPORARY MULCH	4.000 TON	.		.	
	SECTION 0012 TOTAL				.	
	TOTAL BID				.	