

**Division S  
Special Provisions**

**Vine Hill Road Bridge Construction  
S.A.P. 098-594-002 & S.A.P. 027-597-008**

**City of Deephaven, Minnesota**

I hereby certify that the Special Provisions contained in Division "S" of this Proposal were prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

  
\_\_\_\_\_  
Kenneth Adolf, P.E.

Date: 11-1-13 License No. 12040

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S-2.8 An “All Risk” Builders’ Risk Policy for physical loss or damage to the project while performing work under the Contract including materials and equipment on and off site and in transit if intended to become a part of the work. The policy shall cover “ensuing loss” from any design defect. The policy shall name the County as an additional insured.

Policy Limits: (Amount of Project)

S-2.9 All insurance required above shall meet the Additional Conditions of 1714, section D, hereof.

S-2.10 The above subparagraphs establish minimum insurance requirements. It is the sole responsibility of the Contractor to determine the need for and to procure additional insurance which may be needed in connection with this Contract. Copies of insurance policies shall be submitted to the County upon written request. County reserves the right to require Contractor to obtain additional insurance coverage and endorsements at County’s sole discretion and expense, according to the nature and location of work to be performed by Contractor.

Notwithstanding any other provision of this Agreement to the contrary, no officer, employee or agent of the County is authorized to cause, suffer, or permit the Contractor or any of its employees, guests, agents, subcontractors, or suppliers to commence or perform any work or otherwise enter upon the project site unless and until all of the conditions of this Article have been conformed to and performed.

If Contractor shall fail to certify required insurance coverage to the County as set forth above, before commencing work hereunder, the County may, at its option and without waiving any rights under this Contract, place insurance of the character, nature and limits described above to cover the operations of the Contractor, paying the premiums for the same and charging same to the Contractor.

The County by requiring the foregoing minimum insurance coverages will not be deemed to limit any of the other obligations or liabilities of the Contractor. Contractor shall be responsible to pay the full amount of any deductibles or self-insured portions of any coverage.

The failure of the County to obtain certificates of insurance for the policies or renewals thereof or failure of the insurance company to notify the County of the cancellation of policies required under this Contract shall not constitute a waiver by the County of the Contractor’s requirement to provide such insurance

Contractor shall submit to County, within three (3) days, copies of all reports arising out of any injuries to its employees or those of any firm or individual to whom it may have sublet work, or any property damages arising or alleged to have arisen on account of any work done by Contractor under the Contract Documents.

S-2.11 The Contractor shall maintain insurance with these provisions:

1. Except as to Workers' Compensation, Employers' Liability and Professional Errors & Omissions insurance, County shall be named as an additional insured on all liability policies. The County as an additional insured shall have all the rights, coverages, and limits afforded the Contractor under the policies. In the event that any insurer issues a reservation of rights for County as an additional insured, County shall be entitled to employ independent counsel at Contractor's expense.
2. For all insurance policies required or referenced in this agreement, Contractor agrees to waive and shall require all Contractors of every tier to waive all subrogation rights on behalf of itself and its insurers (or in the alternative to secure the waiver of subrogation from its insurers) against County and all of County's employees and agents, and Hennepin County Regional Rail Authority.
3. That Contractor's insurance is primary and any insurance maintained by County is considered excess and non-contributory.
4. Cross liability or severability of interest clause (liability policies only).
5. Liability insurance policies (except for professional errors and omissions) must be an occurrence policy form, and not a claims-made type of policy.
6. It shall be considered a material breach of this contract if at any time before, during or after completion of the project as required in this agreement for Contractor or any of its subcontractor's insurance to be cancelled, non-renewed, reduced in coverage below that required in this agreement, or an insurance carrier rating is reduced below an A- as rated by A.M. Best and Contractor has not obtained qualifying alternative insurance from an approved carrier.

S-2.12 The Contractor shall not commence work until it has obtained required insurance and filed with the County a properly executed Certificate of Insurance which clearly evidences the required insurance coverages. The certificate shall name Hennepin County as the certificate holder, and shall also name Hennepin County, Hennepin County Regional Rail Authority, the City of Deephaven, and Three Rivers Park District as additional insured(s) for the required liability insurance coverages, (except for Workers' Compensation, Employers' Liability and Professional Errors & Omissions) with respect to operations covered under the Contract. The certificate should also show that Hennepin County will receive 30 days prior written notice in the event of cancellation, non-renewal, or material change in any described policies.

The Contractor shall furnish to the County updated certificates during the term of the Contract as insurance policies expire. If the Contractor fails to furnish proof of insurance coverage, the County may withhold payments and/or pursue any



other right or remedy allowed under the Contract, law, equity, and/or statute.

**S-2.13 REMOVAL OF LIENS**

Any liens filed on a project which are not promptly removed constitute a default. To remove a lien the Contractor is required to post a bond, deposit money, or meet any other statutory requirement.

**S-2.14 PARTIAL OCCUPATION BY OWNER**

Whenever it may be useful or necessary, Contractor or County shall be permitted to occupy and use any portion of the work which has been either partially or fully completed by Contractor before final inspection and acceptance there by County, but such use or occupation shall not relieve Contractor of its guarantee of said work and materials nor of its obligation to make good at its own expense any defect in materials and workmanship which may occur or develop prior to Contractor's release from responsibility to the County.

**S-2.15 RIGHT TO AUDIT**

As to all work which the Contractor may perform on a reimbursable basis or for which Contractor makes a claim for additional compensation or for which a claim is asserted by any third party or injured person County will have the right at all reasonable times and places, to inspect, copy and audit any of Contractor's books, accounts, time cards, records of transactions, estimates, schedules, correspondence or any other records or documents which may have a possible bearing on the performance of such work of claim.

Further right of examination for all of Contractor's work will include inspection at all reasonable times of the Contractor's plant, or such parts thereof as may be engaged in the performance of the contract. All accounts, documents and records relevant to this contract will be retained by the Contractor for three years after completion of the work, unless a longer period is required by law.

**S-2.16 PRESERVATION OF EVIDENCE**

Contractor should be required to give County notice as soon as any type of accident, incident, or claim is asserted against Contractor or Owner and to preserve all evidence and to allow County the opportunity to fully investigate all incidents prior to any evidence being moved, altered, covered up or destroyed in any manner.

**S-2.17 CONTRACT OBLICATIONS TO SURVIVE PERFORMANCE**

Obligations, including but not limited to, construction defect claims, personal injury claims, warranty claims and maintaining insurance, of the Contractor shall continue in place and shall survive as long as any contractual obligation exists.

**S-3            EMERALD ASH BORER COMPLIANCE**

This Project is located, all or in part, in a county that the Minnesota Department of Agriculture has placed under an Emerald Ash Borer Quarantine. Any work for this Contract is subject to the following:

- S-3.1        **No part of an Ash (*Fraxinus* spp) tree from a quarantined area can be marketed to wood-using industries or individuals without an Emerald Ash Borer compliance agreement with Minnesota Department of Agriculture.**
- S-3.2        **The Contractor shall not make ash or any non-coniferous (hardwood) species with bark attached available to the public for use as firewood from the quarantined area. The Contractor shall not transport entire ash trees, limbs, branches, logs, chips, ash lumber with bark, stumps and roots outside of a quarantined county without fulfilling the requirements of an Emerald Ash Borer Compliance Agreement with the Minnesota Department of Agriculture. Contact the Minnesota Department of Agriculture at 1-888-545-6684 or visit the Emerald Ash Borer website at: <http://www.mda.state.mn.us/plants/pestmanagement/eab.aspx> to find out which counties are quarantined.**
- S-3.3        **If the ash material is going to be shipped out of Minnesota, the Contractor shall contact [John.o.haanstad@aphis.usda.gov](mailto:John.o.haanstad@aphis.usda.gov) for United States Department of Agriculture joint Emerald Ash Borer Compliance Agreement approval with the Minnesota Department of Agriculture.**
- S-3.4        **The Contractor shall dispose of ash trees:
  - (1)        In accordance with the Emerald Ash Borer Compliance Agreement, and
  - (2)        By utilizing the ash wood chips within the construction limits for erosion control, construction exit pads or landscaping purposes.**
- S-3.5        **No direct compensation will be made for compliance with these requirements.**

**S-4            USE OF ADHESIVE ANCHORS**

The use of adhesive anchors in sustained tension is prohibited. Other application utilizing adhesive anchors, such as metal rail attachment, in a non-direct tensile application is permitted.

**S-5            (1103) DEFINITIONS**

The provisions of MnDOT 1103 are supplemented and/or modified with the following:

**S-5.1        INCIDENTAL COST OR EXPENSE**

The cost of work included in the awarded contract price and for which no direct compensation shall be made. When such term is stated in any part of the Contract documents it shall be deemed to mean: at no additional cost to the County.

**S-6            (1206) PREPARATION OF PROPOSAL**

The provisions of MnDOT 1206 are supplemented and/or modified with the following:

S-6.1            The first paragraph of MnDOT 1206.2 is hereby changed to read:

The bidder's attention is directed to MN Statute § 161.32 subd. 1c, which provides among other things, that a bid will be rejected if it contains any alterations or erasures that are not corrected as follows:

S-6.2            Delete 1206.3 and replace as follows:

**1206.3    ALLOWABLE SUBSTITUTIONS**

All bids shall utilize the County's electronic bidding process on BidVault (<https://bidvault.mn.uccs.com>) in accordance with Hennepin County Transportation Department's "Guide to Bidding County Road and Bridge Projects" booklet on the County's website under 'Business', 'Contract Opportunities', 'Road and Bridge Project Documentation Access', then 'Hennepin County Guide to Bidding'.

A hard copy of the Proposal and the Bidlet Schedule of Prices shall not be accepted or used.

**S-7            (1208) PROPOSAL GUARANTY**

The last sentence of MnDOT1208 is hereby revised to read as follows:

Bonds shall be conditions on the execution of the Contract, Performance Bond, Payment Bond, and prescribed Non-collusion Affidavit and on the submittal and approval of an Affirmative Action Plan; when the submittal of one is required. The penal sum of a bid bond shall be expressed either as a lump sum or as a percentage of the total amount of the bid.

**S-8            (1209) DELIVERY OF PROPOSALS**

The provisions of MnDOT 1209 are hereby deleted and replaced with the following:

Electronic bidding shall be used in accordance with requirements of the bidVAULT website (<https://bidvault.mn.uccs.com/>) as well as Divisions "A" and "S" of this Proposal. In addition to submitting the bid electronically through bidVAULT, there are several items required for bid submittal:

1. The following documents in this Proposal shall be filled out, signed, and submitted prior to bid opening:
  - a) Title sheet of Proposal
  - b) Proposal Form (Page 1 of 2 and Page 2 of 2)
  - c) Non-Collusion Declaration

These documents shall be submitted using one of the following methods:

- Submit the signed original documents to Hennepin County Purchasing and Contract Services, A-1730 Government Center, 300 South 6th Street, Minneapolis, Minnesota 55487-0175. They must be received in the Purchasing office prior to the bid opening time and date and bear the inscription “BID FOR: Vine Hill Road Bridge Reconstruction; C.P. 2121000”;
  - or Email copies of the signed documents prior to the bid opening time and date. The copies shall be emailed to [BIDVAULT@CO.HENNEPIN.MN.US](mailto:BIDVAULT@CO.HENNEPIN.MN.US) with the subject line “Required Submittals for CP 2121000” and the originals must be received in the Purchasing office within three (3) days after bid opening.
2. Bid bond shall be submitted using one of the following means:
- a) Submit an electronic bid bond with your electronic bid for this project using Surety 2000 or InSure Vision; or
  - b) Submit the original paper bid bond or certified check. It must be received in the Purchasing office prior to the bid opening time and date; or
  - c) Email a copy of your original paper bid bond or certified check prior to the bid opening time and date. The copy must be emailed to [BIDVAULT@CO.HENNEPIN.MN.US](mailto:BIDVAULT@CO.HENNEPIN.MN.US), and, your original signed bid security must be received in the Purchasing office within three (3) days after bid opening.
3. Each bidder shall acknowledge receipt of each Addendum by using bidVAULT (electronic bid) prior to the time set for opening Proposals.

**S-9**

**(1210) WITHDRAWAL OR REVISION OF PROPOSALS**

The provisions of MnDOT 1210 are hereby deleted and replaced with the following:

Any bidder may withdraw or revise its Proposal after it has been deposited with the Contracting Authority, provided the request for withdrawal or revision is received in writing before the time set for opening proposals.

The County reserves the right to revise the Plans, Specifications, Special Provisions, and Proposal form for any Project at any time prior to the date set for opening the Proposals. Revisions will be made by Addendum, duly numbered and dated, subject to the following provisions:

- (1) Each Addendum will be delivered via the eGram website unless the Contractor notifies the Hennepin County Purchasing office in writing to receive notification by certified mail, email, courier service (using contractor's account number), or fax.
- (2) If revisions made by an Addendum require considerable change or reconsideration on the part of the bidder, the date set for opening the Proposals may be postponed, in which case the Addendum will include an announcement of the new date set for opening Proposals.
- (3) Each bidder shall acknowledge receipt of each Addendum by using BidVault (electronic bid) or by submitting a letter prior to the time set for opening Proposals.

**S-10**            **(1212) PUBLIC OPENING OF PROPOSALS**

The provisions of MnDOT 1212 are hereby deleted and replaced with the following:

Proposals will be opened at the time indicated in the Advertisement for Bids.

**S-11**            **(1302) AWARD OF CONTRACT**

The award of this Contract will be in accordance with the provisions of MnDOT 1302, and the following modifications:

The first sentence of the first paragraph is hereby deleted and the following substituted therefore:

The Award of Contract, if it be awarded, will be made within 60 calendar days after the opening of proposals to the lowest responsible bidder who complies with all prescribed requirements.

**S-12**            **(1305) REQUIREMENT OF CONTRACT BOND**

The provisions of MnDOT 1305 are hereby deleted and replaced with the following:

At the time of the execution of the Contract, the successful bidder shall furnish both a performance bond and a payment bond. Each bond shall list the address of the successful bidder and of the surety, shall be written for the full amount of the contract price, and shall be written on a form prepared and required by Hennepin County. The sureties on the bonds shall be acceptable to Hennepin County.

**S-13**            **(1306) EXECUTION AND APPROVAL OF CONTRACT**

The provisions of MnDOT 1306 are hereby amended as follows:

- (a) In the first, second and third paragraphs, substitute "performance and payment bonds" for "Contract Bond" and "Bond"; and
- (b) Add the following as a new paragraph:

Before beginning work on the contract, the successful bidder must file both bonds with the treasurer of Hennepin County.

**S-14**            **(1307) FAILURE TO EXECUTE CONTRACT**

The provisions of MnDOT 1307 are hereby modified by substituting the words, "acceptable performance and payment bonds" for the words "an acceptable bond".

**S-15**            **(1402) ALTERATIONS OF THE WORK AND CHANGED CONDITION**

The provisions of MnDOT 1402 are hereby supplemented by the following:

**S-15.1**         The following is added to MnDOT 1402.2:

In 1402.2A, "Differing Site Conditions," 1402.2B, "Suspensions of Work Ordered by the Engineer," and 1402.2C, "Significant Changes to the Character of the Work," the term "adjustment" means compensation in accordance with 1904, "Extra and Force Account Work," 1905, "Elimination of Work," 1907, "Payment for Surplus Material." and the granting of a time extension in accordance with 1806, "Determination and Extension of Contract Time."

**S-16**            **(1404) MAINTENANCE OF TRAFFIC AND (2563) TRAFFIC CONTROL**

**S-16.1**         All traffic control devices shall conform and be installed in accordance to the "Minnesota Manual on Uniform Traffic Control Devices" (MN MUTCD) and Part 6, "Field Manual for Temporary Traffic Control Zone Layouts", the "Guide to Establishing Speed Limits in Highway Work Zones", the Minnesota Flagging Handbook, the provisions of MnDOT 1404 and 1710, the Minnesota Standard Signs Manual, the Traffic Engineering Manual, the Traffic Control Layouts/Typical Traffic Control Layouts in the Plans, and these Special Provisions.

The Contractor shall furnish, install, maintain, and remove all traffic control devices required to provide safe movement of vehicular traffic through the Project during the life of the Contract from the start of Contract operations to the final completion thereof. The Engineer will have the right to modify the requirements for traffic control as deemed necessary due to existing field conditions. The highways shall be kept open to traffic at all times, except as modified on the Staging and Traffic Control plans.

Traffic control devices include, but are not limited to, barricades, warning signs, trailers, flashers, cones, and drums, as required and sufficient barricade weights to maintain barricade stability.

**S-16.2**         **TRAFFIC CONTROL**

(A) The Contractor shall be responsible for the immediate repair or replacement of all traffic control devices that become damaged, moved or destroyed, of all lights that cease to function properly, and of all barricade weights that are damaged, destroyed, or otherwise fail to stabilize the barricades. The

Contractor shall further provide sufficient surveillance of all traffic control devices at least once every 24 hours.

The Contractor shall furnish the Engineer names, addresses and phone numbers of at least two (2) local persons responsible for all traffic control devices.

- (B) If traffic control layouts are not present in the Plan, or the Contractor modifies the layout or sequence from the Plan, the Contractor shall submit the proposed traffic control layout to the Engineer, for approval, at least fourteen (14) days prior to the start of construction. At least 24 hours prior to placement, all traffic control devices shall be available on the Project for inspection by the Engineer. The Contractor shall modify his/her proposed traffic control layout and/or devices as deemed necessary by the Engineer.
- (C) The Contractor shall notify the Engineer in writing at least 72 hours prior to the start of any construction operation that will necessitate lane closure or internal traffic control signing.
- (D) The Contractor shall inspect, on a daily basis, all traffic control devices, which the Contractor has furnished and installed, and verify that the devices are placed in accordance with **the Traffic Control Layouts**, these Special Provisions, and/or the MN MUTCD. Any discrepancy between the placement and the required placement shall be immediately corrected.

The Contractor shall be required to respond immediately to any call from the Engineer or his designated representative concerning any request for improving or correcting traffic control devices. **If the Contractor is negligent in correcting the deficiency within one hour of notification the Contractor shall be subject to an hourly charge assessed at a rate of \$250.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

- (E) The person performing the inspection in paragraph (D) above, shall be required to make a daily log. This log shall also include the date and time any changes in the stages, phases, or portions thereof go into effect. The log shall identify the location and verify that the devices are placed as directed or corrected in accordance with the Plan. All entries in the log shall include the date and time of the entry and be signed by the person making the inspection. The Engineer reserves the right to request copies of the logs as he deems necessary.

The Contractor shall be required to provide copies of the inspection logs, within the time frame agreed upon, when requested by the Engineer. **If the Contractor is negligent in providing the inspection logs within the time frame agreed upon, the Contractor shall be subject to an hourly charge assessed at a rate of \$500.00 per hour for each hour or any portion**

**thereof with which the Engineer determines that the Contractor has not complied.**

- (F) The third sentence of paragraph 2 in MnDOT 1404.7 (Winter Suspension) is hereby revised as follows:

"In the event that any Contractor-owned traffic control devices are damaged or destroyed making them ineffective for their intended use, the Contractor will receive payment in the amount of the value of the traffic control device as determined by the Engineer."

- (G) If, at any time, the Contractor fails to, in a timely manner, properly furnish, install, maintain or remove any of the required traffic control devices, the Department reserves the right to properly correct the deficiency. **Each time the Department takes such corrective action, the costs thereof, including mobilization, plus \$5,000 will be deducted from monies due or coming due the Contractor.**

- (H) Measurement and Payment:

Traffic Control will be measured and paid for as follows:

Payment for furnishing, installing, maintaining, relocating and subsequently removing traffic control devices (including flagpersons) as required will be made as a lump sum under Item 2563.601 (Traffic Control) and according to the following schedule:

- (1) When 5 percent of the Contract amount is earned, 50 percent of the amount bid for traffic control will be paid.
- (2) When 10 percent, or more, of the Contract amount is earned, an additional 25 percent of the amount bid for traffic control will be paid.
- (3) When 50 percent, or more, of the Contract amount is earned, an additional 20 percent of the amount bid for traffic control will be paid.
- (4) The remaining 5 percent bid for traffic control will be paid when all work has been completed and accepted.
- (5) In all items above, the original Contract amount shall be the total value of all Contract Items including the traffic control item, but the percentage earned in each case shall be exclusive of the traffic control item.

S-16.3

VEHICLE WARNING LIGHT SPECIFICATION

All Contractors', subcontractors' and suppliers' mobile equipment, operating within the limits of the Project with potential exposure to passing traffic, shall be equipped with operable warning lights which meet the appropriate requirements of the SAE specifications. This would include closed roads that are open to local



traffic only. This also includes any vehicle which enters the traveled roadway at any time. The SAE specification requirements are as follows:

360 Degree Rotating Lights - SAE Specification J845

Flashing Lights - SAE Specification J595

Flashing Strobe Lights - SAE Specification J1318

Lights shall be mounted so that at least one light is visible at all times from a height of 3.5 feet and from a 100 foot radius about the equipment. In order to meet the 360 degree at 18 m [60 foot] radius requirements supplemental lighting may be used in addition to the lights on the Approved Products List. All supplemental lights must be SAE Class 1 certified. This specification is to be used for both day and night time operations. All costs incurred to provide warning lights shall be at no cost to the Department. These warning lights shall also be operating and visible when a vehicle decelerates to enter a construction work zone and again when a vehicle leaves the work zone and enters the traveled traffic lane.

Contractor shall equip their vehicles with lights that are on the Approved Products List which can be found at:

<http://www.dot.state.mn.us/products/vehiclelighting/index.html>.

S-16.4      **FLAGGER TRAINING**

Any person acting as a flagger on this Project shall have attended a training session taught by a Contractor's qualified trainer. The Contractor's qualified trainer shall have completed a "MnDOT Flagger Train the Trainer Session" in the five years previous to the start date of this Contract and shall be on file as a qualified flagger trainer with the Department. The Flagger Trainer's name and Qualification Number shall be furnished by the Contractor at the pre-construction meeting. The Contractor shall provide all flaggers with the MnDOT Flagger Handbook and shall observe the rules and regulations contained therein. This handbook shall be in the possession of all flaggers while flagging on the Project. The Contractor shall obtain handbooks from the Department. Flaggers shall not be assigned other duties while working as authorized flaggers. The "Checklist for Flagger training" form shall be furnished to the Engineer any time a new flagger reports to work on the Project. The "Checklist for Flagger Training" form can be found at: <http://www.dot.state.mn.us/const/wzs/flagger.html>.

The Engineer will have the right to waive the above requirements.

S-16.5      **TEMPORARY LANE CLOSURE REQUIREMENTS:**

(A) Unless otherwise approved by the Engineer, any temporary lane closure that is adjacent to traffic, and is extending to or beyond **1000 feet** shall have a minimum of one Type III barricade, or 3 drums, placed in the closed lane for every **1000 feet** of extension. Any lane closure that is adjacent to traffic and in place 3 days or more, shall use the Type III barricade only.

- (B) All temporary lane closures shall have Type B Channelizers (drums, Type I or Type II barricades, vertical panel or Direction Indicator Barricades) in the lane closure taper and also in any shifts in traffic alignment.
- (C) Short Term Duration lane closures will not be permitted during inclement weather, nor any other time when, in the opinion of the Engineer, the lane closure will be a greater than normal hazard to traffic.
- (D) Temporary lane closures or other restrictions by the Contractor, during work hours and consistent with the time restrictions, will be permitted during those hours and at those locations approved by the Engineer. Requests for temporary lane closures shall be made at least 24 hours prior to such closures. When a temporary lane closure is used by the Contractor, the closure shall be incidental work and no direct compensation will be made therefore.
- (E) The Contractor shall furnish flag persons as required to adequately control traffic. Flag persons shall conform to the requirements set forth in the MN MUTCD. All costs incurred to provide such flag persons shall be incidental to the lump sum traffic control.

S-16.6

GENERAL REQUIREMENTS:

- (A) All portable sign assemblies shall be perpendicular to the ground. No traffic control device (signs, channelizing devices, arrowboards, etc.) shall be weighted so they become hazardous to motorists and workers. The approved ballast system for devices mounted on temporary portable supports is sandbags, unless it is designed, crash tested, and approved for the specific device. During freezing conditions, the sand for bags shall be mixed with a de-icer to prevent the sand from freezing. The sandbags shall be placed and maintained at the base of the traffic control device to the satisfaction of the Engineer.

When signs will remain in the same location for more than 30 consecutive days the signs shall be post mounted. This would not include portable signs which are set up and taken down at the beginning and end of each work shift. The signs must be post mounted according to the Typical Temporary Sign Framing and Installation Detail Sheet found in the Plan or in these Special Provisions.

- (B) When signs are installed, they shall be mounted on posts driven into the ground at the proper height and lateral offset as detailed in the MN MUTCD. **When signs are removed, the sign posts and stub posts shall also be removed from the Right of Way within two (2) weeks or the Contractor shall be subject to a daily charge assessed at a rate of \$100.00 per day for each day or portion thereof with which the Engineer determines that the Contractor has not complied.**
- (C) The Contractor shall be required to cover or remove all traffic control

devices which may be inconsistent with traffic patterns during all traffic switches. See Maintenance and Staging of Traffic Control.

- (D) Open excavation adjacent to the existing pavement will not be permitted on opposite sides of the roadway at the same time.
- (E) The Contractor shall provide protective devices necessary to protect traffic from excavations, drop-offs, falling objects, splatter or other hazards that may exist during construction. Equipment will not be allowed to suspend over traffic. This work shall be an incidental cost to the Contractor.
- (F) The Contractor will not be permitted to park vehicles or construction equipment so as to obstruct any traffic control device. The parking of workers' private vehicles will not be allowed within the Project limits unless so approved by the Engineer.
- (G) The Contractor will not be allowed to store materials or equipment within 10 m [30 feet] of through traffic unless approved by the Engineer. If materials or equipment must be stored within 10 m [30 feet] of through traffic, the Contractor shall provide Type B channelizers, barricades or barriers, placed near the object to warn and protect traffic.
- (H) All workers within the road Right-of-Way who are exposed to either traffic or to construction equipment shall wear reflectorized high-visibility safety apparel.

High-visibility safety apparel means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage, and at a minimum meets performance Class 2 requirements of the ANSI/ISEA 107 – 2004 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear”.

Additional Requirements: ANSI/ISEA 107-2004 Class 3 Requirements  
(Class 2 Vest with Class E Long Pants)

- Flag Persons – In addition to an ANSI Class 2 hat, vest, shirt, or jacket, flaggers shall wear high visibility Class E long pants.
- Nighttime and Low Light Conditions – All workers working at night or in low light conditions shall wear high visibility Class E long pants in addition to an ANSI Class 2 vest, shirt, or jacket.

All high visibility apparel must be worn in the manner for which it is intended to be worn. All apparel worn on the torso must be closed in the front to provide contiguous 360 degree visibility. If a workers high-visibility apparel becomes faded, worn, torn, dirty, or defaced, reducing the conspicuity of the apparel, the apparel shall be removed from service and replaced with new apparel.

The Contractor will be subject to a non-compliant charge for failure to adhere to the clothing requirements as listed above. Non-compliance charges, for each incident, **will be assessed at a rate of \$500.00 per incident** that the Engineer determines that the Contractor has not complied.

- (I) At the beginning of the Project, the Contractor shall store at least two extra Type III barricades and five extra retro reflective drums, at a convenient location within the Project limits, to be used at the discretion of the Engineer. No direct compensation will be made to the Contractor for furnishing and erecting these traffic control devices.
- (J) When work will be performed between the official hours of sunset and sunrise, all appropriate practices for night work will apply.

The Contractor shall provide sufficient numbers of light plants to adequately illuminate the work area as determined by the Engineer. All costs incurred to provide such light plants shall be incidental to the lump sum traffic control.

All Contractor's personnel, except operators who will remain in their vehicles at all times, shall wear reflectively striped (approximately **33 feet** of striping), highly visible, short sleeved one or two piece coveralls (color and striping pattern to be determined by the District Traffic Engineer), at all times while working on the Project. These coveralls shall be considered an incidental expense for which no direct compensation will be made. Any Contractor's employee found on the Project not wearing the prescribed reflective coveralls will be immediately ordered off the Project by the Engineer.

The Contractor shall provide a sufficient amount of **2 inch** wide highly reflective vehicle marking tape to be applied to Contractor vehicles and equipment, as directed by the Engineer, and as provided by the manufacturer's instructions. This tape shall be considered an incidental expense for which no direct compensation will be made and shall be on the qualified products list for conspicuity vehicle sign sheeting as found at: <http://www.dot.state.mn.us/trafficeng/qpl/Signing.pdf>. Vehicle examples to be marked with tape are Contractor rollers, paver, millers and other equipment normally found in the lane closure.

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#### **(1506) SUPERVISION BY CONTRACTOR**

The provisions of MnDOT 1506 are supplemented as follows:

At the Preconstruction Conference the Contractor shall designate in writing who the competent superintendent and competent individual (if different) will be for this Project. These persons can only be changed throughout the duration of the Project by submission of written authorization to the Engineer by the Contractor.

The submittal of these persons shall be done before any work is performed on this Project.

The Contractor will be subject to an hourly charge for failure to comply with the requirements of MnDOT 1506. Non-Compliance charges, for each incident, will be **assessed at a rate of \$100 per hour**, for each hour or portion thereof, during which the Engineer determines that the Contractor has not complied. No charge will be made if the deficiency is corrected within one (1) hour of notification.

An incident of Non-Compliance will be defined as the receipt of a written work order by the Contractor with instructions to correct a deficiency.

**S-18**                    **(1507) UTILITY PROPERTY AND SERVICE**

Construction operations in the proximity of utility properties shall be performed in accordance with the provisions of MnDOT 1507, except as modified below:

S-18.1                  The provisions of MnDOT 1507.1 B are hereby deleted and the following substituted therefore:

**Gopher State One Call**

The Contractor shall:

- (1) Mark the proposed excavation in accordance with the Minnesota State Statute 216D color code before contacting "Gopher State One Call." The Contractor shall mark proposed excavation area with white paint and white flags or in lieu of white flags, white stakes may be used. The Contractor must adhere to all requirements of Gopher State One Call in addition to the following:

The white markings must delineate the actual excavation area where the locating of underground facilities is required. All flags and stakes shall display the name, and phone number of the Contractor. All areas of proposed excavation shall be considered "practical" for the use of white markings, pursuant to Minnesota Statutes §216D.05 (2).

- (2) Call "Gopher State One Call" at least 48 hours (excluding Saturdays, Sundays, and holidays) before starting excavation operations.
- (3) The Contractor shall acquire a Positive Response confirmation from MnDOT for all proposed excavations when the Gopher State One Call has indicated MnDOT utilities may be affected. The Contractor may call MnDOT Electrical Services Section (ESS) Dispatch Locating to confirm the status of Utility infrastructure owned by MnDOT. MnDOT Electrical Services Section (ESS) Dispatch Locating can be contacted at the following phone numbers; (651) 366 -5750 or (651) 366-5751. The Contractor shall be responsible for all damage to MnDOT owned Utility infrastructure if a Positive Response confirmation has not been acquired from MnDOT. The

Contractor is required to comply with the provisions of Minnesota Statutes chapter 216D when performing Excavation as defined in Minnesota Statutes §216D.01 (subdivision 5), and will be responsible for damages to facilities in accordance with Minnesota Statutes §216D.06.

- S-18.2 If the Contractor is negligent in adhering to MnDOT 1507.1 B, he will be subject to a daily charge assessed at a rate of **\$500.00** per excavation area per day for each day or any portion thereof with which the Engineer determines that the Contractor has not complied.
- S-18.3 All utilities that relate to this Project are classified as "Level D," unless the Plans specifically state otherwise. This utility quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guidelines for the Collection and depiction of existing subsurface utility data."
- S-18.4 By bidding on this Contract, the bidder agrees that it shall use the Plan to identify the location of MnDOT drainage facilities as satisfying the requirements of Minnesota Statutes Ch. 216D and Minnesota Rules 7560.0250 with respect to MnDOT's storm water drainage facilities.
- S-18.5 The following utility owners have existing facilities that may be affected by the work under this Contract, all of which they intend where necessary to relocate or adjust in advance of or concurrently with the Contractor's operations.

CenterPoint Energy, Dean Nicholas, 612-321-5561

CenterPoint Energy will relocate two existing gas mains within the construction area. They anticipate that the existing mains can be taken out of service on April 15, 2014 based on normal temperature and gas demand. The relocated gas mains will be constructed concurrent with the bridge reconstruction project. The Contractor shall coordinate its activities with CenterPoint Energy.

Xcel Energy, Traci Miest, 952-470-3343

See <http://www.dot.state.mn.us/utility> for utility operators contact list.

- S-18.6 The State's Contractor shall coordinate his/her work and cooperate with the foregoing utility owners and their forces in a manner consistent with the provisions of MnDOT 1507 and the applicable provisions of MnDOT 1505.

**S-19 (1508) CONSTRUCTION STAKES, LINES AND GRADES**

The provisions of MnDOT 1508 are hereby modified and supplemented as follows:

Bridge construction staking will be as described in MnDOT 1508 except that the Contractor will be required to re-establish all working points needed during construction from offset points provided by the Engineer. A bench mark will be furnished in the vicinity of such substructure. The Contractor will be responsible for establishing required grade points from bench mark. The Contractor shall

assume full responsibility for all measurements made by him/her from the stakes and marks so established.

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**(1513) RESTRICTIONS ON MOVEMENT AND STORAGE OF HEAVY LOADS AND EQUIPMENT**

The Contractor shall haul Materials and move and store equipment in accordance with the Highway Traffic Regulation Act and applicable provisions of Minnesota Rules when using public Roads or completed Structures, base courses, and pavements within the Project that are open to traffic and becoming a part of the permanent improvement.

The Contractor shall comply with legal load restrictions and with special restrictions required by the Contract when hauling or storing Materials and moving or storing equipment on Structures, completed Subgrades, base courses, and pavements within the Project, under construction or completed but not yet open to traffic.

The Contractor shall complete and place a cab card in each vehicle used for hauling bituminous mixture, aggregate, batch concrete, and grading material (including borrow and excess) before starting work. This cab card shall identify the truck or tractor and trailer by Minnesota or prorated license number and shall contain the tare, maximum allowable legal gross mass, supporting information, and the signature of the owner. The Contractor shall make the card available to the Engineer upon request. The Contract Unit Prices include Contractor-related costs in providing, verifying, and spot checking the cab card information, including weighing empty and loaded trucks on certified commercial scales.

The Contractor shall not operate equipment mounted on crawler tracks or steel-tired wheels on or across concrete or bituminous surfaces unless otherwise approved by the Engineer. The Contract requirements may impose special restrictions on speed, load distribution, surface protection, and other precautions.

When construction operations require crossing an existing pavement, Bridges, or completed portions of the Pavement Structure with otherwise prohibited equipment or loads, the Contractor shall use Department-approved methods of load distribution or bridging at no additional cost to the Department.

The Contractor will not be relieved of liability for damages resulting from the operation and movement of construction equipment because of the issuance of a special permit, or by adherence to any other restrictions imposed.

Unless otherwise required by the Contract or approved by the Engineer, the Contractor shall temporarily store or park construction Materials and equipment on a Bridge deck during Bridge construction in accordance with the limits of this section, established to reflect typical design live loads. The Contractor shall store Materials and equipment limited as follows:

- (1) No stockpiles weighing greater than 65,000 lb per 1,000 ft<sup>2</sup> [31,702 kg per 100 m<sup>2</sup>],
- (2) No individual stockpiles of Materials (including pallets of products, reinforcing bar bundles, and aggregate piles) weighing greater than 25,000 lb per 100 ft<sup>2</sup> [12,200 kg per 10 m<sup>2</sup>],
- (3) No single vehicle or equipment exceeding 80,000 lb [36,300 kg], and
- (4) No combination of more than 200,000 lb [90,700 kg] of vehicles, Materials, and other equipment per span with lengths greater than 40 ft [12.2 m].

If loading exceeds the above defined limits, the Contractor shall submit the proposed loads and structural analysis of the deck and beams certified by a Professional Engineer to the Bridge Engineer for the Bridge Engineer's review within a minimum of 7 calendar days before placement of loads.

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**(1514) MAINTENANCE DURING CONSTRUCTION**

The provisions of MnDOT 1514 are supplemented with the following:

In addition to the Contractor's requirements for sweeping as required under MnDOT 2051 (Maintenance and Restoration of Haul Roads), the Engineer may require additional sweeping of roads adjacent to the construction site to provide safe conditions for the traveling public, environmental reasons, local regulatory requirements or as otherwise directed by the Engineer.

Payment for additional sweeping ordered by the Engineer will be made as specified below. (This price represents a shared cost.)

Pick Up Broom W/Operator .....	\$55.00 per hour
Self-Propelled Pavement Broom W/Operator .....	\$30.00 per hour

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**(1517) CLAIMS FOR COMPENSATION ADJUSTMENT**

Claims for compensation adjustments shall be submitted and processed in accordance with the provisions of MnDOT 1517 and the following:

In Item No. 18 of Section C Review of Claims, the word "be" is hereby corrected to "by".

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**(1602) NATURAL MATERIAL SOURCES**

The provisions of MnDOT 1602 are supplemented with the following:

**S-23.1**

The expansion of any existing natural material sources, or the creation of new Natural Material Sources, will be subject to the requirements of the Farmland Protection Act of 1981 (FPPA or the ACT). Coordination to comply with FPPA shall be the responsibility of the Contractor. Contact the Natural Resources Conservation Service (NRCS) office for the county in which the source is located for further information.



**S-24            (1701) LAWS TO BE OBSERVED (DATA PRACTICES)**

The provisions of MnDOT 1701 are supplemented with the following:

- S-24.1        Bidders are advised that all data created, collected, received, maintained, or disseminated by the Contractor and any subcontractors in performing the work contained in this Contract are subject to the requirements of MN Statute Chapter 13, the Minnesota Government Data Practices Act (MGDPA). The Contractor shall comply with the requirements of the MGDPA in the same manner as the Department. The Contractor does not have a duty to provide access to public data to the public if the public data are available from the Department, except as required by the terms of the Contract.
- S-24.2        Nothing in the Contract documents shall be construed to allow the Contractor to circumvent existing local ordinances that have an impact on its construction operations. The Contractor is hereby advised that it shall conduct its construction operations including, but not limited to, excavation and hauling in accordance with all local ordinances. The Contractor shall become knowledgeable with all pertinent local ordinances and conduct its operations accordingly.

**S-25            (1701) LAWS TO BE OBSERVED (WET LANDS)**

The provisions of MnDOT 1701 are modified and/or supplemented with the following :

- S-25.1        If the Contractor operations involve the excavation and/or disposal of material off MnDOT Right of Way, the Contractor is advised of the following:

MN Statutes Sections 103G.2212 and 103G.241 stipulate that an agent or employee of another may not:

- 1)    drain, excavate, or fill a wetland, wholly or partially; or
- 2)    construct, reconstruct, remove, or make any change in any reservoir, dam, or the course, current, or cross-section of any public water;

unless the agent or employee has obtained a signed statement from the property owner stating that any permit or wetland replacement plan required for the work has been obtained, or that a permit or replacement plan is not required; **AND** this statement is mailed to the appropriate office with jurisdiction over the wetland or public water prior to initiating the work.

The "Landowner Statement and Contractor Responsibility For Work in Wetlands or Public Waters" can be found at:

[http://www.bwsr.state.mn.us/wetlands/forms/Contractor\\_Responsibility.doc](http://www.bwsr.state.mn.us/wetlands/forms/Contractor_Responsibility.doc) .

The Contractor shall provide the Engineer with a copy of the completed "Landowner Statement and Contractor Responsibility for Work in Wetlands or Public Waters" for the excavation and/or disposal site prior to initiating the work.

**S-26            (1701) LAWS TO BE OBSERVED (BRIDGE)**

The provisions of MnDOT 1701 are modified and/or supplemented with the following:

S-26.1        The Contractor shall use MnDOT approved companies for testing, waste transport and disposal as provided and described in MnDOT's manual "Asbestos and Regulated Waste Manual For Structure Demolition Or Relocations for Construction Projects" available on the following website:

<http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Contact Mark Vogel, Office of Environmental Services, 651.366.3630 with any questions regarding the manual.

The Contractor shall only use MnDOT approved contractors for: building/bridge assessments, asbestos abatement and regulated waste oversight, asbestos removal, regulated waste removal, and regulated waste disposal and recycling (for a list of MnDOT Approved Contractors call 651.366.3630).

The Contractor shall use only MPCA permitted Combined Solid Waste Disposal Facilities to dispose of all solid waste including demolition debris. Demolition debris shall not be disposed of in a permit-by-rule landfill.

S-26.2        The successful bidding Contractor shall:

- (A) Comply with the Environmental Protection Agency (EPA) Regulations, 40 CFR pt. 61, subd.M - NATIONAL EMISSION STANDARD FOR ASBESTOS.
- (B) Provide the Minnesota Pollution Control Agency (MPCA) and The MnDOT Project Engineer written notice of intention to demolish or move a structure - see form "Notification of Intent to Perform a Bridge Demolition for MnDOT Operations" at <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Such notice shall be provided to the MPCA and the MnDOT Project Engineer a minimum of 10 working days before any move or demolition.
- (C) And if the bridge contains any asbestos, the Contractor shall:
  - (1) Use a Minnesota Department of Health (MDH) certified oversight contractor to oversee the MDH certified asbestos abatement contractor.
  - (2) Depending on the amounts and types of asbestos on the premises Submit "Notification of Asbestos Related Work", to the Minnesota Pollution Control Agency and the Mn. Department of Health 10 working days prior to commencement of abatement activities. The Contractor shall submit a copy of the completed notification/s to The MnDOT Project Engineer at the same time.

- (3) Submit all required documentation to the Minnesota Pollution Control Agency and the Mn Department of Health to the respective regulatory agencies and copy the MnDOT Project Engineer on all submittals. Information on the requirements of MPCA can be found at: [http://www.pca.state.mn.us/programs/asbestos\\_p.html](http://www.pca.state.mn.us/programs/asbestos_p.html). Information on the requirements of the Department of Health can be found at: <http://www.health.state.mn.us/divs/eh/asbestos/index.html>.
  - (4) Transport all asbestos containing waste in compliance with USDOT packaging and transportation requirements. The Contractor shall provide The MnDOT Project Engineer with all Asbestos Containing Material Transportation shipping papers/manifests. Shipping paper guidance can be found at <http://www.dot.state.mn.us/environment/buildingbridge/disposal.html>.
  - (5) Dispose of all asbestos containing waste in a Minnesota Pollution Control Agency permitted mixed municipal solid waste or Industrial landfill (not demolition debris landfills) permitted to accept asbestos containing wastes. Provide The MnDOT Project Engineer all landfill disposal receipts.
- (D) Comply with MnDOT's manual "Asbestos and Regulated Waste Manual For Structure Demolition Or Relocations for Construction Projects" available on the following website:  
<http://www.dot.state.mn.us/environment/buildingbridge/index.html>.

S-26.3 The successful Contractor shall comply with all MnDOT policy, laws, regulations and/or rules regarding the removal and recycling/disposal of any regulated wastes including, but not limited to: *see manual for procedures and approved contractors/end sites.*

1. Treated Wood
2. Lead Paint
3. Lead Plates
4. Polychlorinatedbiphenols (PCB's)
5. Mercury

The transportation of all the above wastes shall be in compliance with USDOT packaging and transportation requirements. The Contractor shall provide The MnDOT Project Engineer with all shipping papers or manifests.

The Contractor shall provide the MnDOT Project Engineer with copies of disposal or recycling records.

S-26.4 **FAILURE TO COMPLY WITH NOTIFICATION PROVISIONS WILL BE DEEMED A MATERIAL BREECH OF CONTRACT. IN THE EVENT THAT A REGULATORY AGENCY IMPOSES MONETARY SANCTIONS ON MnDOT THAT ARE BASED, IN WHOLE OR IN PART, UPON THE ACTS**

OR OMISSIONS OF THE CONTRACTOR, THE CONTRACTOR AGREES TO INDEMNIFY MnDOT AND TO HOLD MnDOT HARMLESS FOR SAME, EXCEPT TO THE EXTENT THAT ANY SANCTIONS WERE CAUSED BY MnDOT'S OWN NEGLIGENCE.

**S-27**                    **(1706) EMPLOYEE HEALTH AND WELFARE**

The provisions of MnDOT 1706 are supplemented with the following:

S-27.1                All construction operations shall be conducted in compliance with applicable laws, regulations and industry standards as described in MnDOT 1706. The contractor shall be considered to be **fully responsible** for the development, implementation and enforcement of all safety requirements on the project, notwithstanding any actions Hennepin County may take to help ensure compliance with those requirements.

The Contractor shall complete a written project safety and environment checklist/plan (Checklist) addressing identified regulated materials and potential hazards at the job site. This Checklist shall contain name(s) of person(s) responsible for all safety requirements and this Contractor's Designee(s) shall be available at all times that work is being performed. The Contractor's designee(s) shall be responsible for correcting violations on the Project as observed by the Engineer or his/her representative.

The Checklist shall indicate that means and methods have been developed by the contractor to eliminate or control the identified hazard or material, that contractor employees have been appropriately trained to address the identified hazard/material, and that tools, equipment and personal protective equipment are in good condition and adequate to control the hazard. The Checklist shall be submitted at or prior to the Project's pre-construction meeting, but not less than 14 calendar days prior to the start of contracted site work. In the event site work begins less than 14 calendar days from the date of execution of the contract, the Checklist shall be submitted at least 24 hours prior to the start of site work. Should the Contractor expect to and/or fail to submit the Checklist any later than commencement of site work, the Contractor will notify the County's Project Manager in writing within 24 hours of the start of work.

Submittal of the Checklist shall not relieve the Contractor of any obligation under a governing rule, standard, state or federal statute or regulation, municipal ordinance, County policy, or of any provision in the project contract documents.

S-27.2                The Contractor shall not use any motor vehicle equipment on this project having an obstructed view to the rear unless:

The vehicle has a reverse signal alarm which is audible above the surrounding noise level; or

The vehicle is backed up only when an observer signals that it is safe to do so.

- S-27.3 The Contractor is hereby advised that any work performed under the terms of this contract which in the opinion of the Engineer cannot be adequately and safely inspected by County personnel due to the lack of OSHA or ANSI required safety measures (i.e. Trenches, fall protection, confined space or other hazards) be deemed Unauthorized Work in accordance with MnDOT 1512 and will not be paid for. A \$500.00 **monetary deduction (per incident) will be assessed by County for violations of safety standards and requirements that have the potential for loss of life and/or limb of Project personnel or the public.** The areas of special concern include, but are not limited to excavation stability protection, fall protection, protection from overhead hazards, vehicle backup protection (See S-27.2), confined space safety, blasting operations, and personal safety devices.
- S-27.4 None of the monetary deductions listed above shall be considered by the Contractor as allowance of noncompliance incidents of these safety requirements on this Project.
- S-27.5 Bidders are hereby advised that Hennepin County has determined that all existing manholes, catch basins, and similar type enclosed structures on storm sewer systems, water distribution systems, and sanitary sewer systems contained within the right of way of all county roadways and within the construction limits of this Project are confined spaces and access into them shall be in accordance with the MINN.RULE 5207.0300-0304 unless more applicable regulations apply. All new structures of the same type and function of the aforesaid, which are to be constructed as a part of this project, shall also be considered confined spaces and access into them shall be in accordance with the aforesaid OSHA Regulation.
- It shall be the sole responsibility of the successful bidder (Contractor) on this Project to have a confined entry program which complies with OSHA. The Contractor's program shall address, but need not be limited to, access into manholes, catch basins, and similar type enclosed structures on storm sewers, water distribution systems, and sanitary sewer systems that are to be constructed, reconstructed, adjusted, repaired, or otherwise modified as part of this Project. The Contractor's program shall establish acceptable entry conditions for the various classifications of confined spaces in accordance with the MINN.RULE 5207.0300-0304 unless more applicable regulations apply. The Contractor shall have an adequately trained individual who shall be responsible for classifying each confined space in accordance with the Contractor's confined space entry program, and ensuring compliance with same by all of the Contractor's employees and all other individuals within the Contractor's control entering confined spaces on this Project. The Contractor shall develop and implement site-specific procedures to coordinate entry operations when employees of more than one employer are or will be working simultaneously in a confined space.
- The Contractor's confined entry program shall clearly address its applicability to

all subcontractors and their employees that will be utilized for this Project. It shall be the Contractor's responsibility to ensure compliance with OSHA by all subcontractors and their employees on this Project either through the Contractor's own program or through separate programs established by the subcontractors working on this Project.

S-27.6 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions required in connection with their work on this Project, including Regulations of the Occupational Safety and Health Administration (OSHA) and other regulatory and governing agencies.

S-27.7 Hennepin County assumes no responsibility or liability for the Contractor's compliance with applicable federal and state regulations and safe work practices. The Contractor shall remain at all times solely responsible for the sufficiency of its safety program and its compliance with applicable federal and state regulations.

S-27.8 The Contractor shall submit his work plan, at the preconstruction conference, for providing all OSHA required safety equipment (safety nets, static lines, etc.) for all work areas whose working surface is 6 feet or more above the ground, water, or other surfaces. Submittal of this plan will in no way relieve the Contractor of his responsibility for providing a safe working area. The fall protection system shall be furnished, installed, and maintained in accordance with all applicable OSHA Regulation (Standards-29 CFR) including but not limited to "Duty to have fall protection - 1926.501" and "Fall protection Systems criteria and practices – 1926.502", ANSI/ASSE A10.32-2004 'Fall Protection Systems' for construction and demolition operation, and ANSI/ASSE Z359.2-2007 "Minimum Requirements for a Comprehensive Fall Protection Program".

All safety equipment, in accordance with the Contractor's plan, must be in place and operable in adequate time to allow County personnel to perform their required inspection duties at the appropriate time. No cement shall be placed in any areas affected by such required inspection until the inspection has been completed.

**S-28 (1710) TRAFFIC CONTROL DEVICES**

All traffic control devices and methods shall conform to the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), Minnesota Standard Signs Manual, the Traffic Engineering Manual, and the following:

In accordance with the MN MUTCD all sign supports shall be crashworthy. Signs installed on barricades, barricade sign combinations, and all other portable supports shall be crashworthy. This includes all new and used Category I and Category II devices.

The Contractor shall provide the Project Engineer a Letter of Compliance stating that all of the Contractors Category I and II Devices are NCHRP 350 approved as of July 1, 2006. The Letter of Compliance must also include approved drawings

of the different signs and devices and shall be provided to the Project Engineer at the Pre-construction meeting.

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**(1714) RESPONSIBILITY FOR DAMAGE CLAIMS; INSURANCE**

The provisions of MnDOT 1714 are hereby deleted and replaced with the following:

The Contractor shall indemnify, defend, and save harmless Hennepin County, its officers, and its employees from all suits, actions, and claims of any character brought because of injuries or damages received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of the Contractor; or because of any claims arising or amounts recovered from infringements of patent, trademark, or copyright; or because of any claims arising or amounts recovered under the Workers' Compensation Act, or under any other law, ordinance, order, or decree.

Hennepin County may retain for its use money that is due the Contractor under this or any other contract with Hennepin County, as Hennepin County deems necessary to protect its interests with respect to any suits, actions, or claims arising on account of the Contractor's operations or in consequence of any act, neglect, omission, or misconduct of the Contractor; or, in case no money is due, the Contractor's Sureties may be held liable until those suits, actions, or claims have been settled and suitable evidence to that effect has been furnished to Hennepin County.

The Contractor shall identify a contact person for damage complaints from the public, and shall maintain a log of such complaints and any action taken by the Contractor. This log shall be available to the Engineer at his request.

**A Workers' Compensation Insurance**

Contractor shall provide workers' compensation insurance for all employees and shall require any subcontractors to provide workers' compensation insurance in accordance with the statutory requirements of the State of MN and must include:

- a. Part 2, Employers' Liability including Stop Gap Liability for monopolistic states. Minimum limits:
  - \$100,000 – Bodily Injury by disease per employee
  - \$500,000 – Bodily Injury by disease aggregate
  - \$100,000 – Bodily Injury by accident
- b. Coverage C: All States Coverage
- c. If applicable, USL&H, Maritime, Voluntary and Foreign Coverage

- d. Waiver of subrogation in favor of Hennepin County and Hennepin County Regional Rail Authority

If Contractor is self-insured for its obligation under the Workers' Compensation Statutes in the jurisdiction where the project is located, a Certification of the Authority to Self-Insure such obligations shall be provided.

The Contractor must require Subcontractors to file evidence of insurance with the Contractor

**B Commercial General Liability Insurance**

The Contractor shall maintain insurance to cover liability from operations under the Contract, whether such operations are by the Contractor, subcontractor or by anyone directly or indirectly employed under the Contract.

**Minimum Limits of Liability**

\$2,000,000 – **Per Occurrence**

\$2,000,000 – **Annual Aggregate**

\$2,000,000 - **Annual Aggregate** applying to Products and Completed Operations

\$50,000 – **Fire Damage**

\$5,000 – **Medical Expense** (any one person per occurrence)

**Coverages**

- Premises and Operations Bodily Injury and Property Damage
- Personal and Advertising Injury
- Products and Completed Operations Liability
- Contractual Liability as provided in ISO form CG 00 01 12 04 or its equivalent
- Pollution exclusion with standard exception as per ISO Commercial General Liability Coverage Form – CG 00 01 12 04 or equivalent
- Explosion, Collapse and Underground (XCU) perils
- Broad Form PD
- Independent Contractors – Let or Sublet work
- Waiver of subrogation in favor of Hennepin County, Hennepin County Regional Rail Authority, City of Deephaven, and Bolton & Menk, Inc.
- Hennepin County, City of Deephaven, Hennepin County Regional Railroad Authority, Bolton & Menk, Inc. and Three Rivers Park District, named as an Additional Insured, by endorsement, ISO Forms CG 2010 and CG 20 37 or their equivalent for claims arising out of the Contractor's negligence or the negligence of those for whom the Contractor is responsible.



**C Automobile Liability Insurance**

Contractor shall maintain insurance to cover liability arising out of the operations, use, or maintenance of all owned, non-owned, and hired automobiles.

**Coverages**

- Owned Automobiles
- Non-owned Automobiles
- Hired Automobiles
- Waiver of subrogation in favor of Hennepin County and Hennepin County Regional Rail Authority

**Minimum Limit of Liability**

\$2,000,000 – Per Occurrence Combined Single Limit for Bodily Injury and Property Damage

**Umbrella or Excess Liability Insurance**

An Umbrella or Excess Liability insurance policy may be used to supplement the Contractor's policy limits to satisfy the full policy limits required by the Contract.

**D Additional Conditions**

Contractors' policy(ies) shall be primary and non-contributory insurance to any other valid and collectible insurance available to Hennepin County with respect to any claim arising out of the Contract.

Evidence of subcontractor insurance shall be filed with the Contractor.

The Contractor is responsible for payment of Contract related insurance premiums and deductibles.

Insurance companies must have an AM Best rating of A- (minus) and a Financial Size Category of VII or better, and be authorized to do business in the State of Minnesota.

Certificates of Insurance acceptable to Hennepin County shall be submitted prior to commencement of work under the Contract. Such Certificates and the required insurance policies shall contain a provision that coverage afforded under these policies shall not be cancelled without at least thirty (30) days advance written notice to Hennepin County.

**E Notice to the Contractor**

The failure of Hennepin County to obtain Certificate(s) of Insurance for the policies or renewals thereof or failure of the insurance company to notify the State of the cancellation of policies required under this Contract shall not constitute a waiver by Hennepin County to the Contractor to provide such insurance.

Hennepin County reserves the right to terminate the Contract in accordance with 1808 if the Contractor is not in compliance with the insurance requirements and Hennepin County retains all rights to pursue any legal remedies against the Contractor. In the event of a claims dispute, all insurance policies must be open to inspection by Hennepin County, and copies of policies must be submitted to Hennepin County upon written request of the Engineer.

- S-29.1 Responsibility for damage claims shall be in accordance with the provisions of MnDOT 1714, except that the first paragraph is hereby deleted and replaced with the following:
- S-29.2 The Contractor agrees to defend, indemnify, and hold harmless the County of Hennepin, the City of Deephaven, Hennepin County Regional Rail Authority, Three Rivers Park District, and the State of Minnesota, their or its, officials, officers, agents, volunteers, and employees from any liability, claims, causes of action, judgments, damages, losses, costs, or expenses, including reasonable attorneys' fees, resulting directly or indirectly from any act or omission of the Contractor, a subcontractor, anyone directly or indirectly employed by them, and/or anyone for whose acts and/or omissions they may be liable in the performance of the services required by this Contract, and against all loss by reason of injuries or damages received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any environmental damage or hazardous material damage caused by or resulting from the Contractor's activities; or because of any act or omission, neglect, or misconduct of the Contractor; or because of any claims arising or amounts recovered from infringements of patent, trademark, or copyright; or because of any claims arising or amounts recovered under the Worker's Compensation Act; or under any other law, ordinance, order, or decree or due to the failure of the Contractor to perform fully, in any respect, all obligations under this Contract.

**S-30 (1717) AIR, LAND AND WATER POLLUTION**

The provisions of MnDOT 1717 are supplemented and/or modified with the following:

**S-30.1 DISCOVERY OF CONTAMINATED MATERIALS AND REGULATED WASTES**

If during the course of the Project, the Contractor unexpectedly encounters any of the following conditions indicating the possible presence of contaminated soil, contaminated water, or regulated waste, the Contractor shall immediately stop work in the vicinity, notify the Engineer, and request suspension of work in the vicinity of the discovery area, in accordance with MnDOT 1803.4.

A documented inspection and evaluation will be conducted prior to the resumption of work. The Contractor shall not resume work in the suspected area without authorization by the Engineer.

- (A) Indicators of contaminated soil, ground water or surface water include, but are not limited to the following:
- (1) Odor including gasoline, diesel, creosote (odor of railroad ties), mothballs, or other chemical odor.
  - (2) Soil stained green or black (but not because of organic content), or with a dark, oily appearance, or any unusual soil color or texture.
  - (3) A rainbow color (sheen) on surface water or soil.
- (B) Indicators of regulated wastes include, but are not limited to the following:
- (1) Cans, bottles, glass, scrap metal, wood (indicators of solid waste and a possible dump)
  - (2) Concrete and asphalt rubble (indicators of demolition waste).
  - (3) Roofing materials, shingles, siding, vermiculite, floor tiles, transite or any fibrous material (indicators of demolition waste that could contain asbestos, lead or other chemicals).
  - (4) Culverts or other pipes with tar-like coating, insulation or transite (indicators of asbestos).
  - (5) Ash (ash from burning of regulated materials may contain lead, asbestos or other chemicals).
  - (6) Sandblast residue (could contain lead).
  - (7) Treated wood including, but not limited to products referred to as green treat, brown treat and creosote (treated wood disposal is regulated).
  - (8) Chemical containers such as storage tanks, drums, filters and other containers (possible sources of chemical contaminants).
  - (9) Old basements with intact floor tiles or insulation (could contain asbestos), sumps (could contain chemical waste), waste traps (could contain oily wastes) and cesspools (could contain chemical or oily wastes).

S-30.2 MnDOT 1717.2 A2 is hereby deleted and replaced with the following:

**A2 During Construction**

The Contractor shall schedule and install temporary and permanent sediment and erosion control measures, construct ponds and drainage facilities, finish earth work operations, place topsoil, establish turf, and conduct other Contract work in a timely manner to minimize erosion and sedimentation.

All exposed soil areas with continuous positive slopes that are within 60 m (**200 feet**) of a public water shall have temporary or permanent erosion protection within 24 hours after the construction activity in that portion of the site has temporarily or permanently ceased and connection is established to the public water. All other positive slopes to constructed surface waters, such as permanent storm water treatment ponds, curb and gutter systems, storm sewer inlets, temporary or permanent drainage ditches, or other storm water conveyance systems, shall have temporary erosion protection or permanent cover for the exposed soil areas as soon as practicable but no later than 14 days after construction activity has temporarily or permanently ceased in that area. For those drainage areas that have a discharge point within 1 mile and flows to an impaired or Special Waters shall have temporary erosion protection or permanent cover for the exposed soil areas as soon as practicable but no later than 7 days after construction activity has temporarily or permanently ceased in that area. Impaired and Special Waters are defined as those listed and referenced in the NPDES Permit.

Positive slopes adjacent to public waters and wetlands will be stabilized at the close of each day when weather forecasts for rain that evening, and/or overnight including weekends. Once work is completed it will be stabilized permanently as soon as practical but no later than seven days.

Exposed soil areas do not include; stockpiles or surcharge areas of sand, gravel, aggregate, concrete, bituminous, or road bed and surfacing material. A perimeter sediment barrier may be necessary to minimize loss when these are within the 60 m (**200 feet**) of existing surface waters or the property edge.

The bottom of temporary or permanent drainage ditches or swales constructed to drain water from a construction site must be stabilized with erosion control measures for the last 60 m (**200 feet**), or more when conditions warrant, from the property edge or from the point of discharge to any existing surface water. Stabilization shall be completed within 24 hours after the construction activity in that portion of the ditch has temporarily or permanently ceased. Ditch stabilization will continue concurrently with construction activities but no later than 14 days after construction activities have permanently or temporarily ceased. Any, culvert pipe or storm sewer pipe that is within the cumulative distance is not part of this distance. Ditch checks may be provided where necessary to slow water flow and capture sediment.

Temporary or permanent ditches used as treatment systems will not need to be stabilized but must provide the proper Best Management Practices for the treatment system.

Pipe outlets shall be provided with temporary or permanent energy dissipation within 24 hours of connecting the pipe to any constructed or existing surface waters.

The Contractor shall limit the surface area of erodible soil that can be exposed to possible erosion at any one time when the permanent erosion control features are not completed and operative.

All liquid and solid wastes generated by concrete washout operations must be contained and not have the opportunity to come in contact with the surface waters or ground water. This includes the ditches, slopes to ditches, curb and gutter/storm sewer systems, and ponds. Areas where there are sandy soils, karsts, and high ground water the washout facility must have an impermeable liner. Liquid and solid wastes must be disposed of properly. A concrete washout sign must be installed adjacent to each washout facility to notify personnel.

S-30.3 MnDOT 1717.2E is hereby deleted and replaced with the following:

**E Site Plans**

The Engineer may require the Contractor to submit a site plan, in writing, detailing proposed erosion control and sediment control measures and a schedule indicating starting and completion times for construction operations working in water bodies and/or in direct proximity to waters of the state.

Contractor shall not start work in the affected areas until the schedule and site plan have been accepted by the Engineer and all materials and equipment for the activity are on site.

**S-31 (1717) AIR, LAND AND WATER POLLUTION (CONCRETE GRINDING)**

The provisions of MnDOT 1717 are supplemented and/or modified with the following:

**S-31.1 DIAMOND SURFACING**

Residue and excess water resulting from this operation shall be removed from the roadway by a continuous vacuum and collection system. Residue and water shall not be permitted to flow across adjacent traffic lanes, onto shoulders, off bridge decks, into gutters, or enter closed drainage systems. The Contractor is responsible for providing a suitable means to manage the grinding residue.

The Engineer will identify storm water treatment facilities, wetlands, and other areas of environmental sensitivity on the Project where the slurry discharge operations are not allowed.

The Engineer and Contractor will inspect the site prior to the start of grinding operations to mark and identify acceptable slurry placement locations. The spreading start and stop locations shall be clearly marked.

The slurry generated while grinding in areas where slurry discharge is not allowed shall be picked up and hauled for uniform disposal to areas where the slurry discharge is allowed or to a containment pond (pit).

(A) Rural Areas

In rural areas that have vegetated slopes the slurry can be deposited on the in-slope or back-slope as the grinding operation progresses down the road. The slurry must be deposited at a rate that will not reach the flow line (wetted perimeter) of a ditch, or the toe of a fill slope and within the Right of Way. The slopes must be 1:3 (V:H) or flatter. Limits of slurry deposition are determined in the field by providing the following buffers. :

- Provide a 5 foot buffer from the toe on the in-slope and back-slope of a roadside ditch, or
- Provide a 3 foot buffer from the water edge on the in-slope and back slope of a roadside ditch that has water.
- Provide a 100 foot buffer from wetlands, lakes, ponds, streams, rivers, and infiltration/filtration treatment facilities,
- Provide a 5 foot buffer from the toe on fill slopes next to upland areas.

Spreading should begin a minimum of 1 foot from the shoulder, with each pass of the grinder moving the spreading operation farther down the slope to ensure no build-up of material of no more than 0.5 inches.

The vacuumed material shall be spread evenly on the adjacent slopes by dragging a flexible hose with a spreader bar or other approved device. Additional sediment control BMP's may be required to prevent loss of the slurry into the ditch system or off the Right-of-Way. Acceptable BMP's are:

- Compost filter log, MnDOT 3897,
- Aeration of the soil, which may require mowing, or
- Other methods approved by the engineer.

(B) Urbanized areas

In urbanized areas with closed drainage systems, the slurry shall be collected and transported to a lined containment pond constructed by the Contractor. To ensure a spill does not occur during transport the slurry should be collected in water-tight haul units. The containment ponds may be constructed within or outside the right-of-way. The Contractor must submit a slurry management plan along with written assurance of proper handling during all phases of transport and disposal at the preconstruction conference or at least 30 days prior to diamond grinding for approval by the Engineer. Areas outside of the Right-of-Way may require a separate NPDES construction storm water permit.

At a minimum, the slurry management plan must include the following information for any proposal that will use a containment pond (pit):

- Provide an estimate of the volume of slurry that will be produced on the project and the volume of the containment pond (pit).

- Ownership and location of the containment pond.
- The plan must address if the pond will be lined with clay (including thickness of clay layer) or if an impermeable membrane will be used (including thickness of membrane).
- Describe how the water will be managed. Examples: Will the water be allowed to evaporate or once the fines have settled will the containment pond be dewatered and the water reused in the grinding operation, slurry broadcast operation, used in a commercially useful manor (i.e. dust control, grade compaction), or sent via sanitary sewer or hauled to a water treatment facility? \*If disposing at a treatment facility, the name of the treating facility must be provided.
- Describe how the solids (fines) will be managed. Examples: Will the solids be used as a fill material, a component in recycled aggregate or any other commercially useful application, transported to a facility where they can be stored for future, or disposed of in a landfill? The Contractor shall furnish the Engineer with a document that identifies the name and location of the reuse storage facility or a MPCA permitted lined mixed municipal solid waste or industrial landfill that the solids will be deposited.
- Any proposed reuse of water or solids must be fully described in the plan. Solids reuse must include a description of the engineering need for the material.

The pond area shall be reclaimed to its original condition and vegetated as appropriate to protect against erosion.

(C) Control of pH

The Contractor shall monitor and control the pH of the slurry for all operations. The slurry shall be managed to maintain a pH between 6 and 12. At no time shall slurry containing a pH outside the above limits be allowed to be deposited on the ground. At the start-up of operations, the Contractor shall test the pH at least once per hour to ensure it is within the acceptable limits. The test equipment shall be calibrated daily and approved by the Engineer.

Once the pH control plan is operational and producing consistent results, the testing frequency may be reduced to 4 tests per day. The Contractor shall keep a signed and dated log of all test results and have available to the engineer upon request. The Contractor shall determine the procedure to be used to maintain the slurry within the acceptable range. No direct payment will be made for these procedures.

**S-32**                    **(1718) FURNISHING RIGHT-OF-WAY**

The project construction is within public right-of-way and Hennepin County Regional Railroad Authority (HCRRA) property. Three Rivers Park District maintains a trail within the HCRRA property. An existing agreement with HCRRA provides a temporary easement until completion of construction of the new bridge, or September 1, 2014, whichever is first, for construction of the project and for access. A permit has been obtained from Three Rivers Park District for the closure of the trail. The Contractor shall schedule and coordinate its work with Boe Carlson at 763.559.6761 or [bcarlson@threeriversparkdistrcit.org](mailto:bcarlson@threeriversparkdistrcit.org) to minimize the time period the trail is closed.

A temporary construction easement has also been obtained on the Minnetonka Public Schools property at the southwest corner of the bridge.

No work shall be performed by the Contractor outside the existing right-of-way and easements.

**S-33**                    **(1802) TRAINING FOR CONSTRUCTION TRUCK OPERATORS**

Operators of construction trucks hauling construction materials such as borrow, aggregate base, asphalt mixtures and concrete paving mixtures are encouraged to become certified as a Level I Construction Truck Operators (CTO).

This one-day session taught in various MnDOT Districts features classroom and hands-on educational experiences. The objective of the CTO Training is to make the driver aware of the Federal and State requirements and regulations regarding the construction truck and driver, and the safe driving techniques that will result in the safe operation of the construction truck. Presenters include Minnesota State Patrol, Minnesota Department of Transportation and the Minnesota Safety Center.

This training is co-sponsored by the Minnesota State Patrol, the Minnesota Highway Safety Center, the Minnesota Trucking Association, the Minnesota Asphalt Pavement Association and the Minnesota Department of Transportation.

Additional information about this certification program can be obtained by contacting any of the following:



	<b>PHONE #</b>	<b>FAX #</b>
Minnesota Asphalt Pavement Association: E-mail: <a href="mailto:info@mnapa.org">info@mnapa.org</a>	651-636-4666	651-636-4790
Minnesota Department of Transportation: E-mail: <a href="mailto:motorcarrier@state.mn.us">motorcarrier@state.mn.us</a> Website: <a href="http://www.dot.state.mn.us/cvo/index.html">http://www.dot.state.mn.us/cvo/index.html</a>	Toll Free: 1-888-472-3389 651-405-6060	651-405-6082
Minnesota Highway Safety Center: E-mail: <a href="mailto:tjsakry@stcloudstate.edu">tjsakry@stcloudstate.edu</a> Website: <a href="http://mnsafetycenter.org">http://mnsafetycenter.org</a>	Toll Free: 1-888-234-1294 320-255-4732	320-255-3942
Minnesota State Patrol: Website: <a href="http://www.dps.state.mn.us/patrol/comveh/index.htm">http://www.dps.state.mn.us/patrol/comveh/index.htm</a>	Toll Free: 1-888-472-3389 651-405-6171	651-405-6082
Minnesota Trucking Association: E-mail: <a href="mailto:john@mnrtruck.org">john@mnrtruck.org</a> Website: <a href="http://www.mnrtruck.org">http://www.mnrtruck.org</a>	651-646-7351	651-641-8995

**S-34      (1803) PROSECUTION OF WORK**

The provisions of MnDOT 1803 are supplemented and/or modified with the following:

All pedestrian facilities and shared trails on this Project must be constructed according to Public Rights-of-Way Accessibility Guidelines (PROWAG) which can be found at: <http://www.access-board.gov/prowac/draft.htm>. The appropriate pedestrian ramp details for each quadrant are included in the Plan. The Engineer may provide additional details to those provided in the Plan that meet the PROWAG guidelines as the need arises and field conditions dictate.

(A) The Contractor must designate a responsible person familiar with PROWAG to assess proposed sidewalk layouts at each site before work begins. Any time work the Contractor is performing concerns pedestrian facilities, the Contractor's representative shall be on site.

(B) Pedestrian facilities must be constructed to meet the following criteria:

(1) Pedestrian Access Routes (PAR) must be constructed to meet the following:

- Minimum 4 feet width.
- A maximum cross slope of 2.0%.
- Vertical discontinuities must be less than 0.25 inches.
- Must provide positive drainage without allowing any ponding.
- All grade breaks shall be constructed perpendicular to the path of travel.

- (2) Landings are part of the PAR and must be constructed to meet the following:
- 4 feet by 4 feet minimum width.
  - Maximum slope of 2.0% in all directions.
  - Required at all locations where the PAR changes directions.
  - Must be connected to the PAR.
  - All grade breaks shall be constructed perpendicular to the path of travel.
- (3) Ramps are part of the PAR and must be constructed to meet either of the following criteria:
- Longitudinal slopes less than 5% in the direction of travel requires no landing at the top of the ramp (unless the PAR changes direction).
  - Longitudinal slopes between 5 - 8.3% in the direction of travel require a landing at the top of the ramp.
- (C) If the Contractor constructs any pedestrian or shared-use trail facilities that are not per Plan, do not meet the above requirements, or do not follow the agreed upon resolution, the Contractor shall be responsible for correcting the deficient facilities with no compensation paid for the corrective work. To ensure that the pedestrian facilities are constructed in compliance with PROWAG, the Contractor shall follow the following three steps:
- (1) The Contractor shall use the appropriate ramp details in the Plan and identify the removal limits for the sidewalk and curb and gutter. If Contractor determines the removal limits are not adequate to meet PROWAG, the Contractor shall stop work immediately and consult the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may finish the removals.
- (2) The Contractor shall not alter any existing drainage patterns unless called for in the plans or approved by the Engineer.
- Prior to pouring each curb and gutter segment, the Contractor must verify the zero height curb and curb transitions will be located as shown in the Plans and will provide an adequate detectable edge as shown on Standard Plan Sheet No. 5-297.250 (Sheet 5 of 5). The Contractor shall also verify the proposed curb flow lines will provide positive drainage as well as maintain existing gutter inflows/outflows. The curb and gutter shall be constructed as detailed in the Plan with a

defined flow line and no vertical discontinuities. The Contractor shall consult with the Engineer to determine a resolution if any of these conditions cannot be met. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with pouring the curb and gutter.

- (3) After the curb has been correctly poured, the Contractor has set the sidewalk forms, and prior to placing the concrete curb ramps/sidewalks, the Contractor shall verify the requirements in Section S-34.2B will be achieved. If any of these requirements cannot be met the Contractor shall meet with the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with the curb ramp/sidewalk pour.
- (D) It shall be the responsibility of the Contractor, or Contractor's Surveyor if applicable, to layout all proposed work at each intersection in accordance with the Plan and requirements listed in this Special Provision. The Contractor may confer with the Engineer for guidance in laying out the proposed work, but it will be the Contractor's responsibility to ensure the proposed work meets all the requirements of this Special Provision. This layout includes, but is not limited to placement of grade breaks, curb transitions, gutter flow lines, truncated dome placement, crosswalk marking placement, flares, landing limits, and ramp limits. It is important that the Contractor layout this work properly to achieve the construction of a compliant pedestrian facility. This layout work shall be incidental with no extra compensation paid.

If contractor surveying is not called for in the Contract, the owner's surveyor will only stake points and elevations provided in the Plan. For detail (i.e. custom) designs, other than specific dimensions provided in the Plan, the Contractor shall be expected to scale dimensions from the Plan as needed to construct the facility. If scaled dimensions do not allow for a facility to be constructed to meet the requirements of this Special Provisions, the Contractor shall follow the process listed in S-34.2B.

- (E) The Contractor shall utilize measures and methods when working near existing buildings and/or private landscaping that will avoid damaging the building's face or structure or other private property. The Contractor will be responsible for any damage to the building's face or structure, or other private property. Any damage resulting from Contractor operations will be repaired at the Contractor's expense to the satisfaction of the Engineer.
- (F) The Contractor shall round all joints and edges of the walk with a ¼ inch radius edging tool, contraction joints shall extend to at least 30 percent of walk thickness and shall be approximately 1/8 inch wide as per MnDOT 2521. The Contractor shall also have the option of providing saw cuts to

construct the sidewalk joints. This work shall be considered incidental and no extra compensation paid.

- (G) In areas where the sidewalk is to be constructed around fixed structures and the grade has been changed, the sidewalk shall be finished around these structures to the satisfaction of the Engineer at no additional cost.

**S-35      (1806) DETERMINATION AND EXTENSION OF CONTRACT TIME**

The Contract Time will be determined in accordance with the provisions of MnDOT 1806 and the following:

- S-35.1      Construction operations shall be started on April 1, 2014 or within eight (8) Calendar Days after the date of Notice of Contract Approval, whichever is later. Construction operations shall not commence prior to Contract Approval. The April 1, 2014 start date is based on CenterPoint Energy taking the existing gas mains out of service on April 15, 2014. Any delay in taking the gas mains out of service will delay the start date by the same number of days.
- S-35.2      All work required under this Contract, to allow full use of the bridge, roadway and trail, shall be completed within 75 Working Days. The balance of the work including completion of all restoration, clean up and punch list items shall be completed within 10 working days after substantial completion.
- S-35.3      No work which will restrict or interfere with traffic shall be performed between 12:00 noon on the day preceding and 9:00 A.M. on the day following any consecutive combination of a Saturday, Sunday, and legal holiday without written permission from the Engineer.
- (A) If the Contractor chooses not to work at all on the day preceding the holiday period, no working day charges will be assessed.
- (B) If the Contractor chooses to work prior to 12:00 noon on the day preceding the holiday period or if the Contractor obtains written permission to work after 12:00 noon on the day preceding the holiday period, working day charges will be assessed only for the actual hours worked.
- S-35.4      When, in the opinion of the Engineer, work on the Project cannot be performed due to failure of material delivery beyond the control of the Contractor, the Engineer will agree to a Suspension of Work in conformance with MnDOT 1803.4 and/or will cease the charging of working days, whichever the Engineer deems applicable.
- A Resumption of Work Order will be issued by the Engineer after the Contractor has received delivery of the required material, and/or the Engineer will resume the charging of working days.

- S-35.5 MnDOT 1806.1B is hereby modified to the extent that no extension of time will be granted for any delays experienced by the Contractor in furnishing and installing Stainless Steel Type Dowels for this Project.
- S-35.6 MnDOT 1806.1C is hereby modified to amend the working day assessment by deleting that no charge will be made for the period from November 15 to April 15. Therefore, Monday through Friday for the period from March 1, 2014 to April 15, 2014 will be counted as working days.

**S-36 (1807) FAILURE TO COMPLETE THE WORK ON TIME**

The provisions of MnDOT 1807 are supplemented as follows:

- S-36.1 In addition to the charges shown in the Schedule of Liquidated Damages, the Contractor will be assessed a monetary deduction in an amount equal to \$500.00 per Calendar Day for failure to complete all the work, with the exception of maintenance and Final Cleanup, under the Contract in the time specified therefore, until that work is, in all things, completed to the satisfaction of the Engineer.
- S-36.2 The liquidated damages set forth in MnDOT 1807 and any monetary deductions as set forth above may apply equally, separately, and may be assessed concurrently.
- S-36.3 For informational purposes only, bidders are advised that in addition to the requirements of MnDOT 1807, other Sections of these Special Provisions, as shown below, contain requirements for assessment of monetary deductions to this Contract:

1404	MAINTENANCE OF TRAFFIC AND (2563) TRAFFIC CONTROL
1506	SUPERVISION BY CONTRACTOR
1507	UTILITY PROPERTY AND SERVICE
1706	EMPLOYEE HEALTH AND WELFARE

**S-37 (1904) EXTRA AND FORCE ACCOUNT WORK**

The provisions of MnDOT 1904 are supplemented and/or modified with the following:

- S-37.1 The Contractor is required to submit force account work itemized statements of costs in accordance with MnDOT 1904 to the Engineer on MnDOT form TP-21659 (Summary of Daily Force Account). Copies of this form can be obtained from the Engineer.

S-37.2 The following sentence shall be added to the second paragraph of MnDOT 1904:

"Under no circumstance will the negotiated unit price for Extra Work which is performed by a subcontractor include a Prime Contractor allowance which exceeds that provided for in 1904(4), Paragraph 3."

**S-38 (1910) FUEL ESCALATION CLAUSE**

The provisions of MnDOT 1910 are hereby deleted and replaced with the attached Fuel Escalation Clause.

**S-39 (2021) MOBILIZATION**

The provisions of MnDOT 2021 are hereby deleted and replaced with the following:

**2021.1 DESCRIPTION**

Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the Project site; for the establishment of all Contractor's offices and buildings or other facilities necessary for work on the Project. Mobilization may include bonding, permit, and demobilization costs. When the proposal does not have a lump sum item for Mobilization, all costs incurred by the Contractor for Mobilization shall be incidental to other work.

**2021.2 BLANK**

**2021.3 BLANK**

**2021.4 BLANK**

**2021.5 BASIS OF PAYMENT**

Based on the lump sum Contract price for mobilization, partial payments will be made as follows:

Mobilization Partial Payments		
% of Original Contract Amount Completed <sup>1</sup>	Pay Lesser of the Two	
	% of Mobilization	% of Original Contract Amount
5	50	3
15	75	5
25	100	5
95	100	N/A
<sup>1</sup> The Percent of Original Contract Amount Completed = the amount earned by the Contractor, excluding money earned for mobilization and material on hand, divided by the total value of the original Contract (all bid items).  If the Contract unit price for mobilization exceeds 5 percent of the total original contract amount, the Department may withhold (on any partial estimate) the portion in excess of 5 percent until the Contractor earns at least 95 percent of the original contract amount.		

The total sum of all payments shall not exceed the original Contract amount bid for the mobilization item, regardless of the fact that the Contractor may have, for any reason, shut down work on the Project or moved equipment away from the Project and then back again.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the Contract.

<u>Item No.</u>	<u>Description</u>	<u>Item Unit</u>
2021.501	Mobilization .....	Lump Sum

**S-40      (2101) CLEARING AND GRUBBING**

Clearing and grubbing operations shall be performed in accordance with the provisions of MnDOT 2101 and the following:

S-40.1      The first paragraph of MnDOT 2101.3D Disposal Limitations, is revised to read as follows:

The Contractor shall dispose of trees, brush, stumps, roots, and other debris or byproducts by chipping, marketing, or burning. The Contractor:

- S-40.2 MnDOT 2101.3D(4) under Disposal Limitations, is revised to read as follows:
- (4) Shall conduct burning only after the disposal options are deemed impractical, and in accordance with 2104.3, Minnesota Rules Chapter 7009 and any applicable local ordinances. At no time shall waste tires, rubble, or plastics or similar materials be used to ignite the wood resources.
- S-40.3 MnDOT 2101.3D(5) under Disposal Limitations, is revised to read as follows:
- (5) Shall not bury trees, brush, stumps, roots, and other debris or by-products within the State Right of Way.
- S-40.4 MnDOT 2101.3D1(a) under Marketable Trees, is revised to read as follows:
- (a) Shall not burn or waste marketable trees without having written proof from three potential wood-using industries or individuals that the wood is not wanted. This requirement only applies when the volume of marketable trees on the Project exceeds 75 m<sup>3</sup> (**100 cubic yards or 20 cords or 10,000 board feet**).
- S-40.5 MnDOT 2101.3D2c(3) under Disposal Deadlines and Locations, is revised to read as follows:
- (3) Within the Right of Way by burning or chipping, when allowed.
- S-40.6 The first paragraph of MnDOT 2101.3D3 Pine, is revised to read as follows:
- The Contractor shall dispose of all non-marketable pine trees, brush, stumps, roots, and debris by chipping, debarking, burning, or covering with an air tight tarp within 20 calendar days of being cleared during the growing season.
- S-40.7 MnDOT 2101.3D6 Burying, is hereby deleted in its entirety.
- S-40.8 The first paragraph of MnDOT 2101.5 Basis of Payment, is revised to read as follows:
- Payment for the accepted quantities of clearing and grubbing at the Contract prices per unit of measure will be full compensation for all removal and disposal costs, including the costs of securing outside disposal sites as needed and of carrying out the specified treatment in disposing of elm, oak wilt infected red oaks, pine, and marketable trees.
- S-40.9 The Contractor shall remove only those trees necessary to be removed to construct this Project. All other trees shall be protected from damage during construction.
- S-40.10 The Contractor shall take special care to preserve existing trees and shrubs wherever possible. This may include careful grading operations, slight adjustments of slopes, and placing snow fence at tree drip lines. Snow fence has been provided in the Contract to help preserve trees and shrubs. Snow fence placement is shown in especially sensitive locations.



**S-41            (2102) PAVEMENT MARKING REMOVAL**

The provisions of MnDOT 2102 are modified and/or supplemented with the following:

S-41.1        In addition to the requirements above, the Contractor is responsible for determining what work areas have lead concentration above OSHA's Permissible Exposure Limit. That information is to be provided to the Project Engineer and MnDOT's Inspectors.

(A) Site access

To ensure that no one is accidentally exposed to lead, people are not permitted into areas of high lead concentration without protection. Signs are used to indicate where unprotected people must not go. The signs shall say:

**Warning. Lead Work Area. Poison. No Smoking or Eating.**

(B) Protective Clothing

The Contractor must provide protective clothing for MnDOT inspectors in any area with lead exposure above  $30 \mu\text{g}/\text{m}^3$  or where the lead concentration is unknown. The clothing can be disposable or reusable. It must include coveralls or equivalent, shoe covers, and head covers. The Contractor is responsible for laundering the clothing and for providing clean clothing at least weekly or for daily disposal of the clothing. If the contaminated clothing can be reused, the Contractor is responsible for storing it.

(C) Wash facilities

The Contractor must provide soap, water, and towels to enable MnDOT's inspectors to wash at the site. If showers are provided for the Contractor's employees, they must be available for MnDOT's inspectors, also.

The Contractor must provide a means to remove surface contamination from the inspector's clothing. That may be a HEPA vacuum, a downdraft booth (with the exhaust captured and cleaned), or other effective means that do not increase the concentration of airborne lead.

(D) Inspection Delay

MnDOT's inspectors will not enter a blasting containment area until at least fifteen minutes after blasting and other lead dust-producing activities have stopped, to permit the dust to settle. There will be no extra payment or penalty against MnDOT for this delay.

S-41.2 The following is hereby added to the end of MnDOT 2102.3:

All pavement marking removal shall be done utilizing either water blasting or sand blasting equipment. GRINDER-TYPE CUTTING HEADS SHALL NOT BE USED for pavement marking removal.

**S-42 (2104) REMOVING PAVEMENT AND MISCELLANEOUS STRUCTURES**

Abandoned structures and other obstructions shall be removed from the Right of Way and disposed of in accordance with the provisions of MnDOT 2104, except as modified below:

S-42.1 Measurement and payment for the removal and disposal of materials will be made only for those Items of removal work specifically included for payment as such in the Proposal and as listed in the Plans. The removal of any unforeseen obstruction requiring in the opinion of the Engineer equipment or handling substantially different from that employed in excavation operations, will be paid for as Extra Work as provided in MnDOT 1403.

**S-43 (2104) REMOVE AND HAUL TREATED WOOD**

If the Contractor is required to dispose of treated wood, the provisions of MnDOT 2104 are supplemented with the following:

S-43.1 The Contractor can elect to reuse the treated wood for its original intended purpose. The Contractor shall furnish a completed Transfer of Ownership form to the Engineer prior to removing any treated wood from the Project limits. The Transfer of Ownership form is available at the following website:  
<http://www.dot.state.mn.us/environment/buildingbridge/disposal.html>.

S-43.2 If the Contractor cannot or elects not to re-use the treated wood for its original intended purpose, but must be disposed, the following shall apply:

- (A) The Contractor shall dispose of all waste treated wood in a MPCA permitted Minnesota solid waste or industrial landfill. The Contractor shall not dispose of waste treated wood in a demolition landfill. Within 30 days after the treated wood is transported to the landfill, the Contractor shall provide the Engineer with shipping manifests, scale tickets and invoices. Shipping manifests shall include, but are not limited to, the following information: specify treated wood as the type of waste, quantity of wood, date of hauling and disposal, and location of disposal.
- (B) The Contractor has the option to chip creosote treated wood on site instead of hauling it to a landfill. After the wood is chipped on site, the Contractor shall transport the chipped wood off site to a MPCA permitted incinerator that is permitted to burn creosote treated wood. Call 651.366.3630 for list of incinerators permitted to burn creosoted treated wood. This applies to creosote treated wood only.

S-43.3 Measurement and payment for the removal and disposal of treated wood will be made only when specifically included for payment as such in the Proposal and as listed in the Plans. All other removal and disposal of treated wood operations shall be incidental work and no direct compensation will be made therefore.

**S-44 (2104) SALVAGE CHAIN LINK FENCE**

Salvage Chain Link Fence shall include the salvaging of all the chain link fabric, posts, caps, rails, brackets, braces, fasteners, barb wire, etc. as need to complete the work as specified. The material shall be salvaged and stored in a safe location to avoid damage and vandalism until the fence is to be installed. The Contractor shall replace any items that are currently damaged or are damaged during the salvaging or storing process at the Contractors expense. All posts that are currently set in concrete or will be used as corner posts in the new fence alignment shall be set or reset in new concrete.

Measurement will be made by the Lineal Feet as measured along the centerline of the fence. Payment will be made under Item 2104.521 Salvage Chain Link Fence at the Contract bid price per Lineal Feet, which shall be compensation in full for all equipment, labor and materials necessary to complete the work as specified.

**S-45 (2105) EXCAVATION AND EMBANKMENT**

Roadway excavation and embankment construction shall be performed in accordance with the provisions of MnDOT 2105, except as modified below:

S-45.1 MnDOT 2105.2A2 Rock Excavation is revised to read as follows:

Rock excavation shall consist of all materials that cannot, in the Engineer's opinion, be excavated without drilling and blasting or without the use of rippers, together with all boulders and other detached rock each having a volume of 1 cubic meter (**1 cubic yard**) or more, but exclusive of those quantities that are to be paid for separately under the item of rock channel excavation.

S-45.2 The last paragraph in MnDOT 2105.3B Preparation of Embankment Foundation, is revised to read as follows:

Before backfilling depressions within the roadway caused by the removal of foundations, basements, and other structures, the Contractor shall enlarge the depressions as directed by the Engineer.

S-45.3 The first and second sentences in the second paragraph in MnDOT 2105.3D Disposition of Excavated Material, are revised to read as follows:

When the soils are so varied that selection and placement of uniform soils is not practical, the Contractor shall use disks, plows, graders or other equipment to blend and mix suitable soils to produce a uniform soil texture, moisture content and density; except that, all soils that contain 20 percent or more particles passing the 75  $\mu\text{m}$  (**#200**) sieve shall be blended, mixed and dried with a disk, within the

entire upper 2 meters (**6 feet**) of embankment. The disk shall meet the requirements of 2123 N, Disk Harrow. A disk is also to be used below the upper 2 meters (**6 feet**) of the embankment fill area, if in the opinion of the Engineer, the Contractor is not producing a uniform soil texture.

S-45.4 The fifth paragraph in MnDOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

Peat, muskeg, and other unstable materials that are not to be used in the roadbed embankments shall be deposited in the areas indicated in the Plans or elsewhere as approved by the Engineer. All other material that is considered unsuitable for use in the upper portion of the roadbed shall be placed outside of a 1:1 slope down and outward from the shoulder lines on fills under 10 m (**30 feet**) in height or outside of a 1 vertical to 1.5 horizontal slope down and outward from shoulder lines on fills over 10 m (**30 feet**) in height, or used to flatten the embankment slopes, or disposed of elsewhere as approved by the Engineer.

S-45.5 The second sentence in the eighth paragraph of MnDOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

No stones exceeding 150 mm (**6 inches**) in greatest dimension will be permitted in the upper 1 m (**3 feet**) of the roadbed embankment.

S-45.6 The fourth to last paragraph in MnDOT 2105.3D Disposition of Excavated Material, which begins with “All combustible debris materials (stumps, roots, logs, brush, etc.) together with all...” is hereby deleted and replaced with the following:

All noncombustible materials other than soils (oversized rock, broken concrete, metals, plastic pipe, etc.) shall be disposed of in accordance with 2104.3C.

S-45.7 The ninth paragraph of MnDOT 2105.5 is hereby deleted and replaced with the following:

If the Proposal fails to include a bid item for rock excavation or rock channel excavation, and material is uncovered that is so classified, excavation of the rock will be paid for separately at the Contract price for common excavation or common channel excavation, plus an additional \$26.00 per cubic meter (**\$20.00 per cubic yard**) . If no bid item is provided for common channel excavation, excavation of materials classified as rock channel excavation will be paid for at the Contract price for common excavation plus an additional \$28.00 per cubic meter (**\$21.50 per cubic yard**). Such stipulated prices for rock excavation will apply up to a maximum of 200 m<sup>3</sup> (**260 cubic yards**) of excavation per item or to such quantity as may be performed by mutual consent prior to execution of an Extra Work agreement.

S-45.8 The eleventh paragraph of MnDOT 2105.5 is hereby deleted and replaced with the following:

- (a) That portion of the additional excavation that is removed from below a plane parallel to and 5 m (**15 foot**) below the natural ground surface will be measured in 2 m (**5 foot**) depth zone increments and paid for separately at adjusted unit prices. The adjusted unit price will be equal to the Contract bid price for muck excavation plus \$0.39 per cubic meter (**\$0.30 per cubic yard**) for the additional excavation within the 5-7 m (**15-20 foot**) depth zone and an additional \$0.26 per cubic meter (**\$0.20 per cubic yard**) for each additional 2 m (**5 foot**) increment of depth beyond 7 m (**20 foot**).

S-45.9            Compaction of all embankment construction, including culvert backfills, shall be obtained by the "Specified Density Compaction" method described in MnDOT 2105.3F.

**S-46            (2211) AGGREGATE BASE**

Aggregate base courses shall be constructed in accordance with the provisions of MnDOT 2211 except as modified below:

S-46.1            Compaction shall be achieved by the "Penetration Index Compaction Method" described in MnDOT 2211.3C.

S-46.2            The first sentence in MnDOT 2211.3F1 Gradation Control, is revised to read as follows:

The Contractor and/or aggregate producer shall be responsible for maintaining a gradation control program in accordance with the random sampling acceptance method described in the MnDOT Grading and Base Manual.

S-46.3            MnDOT 2211.3F2(d) under Acceptance Testing is hereby deleted and replaced with the following:

- (d) Samples for gradation testing will be taken randomly by the Engineer prior to compaction, in accordance with the random sampling method described in the Grading and Base Manual. All gradation tests will be reported to the nearest whole number, except the 75 $\mu$  [#200] sieve will be reported to the nearest one tenth of one percent (0.1%).

S-46.4            MnDOT 2211.3F2(j) under Acceptance Testing, is revised to read as follows:

- (j) One gradation sample will be taken from each subplot and tested. Payment will be based on the average results from the four subplot samples for each specified sieve.

S-46.5            The third paragraph after MnDOT 2211.3F2(k) under Acceptance Testing, is revised to read as follows:

A 5% price reduction will be assessed to both individual or averaged test lots for each test result that fails to meet specified gradations for sieve sizes not listed in Tables 2211-B and 2211-C by more than 2%. These price reductions are

cumulative and shall be analyzed both separately and averaged by lot when applicable.

S-46.6 Table 2211-B in MnDOT 2211.3F2 Acceptance Testing, is hereby deleted and replaced with the following:

**Table 2211-B**  
**AGGREGATE BASE PAYMENT SCHEDULE**  
**(4 Sublots/4 Samples)**

% Passing Outside Specified Limits*		
4.75 mm (#4), 2.00 mm (#10), and 425 µm (# 40) Sieves	75 µm (#200) Sieve	Acceptance Schedule (Price Reduction)
1	0.1	5%
-----	0.2	6%
-----	0.3	9%
-----	0.4	11%
-----	0.5	14%
2	0.6	15%
> 2	> 0.6	Corrective Action
<p>*Based on average of 4 tests            Price reductions for more than one failing sieve size shall be cumulative. The compensation due to the Contractor for the quantity of material represented by the failing test results shall be reduced by the sum of the respective percentages.            The Contractor does not have the option of taking a price reduction in lieu of complying with the Specifications.</p>		

S-46.7 The following is added to Table 2211-C in MnDOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Substantial compliance will be eliminated when two or more test failures occur and test failures meeting substantial compliance will be subject to the next higher price reduction. One sieve failure = one test failure. Test failures for each material type will be treated separately.

S-46.8 The following is added to Table 2211-D in MnDOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Substantial compliance will be eliminated when two or more test failures occur

and test failures meeting substantial compliance will be subject to the next higher price reduction. Test failures for each material type will be treated separately.

**S-47**            **(2221) AGGREGATE SHOULDERING**

Aggregate shouldering courses shall be constructed in accordance with the provisions of MnDOT 2221 except as modified below:

S-47.1            Compaction shall be achieved by the "Penetration Index Compaction Method" described in MnDOT 2211.3C.

S-47.2            The second sentence in MnDOT 2221.1 Description, is revised to read as follows:  
The aggregate shouldering shall be produced and placed under the Contractor's quality control program in accordance with the MnDOT Grading and Base Manual.

S-47.3            The following is hereby inserted after the first paragraph of MnDOT 2221.3C Spreading and Compacting:

Water shall be applied to the shouldering material during the mixing and spreading operations so that at the time of compaction the moisture content is not less than 5 percent of the dry weight.

**S-48**            **(2357) BITUMINOUS TACK COAT**

The provisions of MnDOT 2357 are hereby deleted and replaced with the following:

**2357.1    DESCRIPTION**

This work consists of applying bituminous material (emulsion or cutback asphalt) on a bituminous or concrete pavement prior to paving a new lift of Plant Mixed Asphalt.

**2357.2    MATERIALS**

**A   Bituminous Material .....3151**

The bituminous material for tack coat will be limited to one of the following kinds of emulsified asphalt. Use of medium cure cutback asphalt (MC-250) is allowed during the early and late construction season when it is anticipated the air temperature may drop below 32 degrees Fahrenheit.

Allowable grades are as follows:

**Emulsified Asphalt**

AASHTO 208 Dilution of the emulsion to 7 parts emulsion to 3 parts water is only allowed by the supplier. **No field dilution is allowed.** The storage tank for diluted emulsion must have a recirculation system or agitator that will prevent settlement or separation of the material.

Table 2357-1-- Residual Asphalt Content		
	Minimum Residual Asphalt Content	
Emulsion	Undiluted	Diluted (7:3)
CSS-1 or CSS-1h	57%	40%

Cutback Asphalt

Medium Cure Liquid Asphalt .....MC-250

Only Certified Sources are allowed for use. MnDOT’s Certified Source List is located at the following link: <http://www.dot.state.mn.us/products/index.html>.

**2357.3 CONSTRUCTION REQUIREMENTS**

**A Restrictions**

Conduct tack coat operations in a manner that offers the least inconvenience to traffic. Maintain movement in at least one direction at all times without pickup or tracking of the bituminous material.

Do not apply the tack coat when the road surface or weather conditions are unsuitable as determined by the Engineer. Limit the daily application of tack coat to approximately the area on which construction of the subsequent bituminous course can reasonably be expected to be completed that day.

**B Equipment**

Apply the bituminous material with a distributor meeting the requirements of 2360.3.B.2.d.

**C Road Surface Preparations**

Apply the bituminous tack coat material to a dry and clean roadway surface. All necessary repairs or reconditioning must have been completed as provided for in the Contract and approved by the Engineer.

Remove all foreign matter on the road surface before applying tack coat and dispose of as approved by the Engineer.

Before placing an abutting bituminous course, provide a uniform coating of liquid asphalt or emulsified asphalt to the contact surfaces of all fixed structures and at the edge of the in-place mixture in all courses at transverse joints and in the final wearing course at longitudinal joints.

**D Application of Bituminous Tack Coat Material**

Unless otherwise indicated in the Plans or provisions, apply the bituminous tack coat material within the application rates shown below in Table 2357.3-D as based on pavement type or condition and type of bituminous material. **Dilution of asphalt emulsion in the field is not allowed.**



All tack must break, turn from brown to black, before paving the subsequent lift or course. Do not allow vehicles to drive on tack that has not broken.

Apply a uniform tack coat to the existing asphalt or concrete surface and to the surface of each course or lift constructed, except for the final course or lift. Tack each lift when placing multiple lifts in the same day. Uniform application will not have streaks (corn rows), bare spots, puddles, or other irregular patterns. The Engineer will compare the freshly sprayed emulsion to a brown sheet of construction paper or a black sheet of construction paper for broken tack to determine conformance with tack application uniformity.

Using a distance of 1,000 feet [300 meter] perform a yield check at the beginning of each project to verify the application rate is correct. The Engineer may require additional yield checks be performed if the application rate is questioned.

The Engineer may also require the Contractor to verify application is within 10% of the intended application rate by ASTM D 2995 test method A.

Table 2357-2 Tack Coat Application Rates			
Surface Type	Application Rates -- gallons/square yard [ <b>liters/square meter</b> ]		
	Undiluted Emulsion	Diluted Emulsion (7:3) <sup>1</sup>	MC Cutback <sup>2</sup>
New Asphalt	0.05 to 0.07 [ <b>0.23 to 0.32</b> ]	0.08 to 0.10 [ <b>0.36 to 0.45</b> ]	0.05 to 0.07 [ <b>0.23 to 0.32</b> ]
Old Asphalt <sup>3</sup> and PCC	0.08 to 0.10 [ <b>0.41 to 0.50</b> ]	0.13 – 0.15 [ <b>0.59 to 0.68</b> ]	0.09 to 0.11 [ <b>0.41 to 0.50</b> ]
Milled Asphalt and Milled PCC	0.07 to 0.11 [ <b>0.41 to 0.50</b> ]	0.10 – 0.13 [ <b>0.45 to 0.59</b> ]	0.09 to 0.11 [ <b>0.41 to 0.50</b> ]

- 1- As provided by the asphalt emulsion supplier
- 2- Use when approved by the Engineer
- 3- Older than 1 year

**E Bituminous Temperature**

The application temperature of the bituminous material will be:

- CSS-1, CSS-1H.....70 to 160° F (**21 to 71°C**)
- MC-250.....165 to 220° F (**74 to 104°C**)

**F Bituminous Sampling**

Sample asphalt emulsion from either the spigot or a nozzle on the distributor according to the schedule of materials control.

**G Pedestrian Crossings**

Spread sand on newly tacked surfaces at regularly utilized and open for public use pedestrian crossings.

**H Acceptance of Tack Material**

Assess a monetary deduction of 5% of the mix price for failures related to 3151 or workmanship/application, as determined by the Engineer. The basis of measurement for deficiencies related to material and workmanship/application is full width of the lane by station.

**2357.4 METHOD OF MEASUREMENT**

**A Bituminous Material**

Bituminous material used for tack coat will be measured by volume at 15°C (60° F).

**2357.5 BASIS OF PAYMENT**

**Payment for the accepted quantity of asphalt emulsion and cutback shall be at the Contract price per unit of measure for undiluted asphalt emulsion and neat cutback.** Furnishing and applying sand on newly tacked surfaces at pedestrian crossings shall be at no expense to the Department with no direct compensation being made therefore. Should the Contract fail to include a Contract Item covering payment for the bituminous material used for tack coat, all costs of furnishing and applying bituminous tack coat material will be included in the compensation provided for the bituminous mixture, with no measurement made of the bituminous material used and with no direct compensation being made therefore.

Payment for the tack coat will be made on the basis of the following schedule:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
2357.502	Bituminous Material for Tack Coat .....	Liter [ <b>gallon</b> ]

**S-49 (2360) PLANT MIXED ASPHALT PAVEMENT**

MnDOT 2360 is hereby deleted from the MnDOT Standard Specifications and replaced with the attached **2360 (Plant Mixed Asphalt Pavement) Specification.**

S-49.1 Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

Type SP 12.5 Wearing Course            SPWEB340C

Type SP 12.5 Non-Wearing Course    SPNWB330B

S-49.2 The sentence “In addition to the list the above pavement surface must meet requirements of 2399 (Pavement Surface Smoothness) requirements.” is deleted from **2360.3.E Surface Requirements** of the attached **2360 (Plant Mixed**

**Asphalt Pavement) Specification.** The requirements of 2360.3.E Surface Requirements will apply.

S-49.3 The first paragraph of 2360.2.G.4.b Sampling and Testing of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is revised as shown below:

Take QC samples at random tonnage or locations, quartered from a larger sample of mixture. Sample randomly and in accordance with the Schedule of Materials Control. Determine random numbers and tonnage or locations using the Bituminous Manual; Section 5-693.7 Table A or ASTM D 3665, Section 5, or, an Engineer approved alternate method of random number generation. ~~Sample either behind the paver or from the truck box at the plant site. Other sampling locations can be approved by the Engineer. The Contractor must decide and notify the Engineer where samples will be taken before production begins. The Contractor and Engineer must both agree to a change of sampling location once production has begun.~~ **Sample mixture from behind the paver. Sampling from the truck box at the plant site is not allowed unless approved by the Engineer. In addition to the QC sample, the Contractor will also bring an additional split of the mixture sample to the plant site and store for the Department for 10 calendar days.** The procedure for truck box sampling is on the Bituminous Office website. The Contractor will obtain at least a 130 pound [60 kg] sample. Split the sample in the presence of the Inspector. The Inspector will retain possession of the Agency portion of each split sample that is taken and randomly submit a minimum of one sample, on a daily basis, to the District Laboratory for Verification testing (see 2360.2.G.3). Store compacted mixture specimens and loose mixture companion samples for 10 calendar days. Label these split companion samples with companion numbers.

S-50 **(2461) STRUCTURAL CONCRETE**

MnDOT 2461 shall be deleted and replaced with the following:

**2461.1 DESCRIPTION**

This work consists of producing, providing, placing, curing, and protecting portland cement concrete for placement in structures, pavements and incidental construction.

**2461.2 MATERIALS**

**A Cementitious Materials**

Provide cementitious materials from certified sources listed on the Approved/Qualified Products list.

Use Type I or Type I/II portland cement to produce Type 1 non-air-entrained concrete.

Use Type I or Type I/II portland cement and an air-entraining admixture listed on the Approved/Qualified Products List to produce Type 3 air-entrained concrete.

Use Type III portland cement as allowed by the Contract or the Engineer.

**A.1 Portland Cement .....3101**  
**A.2 Ground Granulated Blast Furnace Slag .....3102**  
**A.3 Blended Hydraulic Cement.....3103**  
**A.4 Fly Ash .....3115**  
**A.5 Cementitious Content**

Provide concrete with the minimum cementitious content for the grades and slumps of concrete in accordance with Table 2461-1:

<b>Table 2461-1</b>								
<b>Minimum Cementitious Content,</b>								
<i>lb per cu. yd [kg per cu. m]</i>								
<b>Specified Slump Limit, in [mm]</b>	<b>Grades</b>							
	<b>U</b>	<b>V</b>	<b>W</b>	<b>X</b>	<b>Y</b>	<b>A</b>	<b>B</b>	<b>C</b>
1 [25]	800 [475]	730 [435]	—	—	—	—	—	—
2 [50]	830 [490]	765 [455]	660 [390]	630 [375]	570 [340]	530 [315]	490 [290]	420 [250]
3 [75]	850 [505]	730 [475]	695 [410]	665 [395]	605 [360]	560 [335]	515 [305]	445 [265]
> 3 [75]	—	—	730 [475]	700 [415]	640 [380]	590 [350]	540 [320]	470 [280]

Except for grout mixtures, limit the maximum cementitious content for a cubic yard [cubic meter] of concrete to 850 lb [505 kg].

**A.6 Cementitious Substitutions**

The Contractor may replace Type I or Type I/II portland cement with other cementitious materials in accordance with the following restrictions:

- (1) Maximum of 15 percent substitution of Class C or Class F Fly Ash, on a one for one basis, by weight of the designed portland cement;
- (2) For Department designed mixes, the Department will adjust the batch weight of coarse aggregates to compensate for volume changes due to cementitious substitutions;

- (3) Maximum of 33 percent substitution of Class C or Class F Fly Ash for concrete pavement, on a one for one basis, by weight of the designed portland cement;
- (4) Maximum of 35 percent substitution of slag, on a one for one basis, by weight of the designed portland cement; and
- (5) Ternary mixes (portland cement and two other supplementary cementitious materials) are allowed when approved by the Engineer, in conjunction with the Concrete Engineer, or required by or allowed in the Contract.

<b>B</b>	<b>Fine Aggregate .....</b>	<b>3126</b>
<b>C</b>	<b>Coarse Aggregate .....</b>	<b>3137</b>
	Unless otherwise required by the Contract, the Contractor may select the class of coarse aggregate as defined in 3137.2.B, "Classification."	
<b>D</b>	<b>Water.....</b>	<b>3906</b>
<b>E</b>	<b>Concrete Admixtures.....</b>	<b>3113</b>

The Contractor may use the following admixtures listed on the Approved/Qualified Products List:

- (1) Type A, "Water Reducing and Mid-Range Water Reducing Admixtures,"
- (2) Type B, "Admixtures Identified as Hydration Stabilizers,"
- (3) Type D, "Water Reducing and Retarding Admixtures"
- (4) Type S, "Viscosity Modifying Admixtures."

Use of any other admixtures in the concrete requires approval of the Concrete Engineer unless otherwise required by or allowed in the Contract.

When incorporating admixtures into the concrete:

- (1) Use admixture dosage rates recommended by the manufacturer.
- (2) Add all admixtures at the plant.
- (3) Provide admixture additions at the job site that are the same products as originally incorporated into the mix.
- (4) Use calcium chloride in concrete as approved by the Engineer, in conjunction with the Concrete Engineer. Do not use calcium chloride in units containing prestressing steel or in bridge superstructure concrete.

**E.1 Use of Additional Admixtures**

On a case by case basis, the Engineer, in conjunction with the Concrete Engineer, will consider the use of the following admixtures, added either at the plant or at the job site, as listed on the Approved Products list:

- (1) Type C, “Accelerating Admixtures”
- (2) Type E, “Water Reducing and Accelerating Admixtures”
- (3) Type F, “Water Reducing, High Range Admixtures”
- (4) Type G, “Water Reducing, High Range and Retarding Admixtures”

**E.1.a Delivery Time Beyond 90 Minutes**

If the haul time does not facilitate mixing and placing the concrete within 90 minutes, perform the following procedures for pre-qualifying a concrete mix to extend the delivery time to 120 minutes. Extending the delivery time beyond 120 minutes will require additional testing at 30 minute intervals up to the maximum desired delivery time as directed by the Concrete Engineer.

- (1) Provide a Contractor mix design in accordance with 2461.3G2 for each combination of materials.
- (2) Specification 2461.3D is modified to allow up to 25% fly ash replacement for cement. All other requirements of 2461 apply.
- (3) Laboratory trial batching on the proposed mix includes the following testing requirements:
  - a) Perform all laboratory trial batching at an AMRL accredited laboratory.
  - b) Perform all plastic concrete testing after adding all admixtures to the concrete mixture.
  - c) Perform slump, air content, unit weight and temperature testing immediately after batching and at 90 and 120 minutes.
  - d) Fabricate concrete cylinders for compressive strength at 90 and 120 minutes (sets of 3) and cylinders for hardened air content testing at 90 and 120 minutes (sets of 5).
  - e) Test the cylinders for compressive strength at 28 days.
  - f) Determine the hardened air content (ASTM C457) at a minimum of 7 days. The Contractor is required to test at 2 samples representing 90 minutes and 2 samples representing 120 minutes and provide MnDOT with the other 6 samples for testing at their discretion. Retain any hardened concrete test specimens for a minimum of 90 days for MnDOT to examine at their discretion.
  - g) Ensure the admixture manufacturer’s technical representative is present during the trial batching.
  - h) Contact the MnDOT Concrete Engineering Unit a minimum of 2 days prior to mixing. This same 2 day notification is required prior to any physical testing on hardened concrete samples.

- i) Once accepted by the Concrete Engineer, the laboratory trial batching is considered acceptable for use for 5 years, unless it is determined the material sources have changed significantly since the initial laboratory testing and acceptance. In all cases, the Engineer will require field trial batching on a project specific basis.
- (4) Field trial batching on the proposed mix for each specific project shall include batching in the presence of the Engineer and the following:
- (a) Provide a QC Plan for extending the delivery time beyond 90 minutes.
  - (b) Mix and transport the concrete using the same materials as were utilized in the laboratory trial batching.
  - (c) Batch a minimum 5 cu. yd (4 cu. m) of concrete utilizing the same methods intended for use when supplying concrete placed into the permanent work.
  - (d) Maintain the ready mix truck in transit; by either driving around the yard or on the roadway; and maintain the drum speed at 5 to 7 revolutions per minute for the entire 120 minutes.
  - (e) Perform all plastic concrete testing after adding admixtures to the concrete mixture.
  - (f) Perform slump, air content, unit weight and temperature testing at 90 and 120 minutes.
  - (g) Fabricate concrete cylinders for compressive strength at 90 and 120 minutes (sets of 3) and cylinders for hardened air content testing at 90 and 120 minutes (sets of 2).
  - (h) Test the cylinders for compressive strength at a minimum of 7 days.
  - (i) Determine the hardened air content (ASTM C457) at a minimum of 7 days. The Contractor is required to test 1 sample representing 90 minutes and 1 sample representing 120 minutes and provide MnDOT with the other 2 samples for testing at their discretion. Retain any hardened concrete test specimens for a minimum of 90 days for MnDOT to examine at their discretion.
  - (j) Incorporate the trial batch concrete into other work with the approval of the Engineer.
  - (k) The Contractor must demonstrate to the Engineer the ability to properly mix, control and place the concrete.
- (5) The Concrete Engineer, in coordination with the Engineer, will review the trial batch results and all related concrete testing for compliance with the QC

Plan and the Contract. Final approval of the mixture is based on satisfactory field placement and performance.

**F Concrete Mix Designs**

**F.1 Department Designed**

The Department will provide the estimated composition of concrete mixes unless otherwise required by the Contract.

The Department may adjust the mix composition of the concrete without adjusting the Contract unit price for any Contract items.

**F.1.a Concrete Yield**

The Department defines concrete yield as the ratio of the volume of mixed concrete, less accountable waste, to the planned volume of the work constructed. The Department will not assume responsibility for the yield from a given volume of mixed concrete.

**F.1.b High-Early Strength Concrete**

When the Engineer requires high-early strength concrete, the concrete is designed in accordance with the following:

- (1) Increasing the cement content of the concrete up to 30 percent; using an approved accelerator as allowed by the Engineer, in conjunction with the Concrete Engineer; or both.
- (2) Using 100 percent portland cement, unless allowed by the Contract or the Engineer.
- (3) A maximum cement content for a cubic yard [cubic meter] of concrete not to exceed 900 lb [535 kg].
- (4) A water/cement ratio not to exceed 0.38 for Type 3 Concrete unless otherwise required by the Contract.

**F.2 Contractor Designed**

Design the concrete mix based on an absolute volume of 27.00 cu. ft  $\pm$  0.10 cu. ft [1.000 cu. m  $\pm$  0.003 cu. m] for the following:

- (1) Concrete paving mixes in accordance with 2301, "Concrete Pavement;"
- (2) Concrete mixes with an anticipated or required 28-day compressive strength of at least 5,000 psi [34 MPa];
- (3) Precast concrete in accordance with 2405, "Prestressed Concrete Beams," 2412, "Precast Concrete Box Culverts," 3236, "Reinforced Concrete Pipe," 3238, "Precast Concrete Box Culverts," 3621, "Concrete Masonry Units," 3622, "Sectional Concrete Manhole and Catch Basin Units," and 3630, "Precast Concrete Median Barriers;"



- (4) Colored concrete;
- (5) Stamped concrete;
- (6) Cellular Concrete Grout – Controlled Low Strength Material (CLSM);
- (7) Extended Delivery Times Beyond 90 minutes; and
- (8) Concrete as otherwise required by the Contract.

Submit the concrete mixes using the MnDOT Contractor Mix Design Submittal Package available on the Department’s website at least 21 calendar days before initial placement of the concrete mix. The Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data for mix design calculations.

The Concrete Engineer, in coordination with the Engineer, will review the mix design submittal and will approve the materials and mix design for compliance with the Contract.

The Contractor assumes full responsibility for the mix design and performance of the concrete.

The Engineer determines final acceptance of the concrete for payment based on satisfactory field placement and performance.

**F.3 Classification of Concrete**

The Department will classify concrete by type, grade, consistency, and aggregate size. Refer to the mix number and Table 2461-2 to determine the mix requirements for each item of work.

<b>Table 2461-2</b>				
<b>Mix Number Identification</b>				
<b>First Digit</b>	<b>Second Digit</b>	<b>Third Digit</b>	<b>Fourth Digit</b>	<b>Additional Digits</b>
Type	Grade	Slump range	Coarse aggregate gradation range	Class A coarse aggregate when required, modified mix designation, or both

Refer to individual Contract items in the Standard Specification for Mix Numbers. Deviations from the specified Mix Numbers require coordination with the Concrete Engineer.

If the Contract does not show a concrete mix number, provide Type 3, Grade Y concrete with a slump and aggregate gradation determined by the Engineer.

The Department will designate grout by type and grade followed by the word “GROUT.” Do not provide grout containing coarse aggregate. If the plans do not show a type or grade for grout, provide 3A GROUT.

**F.3.a Type Designation**

Provide Type 1 or Type 3 concrete in accordance with Table 2461-3:

<b>Table 2461-3 Concrete Type Designation</b>		
<b>Concrete Type</b>	<b>Target Air Content*, %</b>	<b>Maximum Water/Cement Ratio  </b>
1	2.0	≤ 0.53 for 1A43 ≤ 0.68 for 1C62 ≤ 0.64 for 1C Grout
3	6.5 †	≤ 0.45 †#
<p>* For concrete mix design purposes only.     The water/cement ratio is defined as the ratio of the total water weight to the total cementitious weight.  † Unless otherwise required by 2301 or elsewhere in the Contract.  #The maximum water/cement ratio for machine placed concrete is 0.42.</p>		

**F.3.b Grade Designation**

The Department will designate concrete grade using a letter to represent the anticipated compressive strength and the minimum cementitious content in accordance with 2461.2.A.5, “Cementitious Content,” and Table 2461-4:

<b>Table 2461-4 Concrete Grade Designation</b>		
<b>Concrete Grade</b>	<b>Type 1 Anticipated Compressive Strength, psi [MPa] *</b>	<b>Type 3 Anticipated Compressive Strength, psi [MPa] *</b>
U	6,300 [43]	5,600 [39]
V	6,000 [41]	5,300 [37]
W	5,700 [39]	5,000 [34]
X	5,400 [37]	4,700 [32]
Y	5,000 [34]	4,300 [30]
A	4,500 [31]	3,900 [27]
B	4,100 [28]	3,400 [23]
C	3,200 [22]	2,700 [19]
<p>* Anticipated minimum strength produced in accordance with the Department specifications and cured for 28 days under laboratory conditions.</p>		

The Concrete Engineer, in coordination with the Engineer, may increase the cement content for concrete with test cylinder results less than the anticipated compressive strength in accordance with Table 2461-4, “Concrete Grade Designation.” The Contractor may request an increase in the cement content as approved by the Engineer, in conjunction with the Concrete Engineer.

**F.3.c Slump Designation**

Refer to the slump designation for the upper limit of the slump range without a water reducer in accordance with Table 2461-5:

<b>Table 2461-5 Slump Designation</b>	
<b>Slump Designation</b>	<b>Slump Range without Water Reducer, in [mm]</b>
1	½ – 1 [12 – 25]
2	1 – 2 [25 – 50]
3	1 – 3 [25 – 75]
4	2 – 4 [50 – 100]
5	2 – 5 [50 – 125]
6	3 – 6 [75 – 150]

**F.3.d Coarse Aggregate (CA) Designation**

Refer to the coarse aggregate designation for the range of optional coarse aggregates gradations allowed in the mix in accordance with Table 3137-4, “Coarse Aggregate Designation for Concrete,” and Table 2461-6:

<b>Table 2461-6 Coarse Aggregate Designation for Concrete</b>	
<b>Range</b>	<b>Optional Coarse Aggregate Designation</b>
0	CA-00 only
1	CA-15 to CA-50, inclusive
2	CA-15 to CA-60, inclusive
3	CA-35 to CA-60, inclusive
4	CA-35 to CA-60, inclusive
5	CA-45 to CA-60, inclusive
6	CA-50 to CA-70, inclusive
7	CA-70 only
8	CA-80 only

**F.3.e Additional Designations**

For mix designs that require a specified class of coarse aggregate as defined in 3137.2.B, "Classification," an additional letter will follow the fourth digit of the Mix Number such as "A" (Class A Aggregate Requirement).

The Engineer may identify special concrete mix designations with additional letters following the last digit such as "HE" (High Early), "WC" (Water/Cement Ratio), "HPC" (High Performance Concrete), "MS" (Microsilica), or others.

**2461.3 CONSTRUCTION REQUIREMENTS**

**A Batching Equipment**

**A.1 Mixer Requirements**

Provide stationary mixers or truck mixers.

**A.2 General Condition**

Maintain mixers as necessary to detect changes in condition due to accumulations of hardened concrete or mortar and examine to detect wear of blades.

Replace or recondition pickup and throwover blades in mixers with a rated capacity less than 14 cu. ft [0.40 cu. m] showing a blade wear loss of greater than ½ in [13 mm], and pickup and throwover blades in mixers of greater capacity, showing a blade wear loss of no greater than ¾ in [19 mm] from the original factory dimensions.

**A.3 Manufacturer's Rating Plate**

Provide mixers that include the manufacturer's rating plate, showing the following information:

- (1) Serial number of the unit,
- (2) Mixing speed of the drum or paddles, and
- (3) Maximum capacity in terms of volume of mixed concrete.

**A.4 Drum Speed for Stationary Mixers**

Operate the drum speed in the mixer as specified by the manufacturer or as directed by the Engineer.

**A.5 Auxiliary Equipment Requirements**

Provide mixers equipped with the following:

- (1) Timing device,
- (2) Discharge locking device,
- (3) Water measuring device that operates mechanically and automatically during each batching cycle, and

- (4) A graduated adjustable indicator device to represent the volume of discharge in increments no greater than  $\frac{1}{4}$  gal [1 L] in full view.

**A.6 Mixer Capacity**

Do not exceed the manufacturer's rated capacity of the mixer when mixing a single batch of concrete.

Batch concrete in volumes the mixer can accommodate without spilling, leaking, or segregating during the charging, mixing, or discharging operations. Provide mixers with a capacity of at least 1 sack [0.25 cu. m].

**A.7 Mixing Time**

The Department defines the mixing time as the time period beginning when the cement and aggregates enter the mixer drum and ending when the discharge begins.

Refer to the manufacturer's recommended minimum mixing time for single drum and dual drum mixers. In the absence of manufacturer's recommendation, the Engineer will designate the minimum mixing time. The minimum mixing time for any concrete batch is 60 s. The Contractor may reduce the manufacturer's recommended minimum mixing time or the Engineer designated mixing time if the Contractor obtains uniform mixing in accordance with 2461.3.E, "Mixing Requirements," and as approved by the Engineer, in conjunction with the Concrete Engineer.

If there is evidence of inadequately mixed concrete (unmixed or partially mixed materials) during concrete placement, the Engineer may direct an increase in the mixing time.

**A.8 Turbine Type Mixers**

Provide turbine type mixers meeting the applicable requirements for conventional type mixers (2461.3.A.1 through 2461.3.A.7) and in accordance with this subsection (2461.3.A.8). Maintain the mixer drum in a cylindrical shape within  $\frac{3}{4}$  in [19 mm] from the original factory dimensions at any point. Maintain the mixer discharge gate in a mortar tight condition in the closed position. Replace or recondition mixer paddles showing a wear loss greater than  $\frac{1}{2}$  in [13 mm] from the original factory dimensions.

Add the mixing water to the batch materials in a manner that distributes the water to the inner or central areas of the drum. Start the flow of water before introducing the solid batch materials into the mixer drum.

During mixing, operate the paddles at a speed between 20 revolutions and 30 revolutions per minute. After adding the batch materials to the drum, mix the concrete for an additional 60 s.

**A.9 Horizontal Axial-Revolving Blade Type Mixers**

Provide horizontal axial-revolving blade type mixers in accordance with the applicable requirements for conventional type mixers (2461.3.A.1 through 2461.3.A.7) and in accordance with this subsection (2461.3.A.9).

Charge the water, aggregates, and cement in the sequence approved by the Engineer. Test the concrete uniformity as directed by the Engineer. The Engineer will use concrete uniformity tests to determine the minimum mixing time.

**B Transportation Units**

**B.1 General Requirements**

Equip transportation units intended for both mixing and agitating with watertight revolving drums mounted and powered and fitted with properly designed mixing blades in accordance with 2461.3.A.1 through 2461.3.A.7. Provide units capable of combining all the ingredients into a homogeneous mixture and designed to provide two drum speeds, one for mixing and the other for agitating. Provide units capable of delivering the concrete without segregation or loss of any of the batch materials.

Equip the mixer drum with a working counting device to record the number of revolutions.

Equip dump trucks and agitator trucks with vibrators to aid in discharge.

**B.2 Capacity of Transportation Units**

Refer to the truck mixer manufacturer's certification plate attached to the unit for the maximum capacity of the unit. If the unit will not satisfactorily mix the maximum volume shown, reduce the batch volume to allow proper mixing or discontinue use of the mixing unit as directed by the Engineer until the problem is corrected.

**C Handling and Storing Materials**

**C.1 Batch Material Requirements**

Do not change the source, kind or gradation of batch materials after the start of concrete production for the work unless otherwise approved by the Engineer. If the Engineer approves use of different material, completely exhaust the supply on hand before changing to the different material.

If delivering freshly washed aggregates to the batching plant, drain the aggregates for at least 12 h before using in the batching operation. If draining freshly washed aggregates at the site of the batching plant, completely separate the drained material from the undrained materials, and provide for the disposal of water that accumulates from the drainage of materials.

Provide smooth, firm, and well-drained stockpile sites cleared of vegetable and extraneous matter. Where the natural foundation is unsatisfactory, as determined by the Engineer, construct the stockpiles on suitable platforms. Construct suitable bulkheads or partitions to separate different kinds of aggregate, gradation, or water content.

Construct stockpiles by methods that hold segregation and degradation to a minimum. If the Engineer sees segregation or degradation, the Engineer may designate that pile as unacceptable for use.

Do not use aggregates used to construct runways for loading or hauling equipment in concrete batches.

Use of aggregates from the bottom 1 ft [0.3 m] of a stockpile placed on an unprepared surface in concrete batches is allowed only under the Engineer's direct supervision and if the material meets all requirements of 3126, "Fine Aggregate for Portland Cement Concrete," and 3137, "Coarse Aggregate for Portland Cement Concrete."

Provide aggregates in accordance with the specified gradation requirements.

The Engineer will consider aggregates unacceptable if the variation in moisture content carried by any of the aggregates causes a marked variation in the consistency of successive batches of the mixed concrete, and will suspend operations until corrected.

## **C.2 Concrete Temperature Control**

Produce concrete at temperatures from 50 °F to 90 °F [10 °C to 30 °C] and maintain temperatures until deposited in the work.

If necessary to maintain placement temperature, uniformly heat or cool the water, aggregates, or both, before introduction into the mixer. Control the temperature of the mixing water during heating or cooling.

Use aggregate at temperatures from 32 °F to 130 °F [0 °C to 55 °C]. Do not allow cementitious material to contact other batch material when the aggregate temperature exceeds 130 °F [55 °C].

Do not heat the cement, add salt, or add chemical admixtures to the concrete mix to prevent freezing.

Use a heating system to heat batch materials as approved by the Engineer. Do not use steam jets to spot heat the material as the work progresses.

Do not place mixer heaters intended for heating the batch materials in the mixer drum.

**D       Batching Requirements**

Calibrate weighing equipment in accordance with 1901, “Measurement of Quantities.” Inspect and calibrate the scales in accordance with the Concrete Manual.

**D.1      Batching by Weight**

**D.1.a    Proportioning Methods**

Proportion concrete batch materials by weight in a central plant or by volume as directed by the Engineer, in conjunction with the Concrete Engineer.

**D.1.b    Weighing Equipment and Tolerances**

Weigh or measure concrete mixture ingredients using load cells or meters for ready-mix and paving concrete to within the targeted batch weight in accordance with the following:

- (1) Water – 1 percent,
- (2) Cement – 1 percent,
- (3) Other cementitious materials – 3 percent,
- (4) Aggregates – 2 percent, and
- (5) Admixtures – 3 percent.

**D.1.c    Batching of Mixing Water**

Measure the mixing water on scales or water metering devices containing the following:

- (1) A discharge indicator capable of being set to within 1 gal [5 L] of a predetermined quantity,
- (2) A positive automatic shutoff valve, and
- (3) An approved inspection seal on the scale or water metering device dating the time of the previous calibration and adjustment

An authorized service agency will calibrate the water meter every 6 months and make adjustments as necessary before use meeting the requirements of the weighing procedure in the Concrete Manual.

Check the water meter for accuracy at least once each month as the work progresses.

**D.1.d    Batching of Cementitious Materials**

Weigh the cementitious material independently of the aggregates in separate compartments or on separate scales.



If the Contractor weighs the cement first and then separately records the weights of each individual cementitious material, the Contractor may weigh the cementitious materials cumulatively as approved by the Engineer, in conjunction with the Concrete Engineer.

**D.1.e   Batching of Aggregates**

If the Contractor records each individual fraction weight of aggregates separately, the Contractor may weigh aggregates cumulatively as approved by the Engineer, in conjunction with the Concrete Engineer.

**D.1.f   Admixture Proportioning**

If using two or more admixtures in a single concrete batch, add each admixture separately to prevent interaction of the different admixtures before mixing with other batch materials. Agitate admixtures to ensure homogeneous concentrations in accordance with the manufacturers recommendations.

Incorporate admixtures to the batch mix in liquid form. Maintain admixture solutions at a uniform concentration at all times. Use the solution concentration and proportions designated by the manufacturer.

If using a mechanical dispenser for proportioning Class I or Class II admixtures, provide a site gauge or meter. Have the admixture manufacturer check admixture dispensers yearly to determine accuracy and ensure unobstructed flow.

**D.2    Batching by Volume**

Proportion concrete for bridge deck overlays by volume or as required by the Contract.

If the Contractor calibrates the mixer for the specific batch materials in use, the Contractor may proportion concrete on other items of work by volume as approved by the Engineer in writing.

The Engineer will approve all methods and equipment used in volumetric proportioning.

Determine all material proportions and calibration settings on the basis of 100 lb [100 kg] of cementitious material.

Provide and use only sacked cement in the original mill containers unless the Contractor calibrates the mixer for the specific materials in use. Do not use fractional sacks.

Increase the cementitious content by 10 percent in the computation of volume proportions unless the Contractor calibrates the mixer for the specific materials in use.

**E        Mixing Requirements**

The Engineer may check the water measuring equipment for accuracy before mixing operations begin and at any other time the Engineer considers necessary.

Mix concrete by one of the following methods:

- (1) A central plant (stationary plant),
- (2) Entirely or in part in truck mixers, or
- (3) At the construction site.

Do not allow the mixing batch to merge or intermix with the subsequent dry batch during mixing.

Discharge water remaining in the drums before batching.

Mix concrete to provide a mixture that is homogeneous and uniform in color. The Engineer will reject concrete batches that show a marked variation in consistency or evidence of improper mixing as unacceptable work in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

After completely mixing the concrete, either in a central plant mixer or truck mixer, continuously agitate while in transit to the point of placement until the concrete is discharged from the unit, unless otherwise allowed by the Engineer, in conjunction with the Concrete Engineer.

If the mixing does not appear uniform, perform slump tests at the 15 percentage point and the 85 percentage points during unloading. If the results show a slump variation greater than 1½ in [38 mm], stop work and correct the mixing unit.

Produce concrete in such quantity and at such a rate as proper placement and finishing will permit. Do not re-temper partially set concrete.

Do not hand mix concrete.

**E.1      Mixing In Truck Mixer**

Charge the materials into the truck mixer drum by introducing sufficient water before adding solid materials. Perform charging operations without losing materials.

Leave the truck mixer at the plant site for a minimum of 5 min or 50 revolutions during the mixing period. Transport the concrete at agitating speed to the point of placement.

**F Certified Ready-Mix Concrete**

**F.1 Definitions**

The Department defines ready-mix concrete as one of the following:

- (1) Central-mixed concrete proportioned and mixed in a stationary plant and hauled to the point of placement in revolving drum agitator trucks or a truck mixer, or
- (2) Truck-mixed concrete proportioned in a stationary plant and fully mixed in truck mixers.

Table 2461-7 defines commonly used certified ready-mix terms.

<b>Table 2461-7 Certified Ready-Mix Terminology</b>	
Term	Definition
Mix design water	The maximum allowable water content for 1 cu. yd [1 cu. m] of concrete in accordance with MnDOT Form TP 02406, <i>Estimated Composition of Concrete Mixes</i> .
Total moisture factor	Factor used to determine total amount of water carried by a given wet aggregate.
Absorption factor	Factor used to determine the water contained within the pores of the aggregate and is held within the particles by capillary force.
Free moisture	The water that is carried on the surface of the aggregate that becomes part of the total water.
Batch water	Water actually batched into the truck by the batcher.
Total water	Batch water added to free moisture. Total water may also include the water used in diluting admixture solutions.
Temper water	Water added in mixer to adjust slump.
Total actual water	The water in the concrete mixture at the time of placement from any source other than the amount absorbed by the aggregate. It includes all batch water placed in the mixer, free moisture on the aggregate and any water added to the ready mix truck prior to placement.
Ready-Mix Producer or "Producer"	Party that is producing the concrete for the Contract. It is understood that the Ready-Mix Producer is the agent of the Contractor.

**F.2 General Requirements**

Supply ready-mix concrete in accordance with 2461.3.F.3, “Certified Ready-Mix Plant Program.”

The Engineer will reject ready-mix concrete delivered to the work site that does not meet the specified requirements for delivery time, consistency, quality, air content, or other properties as unacceptable work in accordance with 1512, “Unacceptable and Unauthorized Work.”

Provide batches for a delivered load of concrete in sizes of at least 1 cu. yd [1 cu. m].

**F.3 Certified Ready-Mix Plant Program**

Provide ready-mix concrete produced by a certified ready-mix plant. Perform quality control of concrete production under a certification program for ready-mix concrete plants.

Complete all concrete plant documentation utilizing the Concrete Ready-mix Plant QC Workbook available from the MnDOT Concrete Engineering website. Electronically submit the QC Workbook to the Engineer by the Tuesday immediately following the previous week’s production.

**F.3.a Plant Certification**

Before concrete production each season, ensure the producer performs the following:

- (1) Performs an on-site inspection at the concrete plant with the Engineer and completes a MnDOT Form 2163, *Concrete Plant Contact Report*.
- (2) Signs the report certifying compliance with the Certified Ready Mix requirements and continual maintenance of the plant. The Engineer will also sign MnDOT Form 2163, *Concrete Plant Contact Report*.
- (3) Provides a copy of the current Concrete Manual and retains it on-site.
- (4) Equips the Certified Ready-Mix Plant with a working facsimile machine or an email address.
- (5) Keeps plant reports, charts ,and supporting documentation on file at the plant site for 5 calendar years.
- (6) Provides electronic scales for weighing all materials.

**F.3.b Sampling and Testing**

Provide a MnDOT Certified Concrete Plant Level 2 Technician to oversee testing and plant operations and to remain on-site during concrete production or have cellular phone availability.

Provide facilities in accordance with 1604, “Plant Inspection – Commercial Facility,” for the use of the plant technician in performing tests.

Ensure the producer provides technicians with certification at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual. The Engineer will provide technicians with certification at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual.

Ensure the producer performs testing in accordance with the Concrete Manual and determines testing rates meeting the requirements of the Schedule of Materials Control. The Engineer performs testing in accordance with the Concrete Manual and determines testing rates meeting the requirements of the Schedule of Materials Control.

Take samples randomly using ASTM D 3665, Section 5.

Perform testing at the certified ready-mix plant site. Perform additional testing as directed by the Engineer. The Engineer may oversee the quality control sampling process.

Provide equipment and perform calibrations meeting the requirements of the following:

- (1) AASHTO T 27, “Sieve Analysis of Fine and Coarse Aggregates,”
- (2) AASHTO T 255, “Total Moisture Content of Aggregate by Drying,”
- (3) AASHTO M 92, “Wire-cloth Sieves for Testing Purpose,” and
- (4) AASHTO M 231, “Weighing Devices Used in the Testing of Materials.”

**F.3.c Gradations**

Determine the gradation of the fine aggregates and the coarse aggregates as required by the Contract. Use mechanical shakers for sieve analysis of fine and coarse aggregates.

Identify quality control companion samples with the following information:

- (1) Date,
- (2) Test number,
- (3) Time,
- (4) Type of material,
- (5) Plant, and
- (6) Sampling location.

Document gradation results on MnDOT Form 2449, Weekly Concrete Aggregate Report.

Chart all producer gradation results and Department verification gradation results of the coarse aggregate and the No. 8 [2.36 mm], No. 30 [600 μm], and No. 50 [300 μm] sieves of the fine aggregate.

The producer may request a reduction in testing rates as approved by the Engineer, in conjunction with the Concrete Engineer.

If the gradation tests on split samples from quality control or verification samples result in a variation between the producer and the Department greater than that set forth in Table 2461-8, the parties shall follow the procedures for test result dispute resolution available from the MnDOT Concrete Engineering website.

<b>Table 2461-8</b>	
<b>Allowable Variations on Percent Passing Sieves</b>	
<b>Sieve Size</b>	<b>Allowed Percentage</b>
2 in – 3/8 in [50 mm – 9.5 mm]	± 6
No. 4 – No. 30 [4.75 mm – 600 μm]	± 4
No. 50 [300 μm]	± 3
No. 100 [150 μm]	± 2
No. 200 [75 μm]	± 0.6

**F.3.c.(1) Non-conforming Material**

Only place concrete meeting the gradation requirements in the work. If the Contractor places concrete not meeting the gradation requirements into the work, the Engineer will not accept nonconforming concrete at the Contract unit price.

For concrete not meeting the required gradation, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the concrete Contract item in accordance with Table 2461-9 and Table 2461-10. When there is not a separate *Structural Concrete* Contract unit price for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per cu. yd [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

<b>Table 2461-9</b>	
<b>General Concrete for Individual Aggregate Fractions</b>	
<b>Fine and Coarse Aggregate Specification Sieves other than Fine Aggregate No. 200 [75 <math>\mu</math>m]</b>	
<b>Outside of Specification, %</b>	<b>Adjusted Contract Unit Price</b>
$\leq 3$	The Department will pay 98 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
4 – 6	The Department will pay 95 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
7 – 10	The Department will pay 90 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
$> 10$	The Department will pay 75 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.

<b>Table 2461-10</b>	
<b>General Concrete for No. 200 [75 <math>\mu</math>m] Sieve of Fine Aggregate</b>	
<b>Outside of Specification, %</b>	<b>Adjusted Contract Unit Price</b>
$< 0.3$	The Department will pay 98 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
0.4 – 0.6	The Department will pay 95 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
0.7 – 1.0	The Department will pay 90 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
$> 1.0$	The Department will pay for 75 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.

If failure occurs on the fine aggregate No. 200 [75  $\mu$ m] sieve and on other sieves concurrently, the Department will only reduce the price based on the larger percentage deduction.

The Engineer, in conjunction with the Concrete Engineer, will determine adjusted Contract unit prices for coarse aggregate quality failures in accordance with 1503, “Conformity with Contract Documents,” and 1512, “Unacceptable and Unauthorized Work.”

**F.3.d Moisture Content**

Ensure the producer performs the following:

- (1) Determines the moisture content using the oven-dry method in all fractions of the aggregate.
- (2) Documents moisture tests on MnDOT Form 2152, *Concrete Batching Report*.
- (3) Charts the moisture content of each aggregate.

In addition to the oven-dry moisture test, the producer may obtain the moisture content in the fine aggregate using a moisture probe.

To obtain approval for the use of a moisture probe, ensure the producer calibrates the moisture probe before each construction season meeting the requirements of the Concrete Manual. Ensure the producer verifies and charts both the probe moisture content and the oven-dry verification moisture test.

**F.3.e Plant Diaries**

Provide daily plant diaries in accordance with the Concrete Manual using an approved form from the MnDOT's Concrete Engineering website.

**F.3.f Batch Weight Verification**

The Engineer will observe the batching process to verify weights shown on the Certificate of Compliance.

The Engineer will observe the actual water batched during each collection of verification gradations in accordance with the following:

- (1) the ready-mix truck reverse the drum after washing,
- (2) Verifying use of the current moisture test,
- (3) Verifying that any additional water added to adjust the slump is recorded, and

Validating water weights on the load batched and comparing the total water with the design water.

The Engineer will document the actual water batched on MnDOT Form 24143, *Weekly Certified Ready-Mix Plant Report* and submit a copy to the Engineer to provide to the Concrete Engineer.

The Engineer will provide plant diaries in accordance with the Concrete Manual.

**F.3.g Certificate of Compliance**

Provide a computerized Certificate of Compliance with each truckload of ready-mixed concrete at the time of delivery. The Department defines computerized to mean a document that records mix design quantities from load cells and meters.

If the computer that generates the Certificate of Compliance malfunctions, the Engineer may allow the Contractor to finish any pours in progress if the producer



issues a handwritten MnDOT Form 0042, Certificate of Compliance with each load. Do not allow the producer to begin new pours without a working computerized Certificate of Compliance.

Provide a computerized Certificate of Compliance from the producer for each item of information, including the following:

- (1) Name of the ready-mix concrete plant.
- (2) Name of the Contractor.
- (3) Date.
- (4) State Project Number (SP) or (SAP).
- (5) Bridge Number (if applicable).
- (6) Time concrete was batched.
- (7) Truck number.
- (8) Quantity of concrete in this load.
- (9) Running total of each type of concrete, each day for each project.
- (10) Type of concrete (MnDOT Mix Designation Number).
- (11) Cementitious materials using MnDOT Standard Abbreviations.
- (12) Admixtures using MnDOT Standard Abbreviations.
- (13) Aggregate sources using 5 digit State Pit Numbers.
- (14) Admixture quantity in fluid ounces per 100 lb [milliliters per kilogram] or ounces per cubic yard [milliliters per cubic meter].
- (15) Batch information for materials using MnDOT standardized labels to represent each column in Table 2461-11. Present the information in the order listed across the page (a through k) or print the information using two lines provided that the materials are identified in each line of information.

<b>Table 2461-11</b>			
<b>Standardized Certificate of Compliance Labels</b>			
	<b>Formula Letter</b>	<b>Formul a</b>	<b>Standard Label</b>
a	Ingredients (aggregate, cementitious, water, admixtures)	—	Ingredient
b	Product Source (MnDOT Standard Abbreviation)b	—	Source
c	Total Moisture Factor (in decimals to 3 places)	—	MCFac
d	Absorption Factor (in decimals to 3 places)	—	AbsFac

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e	MnDOT mix design oven dry (OD) weights, <i>lb/cu. yd [kg/cu. m]</i>	—	OD
f	Absorbed moisture in the aggregates, <i>lb/cu. yd [kg/cu. m]</i>	$(e \times d)$	Abs
g	Saturated surface dry (SSD) weights for aggregates, <i>lb/cu. yd [kg/cu. m]</i>	$(e + f)$	SSD
h	Free moisture, <i>lb/cu. yd [kg/cu. m]</i>	$(c - d) \times e$	Free Mst
i	Target weights for one cubic yard [cubic meter] of concrete, <i>lb/cu. yd [kg/cu. m]</i>	$(g + h)$	CY Targ [CM Targ]
j	Target batch weights, <i>lb [kg]</i>	$(cu. yd \times i)$ $[cu. m \times i]$	Target
k	Actual batch weights, <i>lb [kg]</i>	—	Actual
NOTE: Actual cubic yards [cubic meters] batched may vary due to differences in air content, weight tolerances, specific gravities of aggregates, and other variables.			

- (16) Total Water (Batch Water + Free Moisture) in pounds [kilograms].
- (17) Water available to add [(Mix Design Water)  $\times$  (Target CY (CM)) – Total water] in gallons [liters].
- (18) Space to note the water adjustment information, including:
  - (18.1) Water in gallons [liters] added to truck at plant (filled in by producer, enter zero if no water is added).
  - (18.2) Water in gallons [liters] added to truck at the jobsite (filled in by producer or Engineer, enter zero if no water is added), and
  - (18.3) Total actual water in pounds [kilogram] (Total Water from Certificate of Compliance plus any additions).
- (19) The following information printed with enough room beside each item to allow the Engineer to record the test results:
  - (19.1) Air content,
  - (19.2) Air temperature,
  - (19.3) Concrete temperature,
  - (19.4) Slump,
  - (19.5) Cylinder number,
  - (19.6) Location or part of structure,
  - (19.7) Time discharge, and
  - (19.8) Signature of Inspector.
- (20) Location for the signature of the MnDOT Certified Plant 1 Technician representing the producer. The technician will review the first Certificate of Compliance for each mix type, each day, for accuracy and hand sign the

Certificate of Compliance at a location designated for signature signifying agreement to the terms of this policy and to certify that the materials itemized in the shipment comply requirements of the Contract.

**F.3.h Decertification**

If the Contractor provides concrete from a plant that cannot produce concrete, fails to perform testing, fails to report accurate results, or fails to complete the required documentation, the Engineer may reject the concrete as unacceptable in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

The Concrete Engineer, with coordination from the Engineer, may decertify the plant and halt production of concrete if the producer performs the following:

- (1) Procedural changes made after the completion of the Concrete Plant Contact Report and after starting the work that cause non-compliance with the program,
- (2) Continually produces concrete in non-compliance with this section,
- (3) Completely disregards the requirements of this section, and
- (4) Submits fraudulent test reports.

If decertifying the plant, the Concrete Engineer may perform the following:

- (1) Revoke plant certification.
- (2) Revoke technician certification for individuals involved,
- (3) Revoke bidding privileges as determined by the Construction Engineer, and
- (4) Criminal prosecution for fraud as determined by the Attorney General.

**G Concrete Placement**

Do not produce concrete earlier than 60 min before the National Weather Service official sunrise, unless the Engineer approves otherwise.

Place concrete after the Engineer inspects and approves the foundation preparations, forms and falsework erection, placement of reinforcement steel, materials, equipment condition, and cold weather protection.

Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the excessive moisture levels make the grade unstable. Maintain the surface temperature above freezing for forms, steel, and adjacent concrete that will come in contact with the poured concrete before concrete placement.

Protect the concrete from freezing.

Protect the concrete against damage from construction operations or traffic.

Assume full responsibility for the acceptable production, placement, finishing, and curing of all concrete under the conditions prevailing, regardless of the restrictions imposed. Provide any artificial lighting, rain or cold weather protection necessary at no additional cost to the Department. The Engineer may subject any defects in concrete or concrete surfaces resulting from weather conditions, inadequate lighting, or other causes to 1503, “Conformity with Contract Documents,” and 1512, “Unacceptable and Unauthorized Work.”

**G.1 Notice of Inspection**

Notify the Engineer at least 24 h before beginning concrete production to allow the Engineer time to provide inspection forces needed for the work and to approve preparations for concrete placement. If the Contractor fails to provide 24 h notice, the Engineer may delay concrete placement in accordance with 1503, “Conformity with Contract Documents” and 1512, “Unacceptable and Unauthorized Work.”

If the producer needs to change plants during placement, notify the Engineer and obtain approval before changing the plant.

**G.2 Placement Temperatures**

Do not place concrete when the air temperature at the point of placement is below 36 °F [2 °C] or is expected to fall below 36 °F [2 °C] within the following 24 h period unless approved cold-weather provisions are in-place. Discontinue concrete placement if the air temperature falls below 36 °F [2 °C].

Maintain concrete at a temperature from 50 °F to 90 °F [10 °C to 30 °C] until placement.

**G.3 Delivery Requirements**

Place concrete into the work in accordance with the following:

- (1) Type 1 Concrete—within 90 min of batching, and
- (2) Type 3 Concrete— within 90 minutes of batching when all admixtures are added at the plant at the manufacturer’s recommended dosage rates listed on the Approved Products list. If the haul time does not facilitate mixing and placing the concrete within 90 minutes, test the concrete in accordance with 2461.3E1a.

The Contractor may transport Type 3 concrete in non-agitating equipment if the concrete is discharged within 45 min of batching.

Batch time starts when the batch plant or the transit mix truck adds the cement to the other batch materials.

**G.4 Field Adjustments**

Do not add additional mixing water once the concrete is 60 min old.

Mix the load a minimum of 5 minutes or 50 revolutions at mixing speed after addition of any admixture.

For concrete with slumps of greater than 1 inch (25 mm) do not make water adjustments after approximately 1 cubic yard ( $1 \text{ m}^3$ ) is discharged.

For concrete with slumps of 1 inch (25 mm) or less, the Engineer will allow water adjustments as necessary to facilitate placement.

The Engineer will test the concrete for compliance with 2461.3.G.6, "Consistency," and 2461.3.G.7, "Air Content," in accordance with the following:

- (1) If the test taken by the Engineer passes, the Engineer will continue verification testing in accordance with the Schedule of Materials Control.
- (2) If the test taken by the Engineer fails, make adjustments and perform any quality control testing before the Engineer performs a final test. Acceptance or rejection of the truck is based on the Engineer's final test result.
- (3) The Engineer will test up to two additional trucks in accordance with items (1) and (2) above.
- (4) If the concrete does not meet the specification after those three trucks, the Engineer will reduce their verification testing rate to once per truck for acceptance for the remainder of the pour.

## **G.5 Test Methods and Specimens**

The Engineer will furnish molds based on the maximum size aggregate for the test specimens in accordance with the following:

- (1) 4 in  $\times$  8 in [100 mm  $\times$  200 mm] cylinder molds,
- (2) 6 in  $\times$  12 in [150 in  $\times$  300 mm] cylinder molds for maximum aggregate sizes greater than 1 $\frac{1}{4}$  in [31.5 mm], and
- (3) 6 in  $\times$  6 in  $\times$  20 in [150 in  $\times$  150 in  $\times$  500 mm] beam molds and use other beam mold sizes as approved by the Engineer.

Provide curing tanks of adequate size and number for curing all of the concrete test specimens in accordance with 2031.3.C, "Special Requirements." Supply the curing tanks with heaters to maintain a water temperature of 73 °F  $\pm$  3 °F [23 °C  $\pm$  2 °C].

If Contractor testing is required by the Contract, perform the following:

- (1) Determine the required testing rates in accordance with the Schedule of Materials Control,
- (2) Take samples after the first  $\frac{1}{4}$  cu yd [cu. m] and before discharging the last  $\frac{1}{4}$  cu. yd [cu. m] of the batch,

- (3) Perform concrete sampling and testing meeting the requirements of the Concrete Manual,
- (4) Measure slump and air content, and make strength specimens when placing the concrete,
- (5) Record field measurements, including strength specimen identifications on MnDOT Form 2448, Weekly Concrete Report, to provide to the Concrete Engineer.

The Engineer will transport the cylinders to the Department's Laboratory for testing.

**G.5.a Standard Strength Cylinders**

The Department will perform the following for standard strength cylinders:

- (1) Cast cylinders for testing at 28 days,
- (2) Mark cylinders for identification of the represented unit or section of concrete,
- (3) Cure the cylinders meeting the requirements of the Concrete Manual, and
- (4) Submit cylinders and a completed cylinder identification card to the Department's Laboratory.

The producer of precast units is responsible for casting standard strength cylinders.

**G.5.b Control Strength Cylinders**

The Engineer will use control cylinders to determine when the sequence of construction operations is dependent upon the rate of concrete strength development. The Engineer will cast control cylinders to determine when the concrete attains the required strength for all desired control limitations. The Contractor is responsible for any additional control cylinders beyond the requirements of 2461.3.G.5.b (1).

The Department will perform the following for control strength cylinders:

- (1) Cast up to three (3) control cylinders.
- (2) Cure the cylinders in the same location and under the same conditions as the concrete structure or unit involved meeting the requirements of the Concrete Manual,
- (3) Mark control cylinders for identification of the represented unit or section of concrete, and
- (4) Submit cylinders and a completed cylinder identification card to the Department's Laboratory.

If the Department is unavailable to test the control cylinders, the Contractor shall submit the control cylinders to an independent testing facility for testing or perform the testing on the control cylinders on a portable mechanical or hydraulic testing machine checked and calibrated with a standard proving ring as approved by the Engineer and in the presence of the Engineer.

The producer of precast units is responsible for casting control strength cylinders.

**G.5.c Strength Specimens for Concrete Paving**

Use flexural beams to determine strength or provide cylinders as allowed by the Contract or approved by the Engineer.

Cast standard beams or cylinders for testing at 28 days.

Cast a sufficient number of control beams or cylinders to determine when the concrete attains the required strength for all desired control limitations.

Cure the standard beams or cylinders meeting the requirements of the Concrete Manual.

Cure the control beams or cylinders in the same location and under the same conditions as the concrete structure or unit involved meeting the requirements of the Concrete Manual.

The Engineer will test the flexural beams and record the results on MnDOT Form 2162, *Concrete Test Beam Data*.

If using cylinders, the Engineer will submit cylinders and a completed identification card to the Department's Laboratory.

**G.6 Consistency**

The Engineer will test the concrete for consistency using the slump test during the progress of the work. The Department may reject concrete batches with consistencies outside of the slump range in accordance with Table 2461-10. If any test shows the slump in excess of the upper limit of the slump range, the Engineer will reject the concrete represented by that test unless the Contractor makes adjustments to the concrete before use.

Adjust the slump within the allowable range to optimize both placement and finishing.

If not using a Department approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Approved/Qualified Products List, meet the slump values for the slump range without water reducer in accordance with Table 2461-12.

If using an Department approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Approved/Qualified Products List, meet

the slump values for the slump range with water reducer in accordance with Table 2461-12.

<b>Table 2461-12 Slump Range Designation</b>		
<b>Slump Designation</b>	<b>Slump Range without Water Reducer, in [mm]</b>	<b>Slump Range with Water Reducer, in [mm]</b>
1	½ – 1 [12 – 25]	½ – 1 [12 – 25]
2	1 – 2 [25 – 50]	1 – 3 [25 – 75]
3	1 – 3 [25 – 75]	1 – 4 [25 – 100]
4	2 – 4 [50 – 100]	2 – 5 [50 – 125]
5	2 – 5 [50 – 125]	2 – 6 [50 – 150]
6	3 – 6 [75 – 150]	3 – 7 [75 – 175]

Contact the Engineer if encountering unusual placement conditions that render the specified slump range unsuitable. The Department will provide mix composition modifications for Department designed mixes to provide the desired change in consistency while maintaining the other specified properties of the concrete mix. Do not add water solely to temporarily facilitate the placement of concrete.

**G.6.a Concrete Placed by the Slip-Form Method**

Place concrete that does not slough and is adequately consolidated at a slump value that optimizes placement for the designated mixture.

**G.6.b Non-Conforming Material**

Only place concrete meeting the slump requirements in the work. If the Contractor places concrete not meeting the slump requirements into the work, the Engineer will not accept non-conforming concrete at the Contract unit price.

For concrete not meeting the required slump, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the Contract item of the concrete in accordance with Tables 2461-13, 2461-14, 2461-15 and 2461-16. When there is not a separate Contract unit price for *Structural Concrete* for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per cu. yd [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

<b>Table 2461-13 General Concrete*</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
Below slump range*	The Department will pay 95 percent of the relevant Contract unit price for materials placed as approved by the Engineer.



<b>Table 2461-13 General Concrete*</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
≤ 1½ in [40 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
1¾ in [45 mm] – 2¼ in [55 mm] above slump range	The Department will pay 50 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
> 2¼ in [55 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
* If the Contractor places piling or footing concrete below the slump range, the Department will deduct \$100 per cu. yd [\$130 per cu. m] or the Contractor-provided invoice amount to the relevant Contract unit price of the concrete represented by the slump test, whichever is less. The Department will not reduce Contract unit price for low slump concrete placed with the slip-form method as approved by the Engineer.	

<b>Table 2461-14 Bridge Deck Concrete</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
Below slump range	The Department will pay 95 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
≤ 1½ in [40 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
> 1½ in [40 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer.

<b>Table 2461-15 Low Slump Bridge Deck Concrete From ½ in to 1 in [12 mm to 25 mm]</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
Below slump range	No deduction for materials placed as approved by the Engineer.
≤ ½ in [12 mm] above slump range	The Department will pay 50 percent of the relevant Contract unit price for materials placed as approved by the Engineer.

<b>Table 2461-15</b> <b>Low Slump Bridge Deck Concrete</b> <b>From ½ in to 1 in [12 mm to 25 mm]</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
> ½ in – ¾ in [12 mm – 20 mm] above slump range	The Department will not pay for concrete placed but will allow the concrete to remain in place as approved by the Engineer.
> ¾ in [20 mm] above slump range	The Department will not pay for concrete. Provide additional testing as directed by the Engineer to determine if the concrete can remain in place or is subject to removal and replacement.

<b>Table 2461-16</b> <b>Low Slump Concrete — Patching</b> <b>From ½ in to 1 in [12 mm to 25 mm]</b>	
<b>Outside of Slump Range</b>	<b>Adjusted Contract Unit Price</b>
Below slump range	No deduction for materials placed as approved by the Engineer
≤ ½ in [12 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
≥ ¾ in [20 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer.

**G.7 Air Content**

Maintain the air content of Type 3 general concrete at the specified target of 6.5 percent ±1.5 percent of the measured volume of the plastic concrete in accordance with 1503, “Conformity with Contract Documents.”

Make any adjustments immediately to maintain the desired air content.

Measure the air content at the point of placement but before consolidation.

**G.7.a Non-Conforming Material**

Only place Type 3 concrete meeting the air content requirements in the work. If the Contractor places Type 3 concrete not meeting the air content requirements into the work, the Engineer will not accept non-conforming concrete at the Contract unit price.

For concrete not meeting the required air content, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the Contract item of the concrete in accordance with Table 2461-17. When there is not a separate Contract unit price

for *Structural Concrete* for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per cu. yd [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

<b>Table 2461-17</b>	
<b>General Concrete (Target Air Content 6.5%)</b>	
<b>Air Content, %</b>	<b>Adjusted Contract Unit Price</b>
> 10.0	The Department will pay 75 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
>8.0 – 10.0	The Department will pay 95 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
5.0 – 8.0	The Department will pay 100 percent of the Contract unit price for the concrete represented, for material placed as approved by the Engineer.
>4.0 – <5.0	The Department will pay 75 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
>3.5 – 4.0	The Department will pay 25 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the surface is exposed to freeze-thaw cycling, coat the concrete with an approved epoxy penetrant sealer from the Approved/Qualified Products List.
≤ 3.5	Remove and replace concrete in accordance with 1503, “Conformity with Contract Documents,” and 1512, “Unacceptable and Unauthorized Work,” as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer will not pay for the concrete and if the Engineer determines the surface is exposed to salt-brine freeze-thaw cycling, coat with an approved epoxy penetrant sealer from the Approved/Qualified Products List.

**G.8 Allowable Testing Tolerances**

Allowable tolerances are based on the results from two different testers and two different pieces of equipment from the same sample. Perform the test within the allowable tolerances in accordance with Table 2461-18.

<b>Table 2461-18 Allowable Testing Tolerances</b>	
<b>Test</b>	<b>Allowable Tolerance</b>
Air content, % volume of concrete	1.0
Average slump:	
≤ 4 in [100 mm]	1.0 in [25 mm]
4 in – 6 in [100 mm – 150 mm]	1.5 in [38 mm]
≥ 6 in [150 mm]	2.0 in [50 mm]
Unit weight, per cu. ft [cu. m], calculated to an air-free basis	1.0 lb/cu. ft [16 kg/cu. m]
Compressive strength 3,000 psi – 8,000 psi [20.6 MPa – 55.2 MPa], average of 3 tests	500 psi [3.4 MPa]

**2461.4 METHOD OF MEASUREMENT**

The Engineer will measure fresh concrete produced as required by the Contract by the theoretical volume. The Engineer will deduct accountable waste from the concrete measurement.

The Engineer will measure concrete mixtures on the basis of the dimensions of the structure shown on the plans. If the plans do not include a Contract item for concrete used in miscellaneous items, include the cost of the concrete with the relevant Contract items.

**2461.5 BASIS OF PAYMENT**

The Department will include the cost of the Certified Ready-Mix Plant Program with other relevant Contract items.

**S-51 (2501) PIPE TIES**

This work shall consist of furnishing and installing Pipe Ties in accordance with MnDOT 2501 and the following:

S-51.1 The work shall consist of drilling the necessary holes, furnishing and installing the pipe ties and covering the exposed portion of the pipe joints with a 460 mm [18 inch] wide strip of geotextile fabric and mastic on the culverts listed in the Plan.

S-51.2 Pipe ties shall be considered an incidental item and related costs shall be included in the unit price for RC Pipe Sewer.

**S-52 (2506) MANHOLES AND CATCH BASINS**

MnDOT 2506 is hereby modified and/or supplemented with the following:

S-52.1 A 100 mm [**4 inch**] thick concrete encasement shall be placed around the outside of the manhole or catch basin as detailed in current MnDOT Standard Plate 4026. This encasement shall be placed at the time of final casting placement and shall be incidental for which no payment will be made.

S-52.2 Adjusting Rings manufactured from High Density Polyethylene (H.D.P.E.) are approved as an alternate to concrete adjusting rings. It is important that the H.D.P.E. adjusting ring be sealed with the product recommended by the manufacturer.

**S-53**      **(2506) CONNECT INTO EXISTING DRAINAGE STRUCTURE**

This work consist of constructing connections into existing drainage structures in accordance with the applicable MnDOT Standard Specifications and the following:

Measurement will be made by the number of connections constructed as specified. Payment will be made under Item 2506.602 (Connect Into Existing Drainage Structure) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to, all materials and labor necessary to install proposed concrete pipe into an existing drainage structure. Any damage caused to the existing drainage structure shall be repaired a the Contractor's expense to the satisfaction of the Engineer.

**S-54**      **(2521) WALKS**

The provisions of MnDOT 2521 are modified in accordance with the following:

S-54.1 MnDOT 2521.3C3 is hereby modified to include the following provision:

After completing final finishing operations, cure all exposed concrete surfaces. Use one of the following curing methods:

- (1) Place the membrane curing compound conforming to 3754 or 3755 within 30 minutes of concrete placement or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2521.3.E.1.a. Place the membrane curing compound on the edges within 30 minutes after permanent removal of the forms or curing blankets, unless the Contract requires otherwise.
- (2) Place plastic curing blankets or completely saturated burlap curing blankets as soon as practical without marring the surface in accordance with 2521.3.E.1.b.

Failure to comply with these provisions will result in the Engineer applying a monetary deduction in accordance with 1503. When there is not a separate Contract unit price for Structural Concrete, the Department will apply a monetary deduction of \$50.00 per cu. yd [\$65.00 per cu. m] or 50 percent of the Contractor-provided invoice amount for the concrete in question, whichever is less.

Whenever weather conditions are such as to cause unusual or adverse placing and finishing conditions, expedite the application of a curing method or temporarily suspend the mixing and placing operations, as the conditions require.

If necessary to remove the coverings to saw joints or perform other required work, and if the Engineer approves, remove the covering for the minimum time required to complete that work.

### **C3a Curing Methods**

#### **C3a(1) Membrane Curing Method**

Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane curing compounds from freezing before application. Handle and apply the membrane curing compound in accordance with the manufacturer's recommendations.

Apply the curing compound with an approved airless spraying machine in accordance with the following:

- (1) At a rate of 1 gal per 150 sq. ft (1 L per 4 m<sup>2</sup>) of surface curing area.
- (2) Apply homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). Some MnDOT approved curing compounds may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, provide a uniform solid opaque consistency meeting the intent of the above requirement.
- (3) If the curing compound is damaged during the curing period, immediately repair the damaged area by re-spraying.

The Engineer will approve the airless spraying machine for use if it is equipped with the following:

- (1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,
- (2) Separate filters for the hose and nozzle, and
- (3) Multiple or adjustable nozzle system that provides for variable spray patterns.

If the Engineer determines that the initial or corrective spraying may result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department.

#### **C3a(2) Curing Blanket Method**

After completion of the finishing operations and without marring the concrete, cover the concrete with curing blankets. Install in a manner that envelops the exposed concrete and prevents loss of water vapor. After the concrete has cured,

apply membrane curing compound to the concrete surfaces that will remain exposed in the completed work.

**C3b Protection Against Rain**

Protect the concrete from damage due to rain. Have available, near the site of the work, materials for protection of the edges and surface of concrete. Should any damage result, the Engineer will suspend operations until the Contractor takes corrective action and may subject the rain-damaged concrete to 1503 and 1512.

**C3c Protection Against Cold Weather**

If the national weather service forecast for the construction area predicts air temperatures of 36 °F [1 °C] or less within the next 24 h and the Contractor wishes to place concrete, submit a cold weather protection plan.

Protect the concrete from damage including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the damaged concrete to 1503 and 1512.

**C3c(1) Cold Weather Protection Plan**

Submit proposed time schedule and plans for cold weather protection of concrete in writing to the Engineer for acceptance that provides provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the cold weather protection plans.

S-54.2 MnDOT 2521.3E is hereby deleted and replaced with following:

**E Backfilling**

Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 hours. Perform vibratory operations and backfilling 72 hours after placing the concrete or after the concrete reaches a compressive strength of at least 3,000 psi [**20.7 Mpa**]. The Engineer will cast, cure, and test the concrete control specimens in accordance with 2461.3G5. If damage results from any of these operations the Engineer will suspend all operations until corrective action is taken and a new method is approved. The Engineer may subject damaged concrete to 1503 and 1512.

The Contractor may hand operate concrete consolidation equipment and walk behind vibratory plate compactors 24 hours after placing the concrete, and other equipment as approved by the Engineer in conjunction with the Concrete Engineer.

After curing, backfill or perform embankment construction to the elevations shown on the plans, without damaging the concrete. Use suitable grading materials from the excavation for backfill material in accordance with 2105, unless otherwise required by the Contract. Place and compact the backfill material in accordance with 2105.

Dispose of surplus excavated materials in accordance with 2105.

**S-55**      **(2531) CONCRETE CURBING**

The provisions of MnDOT 2531 are supplemented and/or modified with the following:

S-55.1      The last paragraph of MnDOT 2531.3C shall be deleted and replaced with the following:

Longitudinal construction joints between a concrete median or gutter section and a concrete pavement shall not be sawed or sealed.

S-55.2      MnDOT 2531.3G is hereby modified to include the following provision:

After completing final finishing operations, cure all exposed concrete surfaces. Use one of the following curing methods:

- (1) Place the membrane curing compound conforming to 3754 or 3755 within 30 minutes of concrete placement or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2521.3.E.1.a. Place the membrane curing compound on the edges within 30 minutes after permanent removal of the forms or curing blankets, unless the Contract requires otherwise.
- (2) Place plastic curing blankets or completely saturated burlap curing blankets as soon as practical without marring the surface in accordance with 2521.3.E.1.b.

Failure to comply with these provisions will result in the Engineer applying a monetary deduction in accordance with 1503. When there is not a separate Contract unit price for Structural Concrete, the Department will apply a monetary deduction of \$50.00 per cu. yd [\$65.00 per cu. m] or 50 percent of the Contractor-provided invoice amount for the concrete in question, whichever is less.

Whenever weather conditions are such as to cause unusual or adverse placing and finishing conditions, expedite the application of a curing method or temporarily suspend the mixing and placing operations, as the conditions require.

If necessary to remove the coverings to saw joints or perform other required work, and if the Engineer approves, remove the covering for the minimum time required to complete that work.

**G1      Curing Methods**

**G1a      Membrane Curing Method**

Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane curing compounds from freezing before application. Handle and apply the membrane curing compound in accordance with the manufacturer's recommendations.



Apply the curing compound with an approved airless spraying machine in accordance with the following:

- (1) At a rate of 1 gal per 150 sq. ft (1 L per 4 m<sup>2</sup>) of surface curing area.
- (2) Apply homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). Some MnDOT approved curing compounds may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, provide a uniform solid opaque consistency meeting the intent of the above requirement.
- (3) If the curing compound is damaged during the curing period, immediately repair the damaged area by re-spraying.

The Engineer will approve the airless spraying machine for use if it is equipped with the following:

- (1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,
- (2) Separate filters for the hose and nozzle, and
- (3) Multiple or adjustable nozzle system that provides for variable spray patterns.

If the Engineer determines that the initial or corrective spraying may result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department.

**G1b Curing Blanket Method**

After completion of the finishing operations and without marring the concrete, cover the concrete with curing blankets. Install in a manner that envelops the exposed concrete and prevents loss of water vapor. After the concrete has cured, apply membrane curing compound to the concrete surfaces that will remain exposed in the completed work.

**G2 Protection Against Rain**

Protect the concrete from damage due to rain. Have available, near the site of the work, materials for protection of the edges and surface of concrete. Should any damage result, the Engineer will suspend operations until the Contractor takes corrective action and may subject the rain-damaged concrete to 1503 and 1512.

**G3 Protection Against Cold Weather**

If the national weather service forecast for the construction area predicts air temperatures of 36 °F [1 °C] or less within the next 24 h and the Contractor wishes to place concrete, submit a cold weather protection plan.

Protect the concrete from damage including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the damaged concrete to 1503 and 1512.

**G3a Cold Weather Protection Plan**

Submit proposed time schedule and plans for cold weather protection of concrete in writing to the Engineer for acceptance that provides provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the cold weather protection plans.

S-55.3 MnDOT 2531.3J is hereby deleted and replaced with the following:

**J Backfilling**

Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 hours. Perform vibratory operations and backfilling 72 h after placing the concrete or after the concrete reaches a compressive strength of at least 3,000 psi [20.7 Mpa]. The Engineer will cast, cure, and test the concrete control specimens in accordance with 2461.3G5. If damage results from any of these operations the Engineer will suspend all operations until corrective action is taken and a new method is approved. The Engineer may subject damaged concrete to 1503 and 1512.

The Contractor may hand operate concrete consolidation equipment and walk behind vibratory plate compactors 24 hours after placing the concrete, and other equipment as approved by the Engineer in conjunction with the Concrete Engineer.

After curing, backfill or perform embankment construction to the elevations shown on the Plans, without damaging the concrete. Use suitable grading materials from the excavation for backfill material in accordance with 2105, unless otherwise required by the Contract. Place and compact the backfill material in accordance with 2105.

Dispose of surplus excavated materials in accordance with 2105.

**S-56 (2531) TRUNCATED DOMES**

This work consists of furnishing and installing Truncated Dome Systems (detectable warning surfaces) at pedestrian curb ramps in compliance with the Public Rights-of-Way Accessibility Guidelines (PROWAG). This work shall be performed in accordance with the applicable MnDOT Standard Specifications, these Special Provisions, the details in the Plan, and the following:

**S-56.1 CONSTRUCTION REQUIREMENTS**

The Contractor shall select a truncated dome product from the approved products list at <http://www.dot.state.mn.us/products/miscmaterials/truncateddomes.html>. The truncated domes shall be placed in concrete and shall be pressed firmly into

the concrete to the point that concrete fills the vent holes on the truncated dome plates. No cutting of truncated domes will be allowed unless approved by the Engineer. Any swelling of the concrete that occurs around the truncated domes must be screeded off and the surrounding concrete shall be finished flush with the truncated dome plate edge. To ensure that the truncated domes are well seated in concrete, the Contractor should provide a 3 inch minimum border around the edges of the truncated domes.

The Contractor will be allowed to interchange 9 foot 5 inch and 10 foot radial truncated domes when either is called for in the Plan. If the Contractor does make a substitution, the Contractor will be required to modify the curb line radius to match the truncated domes and meet the detectable edge requirements shown on Standard Plan Sheet No. 5-297.250 (Sheet 5 of 5).

S-56.2      **METHOD OF MEASUREMENT**

The truncated dome area will be measured by the square foot.

S-56.3      **BASIS OF PAYMENT**

Payment will be made under Item 2531.618 (Truncated Domes) at the Contract bid price per square foot, which shall be compensation in full for furnishing and installation of truncated domes.

**S-57      (2554) TRAFFIC BARRIERS**

Traffic Barriers shall be constructed in accordance with the provisions of MnDOT 2554 and the following:

Guardrail block-outs of composite or recycled material which meet the criteria of NCHRP 350 may be substituted for wood block-outs in the construction of Plate Beam Guardrail systems.

**S-58      (2554) END TREATMENT - TANGENT TERMINAL**

This work shall consist of constructing a commercial type energy absorbing terminal in accordance with MnDOT 2554, the details in the Plan, as recommended by the manufacturer, as directed by the Engineer, and the following:

S-58.1      Energy Absorbing Terminal options shall be as indicated on the Plan.

S-58.2      If the Contractor chooses to install either an ET-2000 or ET-2000 PLUS Energy Absorbing Terminal, it shall be of the type manufactured by Trinity Industries, Inc., Dallas, TX.

If steel posts are to be used they shall be steel breakaway posts as specified by the manufacturer.

The adhesive object marker is sold separately from the terminal and shall be incidental to Item 2554.523 (End Treatment – Tangent Terminal) for which no

direct payment will be made. The object marker to use with the ET-2000 or ET-2000 PLUS is striped yellow and black.

- S-58.3 If the Contractor chooses to install an SKT-350 Sequential Kinking Terminal, the terminal shall be an SKT-350 of the type manufactured by Road Systems, Inc., Big Spring, TX.

The adhesive object marker is sold separately from the terminal and shall be incidental to Item 2554.523 (End Treatment - Tangent Terminal) for which no direct payment will be made. The object marker to use with the SK-350 is striped yellow and black.

- S-58.4 The Contractor is responsible for obtaining the most current details from the manufacturer. The Contractor shall provide one copy for the Engineer.

**S-59**      **(2557) FENCING**

The provisions of MnDOT 2557 are hereby modified as follows:

- S-59.1 Add the following two paragraphs to the end of MnDOT 2557.3 C1:

Fences with a tension wire shall have a flow through (loop) type cap with the tension wire passing through the post cap. A hog ring shall attach the tension wire to the fabric and shall be located 150 mm (**6 inches**) on each side of a post. Additional hog rings shall be spaced 450 mm (**18 inches**) apart.

Wire ties, which attach the fabric to posts, should be spaced evenly with a tie as near to the top and a tie as near to the bottom of the fabric as practical. The number of ties on each post shall equal the height of the fabric in feet.

**S-60**      **(2557) INSTALL CHAIN LINK FENCE**

This work shall consist of installing chain link fence salvaged elsewhere under this Contract in accordance with the following:

Measurement will be made by the length in meters **linear feet** of fence installed complete in place as specified. Payment will be made under Item 2557.603 (Install Chain Link Fence) at the Contract bid price per meter **linear foot**, which shall be compensation in full for all costs incidental thereto, including but not limited to: 1) installing fence components removed and salvaged elsewhere under this Contract in the new locations as specified, and 2) furnishing and installing any other new fence components as may be required for the complete installation, in addition to those materials available from the salvage operations.

**S-61**      **(2557) TEMPORARY FENCE SPECIAL DESIGN**

Temporary Fence shall include the installation of 4' high orange construction fence with steel posts driven into the ground and spaced 10' (maximum) apart.

- S-61.1 Measurement will be made by the Lineal Feet. Payment will be made under Item 2557.603 Temporary Fence at the Contract bid price per Lineal Feet, which shall

be compensation in full for all equipment, labor and materials necessary to complete the work as specified.

**S-62**                    **(2572) PROTECTION AND RESTORATION OF VEGETATION**

The provisions of MnDOT 2572 are supplemented and/or modified with the following:

S-62.1                The first paragraph after MnDOT 2572.3A(5) under Protecting and Preserving, is revised to read as follows:

The Contractor shall not place temporary structures, store material, or conduct unnecessary construction activities within a distance of 8 m (**26 feet**) outside the drip line of trees designated to be preserved without approval from the Engineer.

S-62.2                The second paragraph of MnDOT 2572.3A2 Clean Root Cutting, is revised to read as follows:

The Contractor shall immediately and cleanly cut damaged and exposed roots. Trees designated for protection shall have damaged roots cut back to sound healthy tissue and shall have topsoil immediately placed over the exposed roots. The Contractor shall immediately cover root ends that are exposed by excavation activities with 150 mm (**6 inches**) of topsoil as measured outward from the cut root ends. Exposed cut oak roots shall be immediately (within 5 minutes) treated with a wound dressing material consisting of latex paint or shellac. The Contractor shall limit cutting to a minimum depth necessary for construction and shall use a vibratory plow or other approved root cutter prior to excavation.

S-62.3                The third sentence of MnDOT 2572.3A8 Destroyed or Disfigured Vegetation, is revised to read as follows:

The Engineer will assess damages of trees and landscaping at not less than the appraisal damages as determined by the current edition of the “Guide for Plant Appraisal – Council of Tree and Landscape Appraisers” published by the International Society of Arboriculture.

**S-63**                    **(2573) STORM WATER MANAGEMENT**

The provisions of MnDOT 2573 are supplemented and/or modified with the following:

S-63.1                The second paragraph of MnDOT 2573.3A1 Erosion Control Supervisor, is revised to read as follows:

The Erosion Control Supervisor shall be a responsible employee of the prime Contractor and/or duly authorized by the prime Contractor to represent the prime Contractor on all matters pertaining to the NPDES construction stormwater permit compliance. The Erosion Control Supervisor shall have authority over all Contractor operations which influence NPDES permit compliance including grading, excavation, bridge construction, culvert installation, utility work,

clearing/grubbing, and any other operation that increases the erosion potential on the Project. In addition, the Erosion Control Supervisor shall **implement the Contractor's quality control program and other provisions in accordance with 1717.2 and** be available to be on the Project within 24 hours at all times from initial disturbance to final stabilization as well as perform the following duties:

S-63.2 MnDOT 2573.3 A2, Construction of Temporary Storm Water Basins, is revised to read as follows:

Temporary storm water basins shall be constructed concurrently with the start of soil disturbing activities whenever practicable. The basins must be made fully functional and have storm water runoff from the localized watershed directed to the basins. The exposed sideslopes of the basins must be mulched and/or seeded within the time periods as set forth in 1717, or as directed by the Engineer.

S-63.3 The second paragraph of MnDOT 2573.3 A5, Vehicle Tracking Onto Paved Surfaces, is revised to read as follows:

The Contractor is responsible for insuring paved streets are clean at the end of each working day or more often as necessary to provide safety to the traveling public. Tracked sediment on paved surfaces must be removed by the Contractor within 24 hours of discovery, in accordance with 1717.2. Payment for street sweeping to provide safe conditions for the traveling public, environmental reasons or regulatory requirements shall be as provided in accordance with 1514.

S-63.4 The first sentence of MnDOT 2573.3E2 is revised to read as follows:

The bioroll shall be installed and anchored with wood stakes. The stakes shall be at a minimum nominally 25 mm x 50 mm (**1 inch x 2 inch**) and a minimum of 400 mm (**16 inches**) long with a pointed end.

S-63.5 The first paragraph of MnDOT 2573.3J Filter Log Installation, is revised to read as follows:

**J Filter Log Installation**

Filter logs shall be placed in accordance with the Plan. Straw and wood fiber filter logs shall be staked in place with wood stakes. Wood stakes shall be at a minimum 25 x 51 mm (**1 x 2 inch**) nominal size by 400 mm (**16 inches**) long. The stakes shall be driven through the back half of the log at an angle of approximately 45 degrees with the top of the stake pointing upstream. When more than one log is needed for length, the ends shall be overlapped 150 mm (**6 inches**) with both ends staked. Staking shall be every 0.3 m (**1 foot**) along the log unless precluded by paved surface or rock.

S-63.6 MnDOT 2573.5 Basis of Payment, is revised to read as follows:

Payment for storm water management and sediment control items will be compensation in full for all labor, materials, equipment, and other incidentals necessary to complete the work as specified, including the costs of maintenance and removal as required by the Contract. The Contractor will receive compensation at the appropriate Contract prices, or in the absence of a Contract bid price, according to the following unit prices, or in the absence of a Contract price and unit price, as Extra Work. In the absence of a Contract item for Erosion Control Supervisor, this work shall be considered incidental.

S-63.7 MnDOT 2573.5 E, Unit Prices, is revised to read as follows:

The Department will pay the following unit prices for temporary sediment control items in the absence of a Contract bid price:

- (1) Bale Barrier ..... \$13.45/m (**\$4.10 per linear foot**)
- (2) Silt Fence, Heavy Duty ..... \$10/m (**\$3.00 per linear foot**)
- (3) Flotation Silt Curtain, Type: Still Water, 1.2 m (**4 foot**) depth . \$54.10/m (**\$16.50 per linear foot**)
- (4) Sediment Trap Excavation ..... \$7.20/m<sup>3</sup> (**\$5.50 per cubic yard**)
- (5) Bituminous Lined Flume ..... \$6.00/m<sup>2</sup> (**\$5.00 per square yard**)
- (6) Silt Fence, Type Machine Sliced..... \$6.50/m (**\$2.00 per linear foot**)
- (7) Sediment Removal, Backhoe..... \$175 per hour
- (8) Filter Log, Type Straw Bioroll ..... \$1.00/m (**\$3.00/foot**)
- (9) Filter Log, Type Rock Log..... \$16.50/m (**\$5.00/foot**)
- (10) Flocculant Sock..... \$300 each

**S-64**      **(2575) CONTROLLING EROSION AND ESTABLISHING VEGETATION**

The provisions of MnDOT 2575 are hereby modified and/or supplemented with the following:

S-64.1 MnDOT 2575.3D paragraph 2 and table 2575-2 are hereby deleted and replaced with the following:

The Contractor shall sow the seed uniformly at the rate of application specified in Table 3876-5.

S-64.2 MnDOT 2575.4D is hereby deleted and replaced with the following:

**D      Seed**

When a bulk rate seed mixture is specified as shown in table 3876-5, the measurement will be made on that bulk mass. When a PLS rate seed mixture is specified as shown in table 3876-5, the measurement will be made on the PLS mass.

S-64.3 MnDOT 2575.5C is hereby deleted and replaced with the following:

**C      Seed**

When a seed mixture is specified at a bulk rate as shown in table 3876-5, the payment will be made on that bulk mass. When a seed mixture is specified at a PLS rate as shown in table 3876-5, the payment will be made on the PLS mass.

Payment for seed not meeting germination and purity or PLS requirements of 3876 shall be subject to 1503. When components are missing from the specified mixture the affected seeded areas shall be reseeded with the missing components by the Contractor at no additional cost to the Department.

**S-65**                    **(2575) RAPID STABILIZATION SPECIFICATIONS**

This work shall consist of operations necessary to rapidly stabilize small critical areas, to prevent off site sedimentation and/or to comply with permit requirements. The work may be performed at any time during the Contract and will be conducted on small areas that may or may not be accessible with normal equipment. This work shall be done in accordance with the applicable MnDOT Standard Specifications, the details shown in the Plan, and the following:

**S-65.1**                    **BASIS OF PAYMENT**

In the absence of a Contract bid price, the Department will pay the following unit prices for Rapidly Stabilizing Small Scattered Critical Areas directly abutting Waters of the State during rough grading and as required in the NPDES permit. These unit prices shall be construed to include mobilizations for this activity.

Rapid Stabilization	Pre-Approve Prices	
Method 1	\$900/ha <b>(\$400/acre)</b>	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 0.4 to 0.8 ha [ <b>1 to 2 acres</b> ] of coverage.
Method 2	\$2220/ha <b>(\$898/acre)</b>	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 0.4 to 0.8 ha [ <b>1 to 2 acres</b> ] of coverage.
Method 3	\$149.50/m <sup>3</sup> <b>(\$566/M gallon)</b>	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 11.4 to 34 m <sup>3</sup> [ <b>3000 to 9000 gallons</b> ] of product slurry.
Method 4	\$3.00/m <sup>2</sup> <b>(\$2.50/SY)</b>	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 150 to 650 m <sup>2</sup> [ <b>200 to 800 SY</b> ] of coverage.
Method 5	\$48.60/metric ton <b>(\$45/ton)</b>	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 9 to 18 metric tons [ <b>10 to 20 tons</b> ] of riprap.

**S-66**                    **(2582) PERMANENT PAVEMENT MARKINGS**

The provisions of MnDOT 2582 are hereby modified and/or supplemented with the following:

S-66.1                    The provisions of MnDOT 2582.2 are hereby deleted and replaced with the following:



**A Preformed Plastic Markings for Permanent Traffic Lane Delineation and Legends.....3354**  
**B Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals).....3590**  
**C High Solids Water-Based Traffic Paint .....3591**  
**D Drop-On Glass Beads .....3592**

Qualified materials can be found on MnDOT's Qualified Products List on the Office of Traffic, Safety and Technology website. Other materials may be used on a provisional basis as detailed in the QPL process and as approved by the Engineer. Type of material used will be as specified by Contract Documents.

S-66.2 MnDOT 2582.3A2 is hereby deleted.

S-66.3 MnDOT 2582.3F is hereby deleted and replaced with the following:

Remove and replace, or repair, pavement markings not meeting the minimum initial pavement marking retro reflectivity values in accordance with Table 2582-1, as approved by the Engineer at no additional cost the Department.

If the retro reflectivity deficiency is no greater than 20 percent, the Engineer may accept the work at a unit price reduced by the percent of retro reflectivity deficiency.

S-66.4 MnDOT 2582.3G is hereby deleted and replaced with the following:

**Construction Striper Operations Daily Log**

Contractors applying pavement markings for MnDOT under a contract **are required** to fill out the "Construction Striper Operations Daily Log" form which can be found on the Office of Traffic, Safety and Technology website and as approved by the Engineer.

S-66.5 The provisions of MnDOT 2582.5 are hereby deleted and replaced with the following:

**2582.5 BASIS OF PAYMENT**

Payment for pavement makings installed at Contract prices per unit of material shall be compensation in full for all costs incurred in materials, traffic control, installation, surface preparation, use of primers, in accordance to Contract documents or as approved by the Engineer.

**S-67 (3103) BLENDED HYDRAULIC CEMENT**

MnDOT 3103 is hereby deleted and replaced with the following:

**3103.1 SCOPE**

Provide blended hydraulic cement material for use in concrete applications.

**3103.2 REQUIREMENTS**

Provide blended hydraulic cement from the certified source listed on the Approved/Qualified Products List, meeting the requirements of AASHTO M 240, Type IS, Type IP, or Type IL and the following modifications:

- (1) Fly ash constituent of the blended cement no greater than 25 percent,
- (2) Slag constituent of blended cement no greater than 35 percent,
- (3) Silica fume constituent of blended cement no greater than 7 percent,
- (4) Total alkalis in the blended cement no greater than 5.0 lb per cu. yd [3.0 kg per cu. m], and
- (5) Include the following standardized cement certification statement with delivery invoices: “(insert company name) certifies that the cement produced at (insert plant and location) conforms to AASHTO M 240 and MnDOT 3103 for type (insert type) cement.”

Do not change the source or color, or both, of cement on a project without the written approval of the Engineer.

**3103.3 SAMPLING AND TESTING**

Provide samples for testing meeting the requirements of the Schedule of Materials Control.

**S-68 (3115) FLY ASH FOR USE IN PORTLAND CEMENT CONCRETE**

MnDOT 3115 shall be deleted and replaced with the following:

**3115.1 SCOPE**

Provide fly ash for use in concrete applications.

**3115.2 REQUIREMENTS**

Provide fly ash from the certified source listed on the Approved/Qualified Products List, meeting the requirements of ASTM C 618, Class F or Class C, except as modified by the following table:

<b>Table 3115-1 Mn/DOT Modified Fly Ash Requirements</b>		
<b>Requirement</b>	<b>Class F</b>	<b>Class C</b>
Chemical requirements:		
Loss on ignition	≤ 3.0 %	≤ 3.0 %
Available alkalis as Na <sub>2</sub> O	≤ 3.0 %	≤ 3.0 %
Physical requirements:		
Specific gravity, maximum variation from established value *	≤ ±0.12	≤ ±0.12

* The established value for specific gravity is that value which is stated in the source approval given by the Materials Manufacturer.
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The use of fly ash produced at plants where lime is directly injected into the boiler for sulfur removal, is prohibited in Portland cement concrete.

Ensure the following standardized Fly Ash Certification Statement is included with delivery invoices: “(insert company name) certifies that the fly ash produced at (insert power plant and location) conforms to ASTM C 618 and MnDOT 3115 for Class (insert class) fly ash.”

Do not change the source or color, or both, of fly ash on a project without the written approval of the Engineer.

The Department will consider fly ash meeting the requirements of both Class C and Class F as Class C fly ash.

### **3115.3 SAMPLING AND TESTING**

Provide samples for testing meeting the requirements of the Schedule for Materials Control.

## **S-69 (3126) FINE AGGREGATE FOR PORTLAND CEMENT CONCRETE**

MnDOT 3126 shall be deleted and replaced with the following:

### **3126.1 SCOPE**

Provide fine aggregate for use in portland cement concrete.

### **3126.2 REQUIREMENTS**

#### **A General**

Provide fine aggregate consisting of clean, sound, durable particles, uniform in quality and free from wood, bark, roots and other deleterious material.

The Engineer may consider the following as the basis for acceptance of fine aggregate for portland cement concrete:

- (1) Results of laboratory tests,
- (2) Behavior under natural exposure conditions,
- (3) Behavior of other portland cement concrete with aggregate from the same or similar geological formations or deposits, and
- (4) Any other tests or criteria as deemed appropriate by the Engineer in conjunction with the Concrete Engineer.

**B Composition**

Provide fine aggregate from natural sand. If producing fine and coarse aggregates simultaneously from natural gravel deposits during the same operation, the Contractor may provide fine aggregate containing particles of crushed rock.

**C Washing**

Wash the fine aggregate.

**D Deleterious Material**

Provide fine aggregate containing a cumulative quantity of deleterious materials in accordance with Table 3126-1.

<b>Table 3126-1 Deleterious Materials</b>	
<b>Quality Test</b>	<b>Maximum Percent by Weight</b>
Shale, Alkali, Mica, and Soft and Flaky Particles, Cumulative Total	2.5
Coal and Lignite, Cumulative Total	0.3

**E Organic Impurities**

Provide fine aggregate free of injurious quantities of organic impurities. The Engineer will reject aggregates that produce a color darker than the standard color when tested in accordance with AASHTO T 21, unless the mortar specimens pass the mortar strength requirements specified in 3126.2.F, “Structural Strength.”

**F Structural Strength**

The Engineer will test the structural strength of fine aggregate in mortar specimens in accordance with AASHTO T 71 and Table 3126-2. The Engineer will prepare control mortar specimens using Ottawa sand with a Fineness Modulus (FM) from 2.30 to 2.50.

<b>Table 3126-2 Structural Strength in Fine Aggregate</b>	
<b>Mortar Specimens Containing:</b>	<b>Compressive Strength</b>
Type I/II Portland Cement	≥ 90% of control at 7 days
Type III Portland Cement	≥ 90% of control at 3 days

**G Gradation Requirements**

Produce fine aggregate in accordance with the gradation requirements in Table 3126-3.

<b>Table 3126-3</b>	
<b>Fine Aggregate Gradation Requirements</b>	
<b>Sieve Size</b>	<b>Percent Passing*</b>
$\frac{3}{8}$ in [9.50 mm]	100
No. 4 [4.75 mm]	95 – 100
No. 8 [2.36 mm]	80 – 100
No. 16 [1.18 mm]	55 – 85
No. 30 [600 $\mu$ m]	30 – 60
No. 50 [300 $\mu$ m]	5 – 30
No. 100 [150 $\mu$ m]	0 – 10
No. 200 [75 $\mu$ m]	0 – 2.5
* Percent passing by weight through square opening sieves.	

**H Requirements for Uniformity of Grading**

The uniformity of grading is determined by the Fineness Modulus (FM) of the fine aggregate.

Both the Engineer and Contractor will determine the FM of fine aggregate by adding the cumulative percent passing the following sieves, dividing by 100, and subtracting from 7:

- (1)  $\frac{3}{8}$  in [9.50 mm],
- (2) No. 4 (4.75 mm),
- (3) No. 8 [2.36 mm],
- (4) No. 16 [1.18 mm],
- (5) No. 30 [600  $\mu$ m],
- (6) No. 50 [300  $\mu$ m], and
- (7) No. 100 [150  $\mu$ m].

Do not allow the material to deviate from the FM by greater than 0.20. Contact the Engineer, in conjunction with the Concrete Engineer, for an adjustment if the FM approaches the tolerance limit.

**3126.3 SAMPLING AND TESTING**

Provide fine aggregates in accordance with Table 3126-4.

<b>Table 3126-4 Preliminary Fine Aggregate Testing</b>	
<b>Aggregate</b>	<b>Notification and Testing Required</b>
New source	Notify the Engineer at least 1 month before use. Perform new source concrete aggregate testing.
Previously tested aggregate	Notify the Engineer at least 2 weeks before use. Perform additional testing as required by the Engineer in conjunction with the Concrete Engineer.

Sample and test fine aggregate in accordance with Table 3126-5.

<b>Table 3126-5 Fine Aggregate Test Methods</b>	
<b>Test</b>	<b>Testing Method</b>
Sampling	Concrete Manual
Sieve analysis	Concrete Manual
Deleterious substances	Laboratory Manual Method 1207
Quantity of material passing the No. 200 [75 µm] sieve	Concrete Manual
Organic impurities (color plate)	AASHTO T 21
Structural strength	AASHTO T 71
Specific gravity and absorption	Laboratory Manual Method 1205
Alkali silica reactivity	Laboratory Manual Method 1222

**S-70      (3137) COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE**

MnDOT 3137 shall be deleted and replaced with the following:

**3137.1 SCOPE**

Provide coarse aggregate for use in portland cement concrete.

**3137.2 REQUIREMENTS**

**A General**

Provide coarse aggregate consisting of clean, sound, durable particles, uniform in quality, and free from wood, bark, roots, and other deleterious material.

The Engineer, in conjunction with the Concrete Engineer, may consider the following as the basis for acceptance of coarse aggregate for portland cement concrete:

- (1) Results of laboratory tests,
- (2) Behavior under natural exposure conditions,

- (3) Behavior of other portland cement concrete with aggregate from the same or similar geological formations or deposits, and
- (4) Any other tests or criteria as deemed appropriate by the Engineer, in conjunction with the Concrete Engineer.

**B Classification**

Provide coarse aggregate meeting the requirements of one of the following classifications:

- (1) Class A: Crushed quarry rock including quartzite, gneiss, and granite, or mine trap rock including basalt, diabase, gabbro, and other igneous rock types. Class A aggregate may contain no greater than 4.0 percent non-Class A aggregate. The Department will not allow the intentional blending or adding of non-Class A aggregate.
- (2) Class B: All other crushed quarry or mine rock types including carbonates, rhyolite, and schist.
- (3) Class C: Natural or partly crushed gravel obtained from a natural gravel deposit.
- (4) Class D: Mixture of at least two classes of coarse aggregate. The Engineer, in conjunction with the Concrete Engineer, will determine the suitability of the Class D aggregate for the proposed use including proportioning.
- (5) Class R: Aggregate obtained from recycling concrete. The Engineer, in conjunction with the Concrete Engineer, will determine the suitability of the Class R aggregate for the proposed use including proportioning.

**C Washing**

Wash Class B, Class C, Class D, and Class R coarse aggregate. Wash Class A aggregate as needed to comply with the requirements of Table 3137-1.

**D Quality**

Quality requirements are based on each individual aggregate fraction unless otherwise allowed by the Engineer, in conjunction with the Concrete Engineer with the exception of the following:

- (1) When 100 percent of the fractions from a single source pass the 1 in [25 mm] sieve, quality requirements are based on the composite value of the combined aggregates.
- (2) When less than 100 percent of the fractions from a single source pass the 1 inch [25 mm] sieve:
  - (a) Those fractions passing the 1 inch [25 mm] sieve are combined and based on the composite value;

- (b) The fractions greater than or equal to 1 inch [25 mm] are based on each individual aggregate fraction.

**D1 Coarse Aggregate for General Use**

Provide coarse aggregate for general use concrete in accordance with Table 3137-1.

<b>Table 3137-1</b>	
<b>Coarse Aggregate for General Use</b>	
<b>Quality Test</b>	<b>Maximum Percent by Weight</b>
(a) Shale:	
Fraction retained on the ½ in [12.5 mm] sieve	0.4
Fraction retained on the No. 4 [4.75 mm] sieve, as a percentage of the total material	0.7
(b) Soft iron oxide particles (paint rock and ochre)	0.3
(c) Total spall materials*:	
Fraction retained on the ½ in [12.5 mm] sieve	1.0
Fraction retained on the No. 4 [4.75 mm] sieve, as a percentage of the total material	1.5
(d) Soft particles	2.5
(e) Clay balls and lumps	0.3
(f) Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps†	3.5
(g) Slate	3.0
(h) Flat or elongated pieces‡	15.0
(i) Quantity of material passing No. 200 [75 µm] sieve:	
Class A and Class B aggregates#	1.5
Class C and Class D aggregates§	1.0
(j) Los Angeles Rattler, loss on total sample	40.0
(k) Soundness of magnesium sulfate**	15.0
<p>* Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.</p> <p>   Exclusive of shale, soft iron oxide particles, and total spall materials.</p> <p>† Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 [4.75 mm] sieve.</p> <p>‡ Thickness less than 25 percent of the maximum width. Length greater than 3 times the maximum width.</p> <p># Each individual fraction at the point of placement consists of dust from the fracture and free of clay or shale.</p> <p>§ For each individual fraction at the point of placement.</p> <p>** Loss at 5 cycles for any fraction of the coarse aggregate. Do not blend materials from multiple sources to obtain a fraction meeting the sulfate soundness requirement.</p>	

**D2 Coarse Aggregate for Bridge Superstructure**

Provide coarse aggregate in accordance with 3137.2D1 except as modified by Table 3137-2 for use in the following:

- (1) Bridge superstructure (deck, railing, posts, curbs, sidewalks, and median strips);



- (2) Approach panels; and
- (3) Precast concrete panel facings for Mechanically Stabilized Earth walls.

<b>Table 3137-2</b>		
<b>Coarse Aggregate for Bridge Superstructure</b>		
<b>Quality Test</b>		<b>Maximum Percent by Weight</b>
(a)	Shale:	
	Fraction retained on the ½ in [12.5 mm] sieve	0.2
	Fraction retained on the No. 4 [4.75 mm] sieve as a percentage of the total material	0.3
(b)	Soft iron oxide particles (paint rock and ochre)	0.2
(c)	Total spall materials*:	
	Fraction retained on the No. 4 [4.75 mm] sieve as a percentage of the total material	0.5
(d)	Soft particles	2.5
(e)	Clay balls and lumps	0.3
(f)	Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps, use the percent in the total sample retained on the No. 4 [4.75 mm] sieve	3.0
(g)	Absorption for Class B aggregate	1.10
(h)	Carbonate in Class C and Class D aggregates by weight	30.0
* Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.		
Exclusive of shale, soft iron oxide particles, and total spall materials.		
† Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 [4.75 mm] sieve.		

**D3 Coarse Aggregate for Concrete Pavement**

Provide coarse aggregate in accordance with 3137.2D1, except as modified by Table 3137-3, for use in the following:

- (1) Concrete pavement, and
- (2) Concrete pavement rehabilitation.

<b>Table 3137-3</b>		
<b>Coarse Aggregate for Concrete Pavement</b>		
<b>Quality Test</b>		<b>Maximum Percent by Weight</b>
(a)	Absorption for Class B aggregate	1.75
(b)	Carbonate in Class C aggregate by weight	30.0

**E Gradation**

Provide coarse aggregate in accordance with Table 3137-4 including all sizes within the specified limits. The Department defines coarse aggregate as the

uniform product of the producing plant, unless some sizes are removed to meet the gradation requirements. Do not use broken or non-continuous gradations.

If the coarse aggregate has less than 100 percent passing the 1 in [25 mm] sieve, proportion the coarse aggregate using at least two fractions. Gradation requirements are based on the composite value of the combined coarse aggregates.

<b>Table 3137-4</b>									
<b>Coarse Aggregate Designation for Concrete,</b>									
<i>percent by weight passing square opening sieves</i>									
<b>Aggregate</b>	<b>2 in [50 mm]</b>	<b>1½ in [37.5 mm]</b>	<b>1¼ in [31.5 mm]</b>	<b>1 in [25.0 mm]</b>	<b>¾ in [19.0 mm]</b>	<b>½ in [16.0 mm]</b>	<b>¼ in [12.5 mm]</b>	<b>⅜ in [9.5 mm]</b>	<b>No.4 [4.75 mm]</b>
CA-00	—	—	—	100	95 – 100	—	—	—	0 – 10
CA-15	100	95 – 100	—	—	35 – 65	—	—	5 – 25	0 – 7
CA-25	100	95 – 100	—	—	50 – 80	—	—	20 – 40	0 – 7
CA-35	—	100	95 – 100	—	55 – 85	—	—	20 – 45	0 – 7
CA-45	—	—	100	95 – 100	65 – 95	—	—	25 – 55	0 – 7
CA-50	—	—	—	100	85 – 100	—	—	30 – 60	0 – 12
CA-60	—	—	—	—	100	85 – 100	—	40 – 70	0 – 12
CA-70	—	—	—	—	—	100	85 – 100	50 – 100	0 – 25
CA-80*	—	—	—	—	—	—	—	100	55 – 95

\* Do not allow greater than 5 percent to pass the No. 50 [300 µm] sieve.

If producing Class R aggregate, remove reinforcing steel from the concrete and any concrete material passing the No 4 [4.75 mm] sieve.

### 3137.3 SAMPLING AND TESTING

Sample and test coarse aggregate fractions separately in accordance with Table 3137-5.

<b>Table 3137-5</b>	
<b>Preliminary Coarse Aggregate Testing</b>	
<b>Aggregate</b>	<b>Notification and Testing Requirement</b>
New source	Notify the Engineer at least 1 month before use. Perform new source concrete aggregate testing in accordance with the procedure on the Department's website.
Previously tested aggregate	Notify the Engineer at least 2 weeks before use. Perform additional testing as directed by the Engineer, in conjunction with the Concrete Engineer.

Sample and test coarse aggregate in accordance with Table 3137-6.

<b>Table 3137-6 Coarse Aggregate Test Methods</b>	
<b>Test</b>	<b>Testing Method</b>
Sampling	MnDOT Concrete Manual
Sieve analysis	MnDOT Concrete Manual
Shale test	MnDOT Laboratory Manual 1207
Quantity of material passing the No. 200 [75 µm] sieve	MnDOT Concrete Manual
Specific gravity and absorption	MnDOT Laboratory Manual 1204
Density	AASHTO T 19 or MnDOT Laboratory Manual 1211
Los Angeles Rattler loss	AASHTO T 96
Void content	AASHTO T 19* or MnDOT Laboratory Manual 1211
Deleterious materials	MnDOT Laboratory Manual 1209
Soundness; magnesium sulfate	MnDOT Laboratory Manual 1219
Soft particles	MnDOT Laboratory Manual 1218
Flat or elongated pieces	ASTM D 4791
Clay balls or lumps	MnDOT Concrete Manual
* Base the void content on an oven-dry and compacted-by-rodding condition of the aggregate and a value of 62.4 lb per cu. ft [1,000 kg per cu. m] for water.	

**S-71                    (3138) AGGREGATE FOR SURFACE AND BASE COURSES**

The provisions of MnDOT 3138 are hereby modified as follows:

S-71.1                The second paragraph of MnDOT 3138.2B Gradation Tables 3138-1 and 2, is revised to read as follows:

If Class 7 is substituted for Classes 1, 3, 4, 5, or 6, it shall meet the gradation requirements of the substituted class (Table 3138-1); except that, for Class 5 and 6, up to 5 percent by mass (**weight**) of the total composite mixture may exceed 25.0 mm (**1 inch**) sieve but 100 percent must pass the 37.5 mm (**1.5 inch**) sieve. Surfacing aggregate mixtures containing salvaged materials shall meet the gradation requirements of the materials specified in the Plan. All gradations will be run on the composite mixture before extraction of the bituminous material.

S-71.2                TABLE 3138-1 in MnDOT 3138.2B Gradation Tables 3138-1 and 2, is hereby deleted and replaced with the following:

**TABLE 3138-1  
BASE AND SURFACING AGGREGATE  
Total Percent Passing**

Sieve Size	Class 1 (A)	Class 2	Class 3 (A)	Class 4 (A)	Class 5 (A) (B)	Class 6 (A) (B)
75 mm (3 inches)	--	--	--	--	--	--
50 mm (2 inches)	--	--	100	100	--	--
37.5 mm (1½ inches)	--	--	--	--	--	--
25.0 mm (1 inch)	--	--	--	--	100	100
19.0 mm (¾ inch)	100	100	--	--	90-100	90-100
9.5 mm (⅜ inch)	65-95	65-90	--	--	50-90	50-85
4.75 mm (No. 4)	40-85	35-70	35-100	35-100	35-80	35-70
2.00 mm (No. 10)	25-70	25-45	20-100	20-100	20-65	20-55
425 µm (No. 40)	10-45	12-30	5-50	5-35	10-35	10-30
75 µm (No. 200)	8.0-15.0	5.0-13.0	5.0-10.0	4.0-10.0	3.0-10.0	3.0-7.0

- (A) When salvaged materials are substituted for another class of aggregate, it shall meet the gradation requirements of the class being replaced except as amended in 3138.2 B.
- (B) (The gradation requirements for aggregates containing 60% or more crushed quarry rock may be amended with the concurrence of the Project Engineer and the Grading and Base Engineer.

S-71.3

The first paragraph of MnDOT 3138.3 Sampling and Testing, is hereby deleted and replaced with the following:

Samples for testing to determine compliance with the aggregate gradation specifications for base and shoulder surfacing shall be obtained from the roadway at a time when the material is ready for compaction. However, Class 1, 2, and 7

shoulder surfacing aggregates may be sampled from a stockpile, tested, and accepted before roadway placement, provided that:

- (a) No more than 25 percent of the stockpile samples fail to meet gradation requirements.
- (b) The average of all stockpile tests meet requirements.
- (c) The Contractor mixes the material during placement to the satisfaction of the Engineer.

S-71.4 The fifth paragraph of MnDOT 3138.3 Sampling and Testing, is revised to read as follows:

The stockpile shall be sampled at the rate of one field gradation test per 1,000 metric tons (**tons**) of aggregate used on the Project.

**S-72 (3139) GRADED AGGREGATE FOR BITUMINOUS MIXTURES**

MnDOT 3139 is hereby deleted and replaced with the following:

**3139 Graded Aggregate for Bituminous Mixtures**

**3139.1 Scope**

Provide graded aggregate for use in bituminous mixtures.

**3139.2 PLANT MIXED ASPHALT Requirements**

**A Composition**

Provide graded aggregate composed of any combination of the following sound durable particles as described in 3139.2B.

Do not use graded aggregate containing objectionable materials including:

- (1) Metal,
- (2) Glass,
- (3) Wood,
- (4) Plastic,
- (5) Brick, or
- (6) Rubber.

Provide coarse aggregate free of coatings of clay and silt.

Do not add soil materials such as clay, loam, or silt to compensate for a lack of fines in the aggregate.

Do not blend overburden soil into the aggregate.

Feed each material or size of material from an individual storage unit at a uniform rate.

Do not place blended materials from different sources, or for different classes, types, or sizes together in one stockpile unless approved by the Engineer as a Class E aggregate.

**B Classification**

**B.1 Class A**

Provide crushed igneous bedrock consisting of basalt, gabbro, granite, gneiss, rhyolite, diorite, and andosite. Rock from the Sioux Quartzite Formation may contain no greater than 4.0 percent non-Class A aggregate. Do not blend or add non-Class A aggregate to Class A aggregate.

**B.2 Class B**

Provide crushed rock from other bedrock sources such as carbonate and metamorphic rocks (Schist).

**B.3 Class C**

Provide natural or partly crushed natural gravel obtained from a natural gravel deposit.

**B.4 Class D**

Provide 100 percent crushed natural gravel produced from material retained on a square mesh sieve with an opening at least twice as large as Table 3139-2 allows for the maximum size of the aggregate in the composite asphalt mixture. Ensure the amount of carryover, material finer than the selected sieve, no greater than 10 percent of the Class D aggregate by weight.

**B.5 Class E**

Provide a mixture consisting of at least two of the following classes of approved aggregate:

- (1) Class A,
- (2) Class B, and
- (3) Class D.

**B.6 Steel Slag**

Steel slag cannot exceed 25% of the total mixture aggregate and be free from metallic and other mill waste. The Engineer will accept stockpiles if the total expansion is no greater than 0.5 percent as determined by ASTM D 4792

**B.7 Taconite Tailings**

Obtain taconite tailings from ore mined westerly of a north-south line located east of Biwabik, Minnesota (R15W-R16W) or from ore mined in southwestern Wisconsin.

**B.8 Recycled Asphalt Shingles (RAS)**

Provide recycled asphalt shingles manufactured from waste scrap asphalt shingles (MWSS) or from tear-off scrap asphalt shingles (TOSS). Consider the percentage of RAS used as part of the maximum allowable Recycled Asphalt Pavement (RAP) percentage. See Table 3139-3.

**B.8.A RAS Gradation..... MnDOT Laboratory Procedure 1801**

Provide RAS in accordance with the following gradation requirements:

<b>Table 3139-1 RAS Gradation</b>	
<b>Sieve size</b>	<b>Percent passing</b>
½ in [12.5 mm]	100
No. 4 [4.75 mm]	90

**B.8.B Binder Content**

Determine the binder content using chemical extraction meeting the requirements of MnDOT Lab Procedure 1851 or 1852.

**B.8.C Bulk Specific Gravity**

The Contractor may use an aggregate bulk specific gravity (Gsb) of 2.650 in lieu of determining the shingle aggregate Gsb in accordance with MnDOT Lab Procedure 1205.

**B.8.D Waste Materials**

Do not allow extraneous materials including metals, glass, rubber, nails, soil, brick, tars, paper, wood, and plastics greater than 0.5 percent by weight of the graded aggregate as determined by material retained on the No. 4 [4.75 mm] sieve as specified in MnDOT Laboratory Procedure 1801.

**B.8.E Stockpile**

Do not blend an RAS stockpile with other salvage material. Do not blend MWSS and TOSS. The Contractor may blend virgin sand material with RAS to minimize agglomeration if the Contractor accounts for the blended sand in the final mixture gradation.

**B.8.F Certification**

Ensure the processor provides RAS certification on the following Department form “Scrap Asphalt Shingles from Manufacture Waste” or “Tear-Off Scrap Asphalt Shingles” at [www.dot.state.mn.us/materials/bituminous.html](http://www.dot.state.mn.us/materials/bituminous.html)

**B.9 Crushed Concrete and Salvaged Aggregate**

The Contractor may incorporate no greater than 50 percent of crushed concrete and salvaged aggregate in non-wear mixtures. Do not use crushed concrete in wearing courses.

**B.10 Ash**

Sewage sludge ash and waste incinerator ash are allowed as an aggregate source at a maximum of 5% of the total weight of the mixture. Sewage sludge ash for use as an aggregate source in wear or non-wear courses must be approved by examination with the Hazard Evaluation Process by MnDOT's Office of Environmental Stewardship.

**B.11 Recycled Asphalt Pavement (RAP)**

**B.11.A Aggregate Angularity**

Provide combined RAP and virgin aggregates that meet the composite coarse and fine aggregate angularity for the mixture being produced.

**B.11.B Objectionable Material**

Do not use RAP containing objectionable materials including metal, glass, wood, plastic, brick, or rubber.

**B.11.C Asphalt Binder Content**

Determine the asphalt binder content using the MnDOT Lab Manual Method 1851 and 1852.

**B.11.D Bulk Specific Gravity**

Determine the bulk specific gravity in accordance with MnDOT Laboratory Procedure 1205 or 1815.

**C Quality**

**C.1 Los Angeles Rattler Test ..... MnDOT Laboratory Procedure 1210**

Ensure a coarse aggregate loss no greater than 40 percent.

**C.2 Soundness (Magnesium Sulfate)..... MnDOT Laboratory Procedure 1219**

Maximum loss after 5 cycles on the coarse aggregate fraction (material retained on No. 4 [4.75 mm] sieve for any individual source within the mix) as follows:

- (1) Percent passing the  $\frac{3}{4}$  in [19 mm] sieve to percent retained on the  $\frac{1}{2}$  in [12.5 mm] sieve,  $\leq 14\%$ ,
- (2) Percent passing the  $\frac{1}{2}$  in [12.5 mm] sieve to percent retained on the  $\frac{3}{8}$  in [9.5 mm] sieve,  $\leq 18\%$ ,



- (3) Percent passing the  $\frac{3}{8}$  in [9.5 mm] sieve to percent retained on the No. 4 [4.75 mm] sieve,  $\leq 23\%$ ,
- (4) For the composite if all three size fractions are tested, the composite loss  $\leq 18\%$ , and acceptance will be granted if:
  - (4.1) If the Contractor meets the composite requirement, but fails to meet at least one of the individual components, the Engineer may accept the source if each individual component is no greater than 110 percent of the requirement for that component.
  - (4.2) If the Contractor meets each individual component requirement, but fails to meet the composite, the Engineer may accept the source if the composite is no greater than 110 percent of the requirement for the composite.

Coarse aggregate that exceeds the requirements in this section for material passing the No. 4 [4.75 mm] sieve cannot be used.

**C.3 Spall Materials and Lumps..... MnDOT Laboratory Procedure 1219**

Stop asphalt production if the percent of spall or lumps measured in the stockpile or cold feed exceeds the values listed in Table 3139-3. Determine lump compliance by dry batching.

**C.4 Insoluble Residue Test..... MnDOT Laboratory Procedure 1221**

If using Class B carbonate materials ensure the portion of the insoluble residue passing the No. 200 [75  $\mu$ m] sieve is no greater than 10 percent.

**D Gradation**

Ensure the aggregate gradation broad bands meet the following requirements in accordance with AASHTO T-11 (passing the No. 200 [75  $\mu$ m] wash) and AASHTO T-27.

<b>Table 3139-2</b>				
<b>Aggregate Gradation Broad Bands (percent passing of total washed gradation)</b>				
<b>Sieve size</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
1 in [25.0 mm]	—	—	100	—
$\frac{3}{4}$ in [19.0 mm]	—	100*	85 – 100	—
$\frac{1}{2}$ in [12.5 mm]	100*	85 – 100	45 – 90	—
$\frac{3}{8}$ in [9.5 mm]	85 – 100	35 – 90	—	100
No. 4 [4.75 mm]	60 – 90	30 – 80	30 – 75	65 – 95
No. 8 [2.36 mm]	45 – 70	25 – 65	25 – 60	45 – 80
No. 200 [0.075 mm]	2.0 – 7.0	2.0 – 7.0	2.0 – 7.0	3.0 – 8.0
* The Contractor may reduce the gradation broadband for the maximum aggregate size to 97 percent passing for mixtures containing RAP, if the oversize material originates from the RAP source. Ensure the virgin material meets the requirement of 100 percent passing the maximum aggregate sieve size.				

<b>Table 3139-3 Mixture Aggregate Requirements</b>				
<b>Aggregate Blend Property</b>	<b>Traffic Level 2</b>	<b>Traffic Level 3</b>	<b>Traffic</b>	<b>Traffic Level 5</b>
20 year Design ESAL's	<1 million	1 - 3 million	3 - 10 million	10 – 30 million
Min. Coarse Aggregate Angularity (ASTM D5821) (one face / two face), %- Wear (one face / two face), %- Non-Wear	30/- 30/-	55 / - 55 / -	85 / 80 60/ -	95 / 90 80 / 75
Min. Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %- Wear %-Non-Wear	40 40	42 40	44 40	45 40
Flat and Elongated Particles, max % by weight, (ASTM D 4791)	-	10 (5:1 ratio)	10 (5:1 ratio)	10 (5:1 ratio)
Min. Sand Equivalent (AASHTO T 176)	-	-	45	45
Max. Total Spall in fraction retained on the #4 [4.75mm] sieve – Wear Non-Wear	5.0 5.0	2.5 5.0	1.0 2.5	1.0 2.5
Maximum Spall Content in Total Sample – Wear Non-Wear	5.0 5.0	5.0 5.0	1.0 2.5	1.0 2.5
Maximum Percent Lumps in fraction retained on the #4 [4.75mm] sieve	0.5	0.5	0.5	0.5
Class B Carbonate Restrictions				
Maximum% -#4 [-4.75mm] Final Lift/All other Lifts	100/100	100/100	80/80	50/80

Maximum% +#4 [+4.75mm] Final Lift/All other Lifts	100/100	100/100	50/100	0/100
Max. allowable scrap shingles– MWSS <sup>(1)</sup> Wear/Non Wear	5/5	5/5	5/5	5/5
Max. allowable scrap shingles – TOSS <sup>(1)</sup> Final Lift/All other Lifts	5/5	5/5	0/5	0/0

(1) MWSS is manufactured waste scrap shingle and TOSS is tear-off scrap shingle.

**3139.3 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB) Requirements**

**A Restrictions**

Do not use recycled materials including glass, concrete, bituminous, shingles, ash, and steel slag.

**B Gradation**

The Gradation limits are also considered the Job Mix Formula (JMF) limits.

**B.1 PASB**

<b>Table 3139-4 PASB Aggregate Gradation</b>	
Sieve Size	Percent Passing
1 ½ inch [37.5 mm]	100
1 inch [25.0 mm]	95 - 100
¾ inch [19.0 mm]	85 – 95
3/8 inch [9.5 mm]	30 – 60
No. 4 [4.75 mm]	10 – 30
No. 8 [2.36 mm]	0 – 10
No. 30 [600 µm]	0 – 5
No. 200 [75 µm]	0 – 3

**B.2 PASSRC**

<b>Table 3139-5 PASSRC Aggregate Gradation</b>	
Sieve Size	Percent Passing
5/8 inch [16.0 mm]	100
1/2 inch [12.5 mm]	85 – 100
3/8 inch [9.5 mm]	50 – 100
No. 4 [4.75 mm]	0 – 25
No. 8 [2.36 mm]	0 – 5

**C Quality**

Requirements will meet all of 3139.2.C.

**D Mixture Quality Requirements**

<b>Table 3139-6 Mixture Aggregate Requirements for PASSRC &amp; PASB</b>	
Aggregate Blend Property	
<b>Coarse Aggregate Angularity</b> (ASTM D5821) (one face/two face) % PASSRC <sup>(1)</sup> PASB <sup>(1)</sup>	95/- -/65
Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %	NA
Flat and Elongated Particles, max(2) % by weight, (ASTM D 4791)	NA
Clay Content (2) (AASHTO T 176)	NA
Total Spall in fraction retained on the 4.75mm [#4] sieve	3.0
Maximum Spall Content in Total Sample	5.0
Maximum Percent Lumps in fraction retained on the 4.75mm [#4] sieve	0.5

(1) Carbonate Restrictions: If Class B (as defined in 3139.2.B.2), crushed carbonate quarry rock (limestone or dolostone), is used in the mixture, or if carbonate particles in the material retained on the 4.75 mm [No. 4] sieve

exceeds 55 percent, by weight, the minus 0.075 mm [# 200] sieve size portion of the insoluble residue shall not exceed 10 percent.

**3139.4 Ultra Thin Bonded Wearing Course (UTBWC) Requirements.**

**A. Restrictions**

Do not use recycled materials including glass, concrete, bituminous, shingles, ash, and steel slag.

**B. Coarse Aggregate**

Provide a Class A aggregate, as defined in 3139.2.B.1, in accordance with the following requirements:

<b>Table 3139-7</b>		
<b>UTBWC Coarse Aggregate Requirements</b>		
<b>Tests</b>	<b>MnDOT Laboratory Manual Method</b>	<b>Limit, %</b>
Flat and elongated ratio at 3:1	1208	≤ 25
Los Angeles Rattler Test (LAR)	1210	≤ 40
Bulk Specific Gravity	1204	

**C. Fine Aggregate**

Provide fine aggregate, passing the No. 4 [4.75 mm] sieve in accordance with the following requirements:

<b>Table 3139-8</b>		
<b>Fine Aggregate Requirements</b>		
<b>Tests</b>	<b>Method</b>	<b>Limit, %</b>
Sand equivalent*	AASHTO T 176	≥ 45
Uncompacted void content	MnDOT Laboratory Manual 1206	≥ 40
Bulk Specific Gravity	MnDOT Laboratory Manual 1205	

**3139.5 SAMPLING AND TESTING**

Perform sampling, sieve analysis, lumps, crushing, and shale testing meeting the requirements of the MnDOT Laboratory Manual.

**S-73 (3236) REINFORCED CONCRETE PIPE**

The provisions of MnDOT 3236 are modified and/or supplemented with the following:

- S-73.1 Manufacturers of reinforced concrete pipe may produce an alternate "offset joint" on the spigot end of the pipe. This type of offset joint is to be used with the profile or prelubricated pipe seal systems. See MnDOT Standard Plate 3006.
- S-73.2 The first paragraph of MnDOT 3236.2A3 is hereby deleted and replaced with the following:
- Cement substitutions as addressed in 2461.3D are hereby modified as follows to allow:
- (a) 30 percent Class F or Class C fly ash by weight
  - (b) 35 percent ground granulated blast furnace slag by weight
  - (c) 35 percent substitution with a combination of ground granulated blast furnace slag and Type F or Type C fly ash by weight
- All other provisions of 2461.3D shall apply. The use of admixtures shall conform to 2461.3E.

**S-74**      **(3301) REINFORCEMENT BARS**

The third to the last paragraph of MnDOT 3301.2 is hereby deleted and replaced with the following:

When epoxy coated reinforcement bars are specified, coating shall be in conformance with AASHTO M 284M/M 284-06. Application of epoxy coating shall be made in a fusion bonded epoxy coating plant that has been granted "Certification" by the Concrete Reinforcing Steel Institute, or an organization approved by the Materials Engineer.

**S-75**      **(3302) DOWEL BARS**

MnDOT 3302 is hereby deleted and replaced with the following:

Dowel bars shall be fabricated from Grade 40 or 60 steel in accordance with AASHTO M31 and be epoxy coated in conformance with AASHTO M254. The ends of the dowel bars may be epoxy coated at the discretion of the fabricator. Application of epoxy coating shall be made in a fusion bonded epoxy coating plant that has been granted "Certification" by the Concrete Reinforcing Steel Institute, or an organization approved by the Materials Engineer.

The plant's quality control office shall maintain documentation containing the data required by certification. This documentation shall contain test data and measurements taken at times and locations approved by the Engineer, ensuring that monitoring, by personnel not directly involved in production, is sufficient for compliance with approved procedures.

All dowel bars shall be stored and protected in accordance with 2472.

Shearing will be permitted provided the coating is not damaged and subject to permissible deformation. Any deformation larger than true shape shall not exceed

1 mm (**0.04 inch**) increase in diameter or thickness and shall not extend more than 10 mm (**0.40 inch**) from the dowel end.

**S-76**      **(3376) FENCE WIRE**

MnDOT 3376 is hereby deleted and replaced with the following:

**3376.1 Scope**

This Specification covers fencing wire of the barbed, woven, and chain link types, together with wire fasteners, tie wires, and tension wire.

**3376.2 REQUIREMENTS**

**A Barbed Wire**

Barbed wire shall meet the requirements of AASHTO M280. Unless otherwise specified, either zinc-coated or aluminum-coated barbed wire may be supplied. Barbs shall be 4-point full round with 9.5 mm (**0.375 inch**) minimum barb length. Zinc coated barbed wire shall meet Class 3 coating requirements. Aluminum-coated barbed wire may be Standard or High Security Grade.

**B Woven Wire**

Woven wire fence fabric shall be metallic-coated steel and shall conform to the requirements of AASHTO M 279, for the size and construction specified. Fabric shall be either Type A or Type Z with Class 3 coating.

When size and construction are unspecified, any 3.8 mm (**9 gauge**) diameter wire design may be furnished at the Contractor's option.

The vertical stay wires shall be joined to each horizontal line wire by the hinge joint method consisting of not less than one and one-half twists tightly wrapped.

**C Chain Link**

Chain link fabric shall conform to AASHTO M 181 for the type specified. The finished wire size, size of mesh, type of selvage, and height of fabric shall be as shown in the Plans.

Type IV fabric, PVC coated steel, shall be Class A extruded and bonded, or shall be Class B bonded.

**D Miscellaneous Items**

Wire fasteners, tension wire, fittings, and hardware items shall be furnished in Compliance with AASHTO M 181, except as noted or unless otherwise indicated in the Contract or approved by the Engineer.

Staples for attaching wire to wood posts shall be galvanized L or U shaped fasteners produced from 3.8 mm (**9 gauge**) diameter wire, with shank length as specified in 2557.3C2. L-shaped staples shall have barbed, serrated or ring

shanks. The staples shall be galvanized after fabrication in accordance with ASTM A 153.

Flat metal bands may be approved for use in lieu of wire fasteners.

All polymer coated tension wires shall have a Class 2A or 2B polymer coating thickness in accordance with Specification ASTM F 1664.

All polymer coated hog rings and wire ties shall have a Class 2A or 2B polymer coating thickness in accordance with Specification ASTM F 668.

All polymer coated truss rods, truss rod tighteners, tension bands, brace bands, post and line caps, and cups shall have a Class 2B polymer coating thickness in accordance with Specification ASTM F 668, but shall have a minimum coating thickness of 0.25 mm (**0.010 inches**).

Tension wire shall meet the requirements of AASHTO M181 Class 1 for zinc, or it shall meet the requirements of AASHTO M181 for aluminum coating.

Non-polymer coated hog rings shall be a minimum of 12 gauge galvanized steel meeting the requirements of ASTM F 626, with a minimum of 244 g/m<sup>2</sup> (**0.80 ounces per square foot**) of zinc coating.

Polymer coated hog rings shall be 12 gauge minimum galvanized steel meeting the requirements of AASHTO M 181 with a minimum of 92 g/m<sup>2</sup> (**0.30 ounces per square foot**) of zinc coating.

Non-polymer coated wire ties shall meet the requirements of one of the following:

- a) Nine-gauge steel 3.76 +/- 0.13 mm (0.148 +/- 0.005 inch) with a tensile range of 55 to 65 ksi coated with a minimum of 275 g/m<sup>2</sup> (0.90 ounces per square foot) of zinc coating in accordance with Specification ASTM A 641 (A 641M), class 3 or A coating, or coated with 122 g/m<sup>2</sup> (0.40 ounces per square foot) of aluminum in accordance with Specification ASTM A 809.
- b) 4.55 mm (0.179 inch) minimum aluminum alloy conforming to Specification ASTM B 211, alloy 1100 H18.

Polymer coated wire ties shall meet the requirements of one of the following:

- a) Nine-gauge steel 3.76 +/- 0.13 mm (0.148 +/- 0.005 inch) with a tensile range of 55 to 65 ksi coated with a minimum of 100 g/m<sup>2</sup> (0.35 ounces per square foot) of zinc coating in accordance with Specification ASTM A 641 (A 641M), Class 1, or coated with a minimum of 61 g/m<sup>2</sup> (0.20 ounces per square foot) of aluminum.
- b) 4.55 mm (0.179 inch) minimum aluminum alloy conforming to Specification ASTM B 211, alloy 1100 H18.



Truss rod tighteners, tension bands, brace bands, rail ends, brace bands, post and line caps, and cups shall have zinc coating meeting the requirements of ASTM F 626, 366 g/m<sup>2</sup> (1.2 ounces per square foot) minimum.

Truss rods shall have zinc coating of 183 g/m<sup>2</sup> (**0.6 ounces per square foot**) minimum, and shall be polymer coated, for both a polymer and non-polymer coated fence.

Zinc coatings on tension bars shall meet the requirements of AASHTO M111, Grade 85.

Nuts and bolts shall be zinc coated in accordance with AASHTO M 232, and when polymer coating is specified, may be shop or field-painted in lieu of polymer coating.

### **3376.3 INSPECTION AND TESTING**

Inspection and testing for compliance with the specified requirements shall be done at such time and place as the Engineer elects.

#### **S-77 (3401) FLANGED CHANNEL SIGN POSTS**

The provisions of MnDOT 3401 are hereby modified and/or supplemented with the following:

S-77.1 The last sentence of MnDOT 3401.2A Material, is hereby revised to read as follows:

The steel shall conform to the mechanical requirements of ASTM A 499, Grade 420 (**60**) and to the chemical requirements of ASTM A 1 for rails having nominal mass of 45 kg per m [**91 pounds per yard**] of length or heavier.

S-77.2 MnDOT 3401.2C Mass, is hereby deleted and the following substituted therefore:

#### **C Mass (Weight)**

The nominal mass (**weight**) of the posts shall be as specified in the Plans, 3.0, 3.7, 4.1, 4.5, or 6.0 kg/m (**2.0, 2.5, 2.75, 3.0, or 4.0 pounds per foot**) of length, before punching and exclusive of galvanizing, anchor plates, and other attachments. A variation up to 5 percent under the specified mass (**weight**) will be permitted.

S-77.3 MnDOT 3401.2D, Shape and Dimensions, is hereby deleted and the following substituted therefore:

#### **D Shape and Dimensions**

The posts shall be of channel section design with flanges against which the sign will be placed. The front face of the flanges shall be flat and in the same plane so as to provide smooth, uniform bearing for the sign. The back of the flanges and the posts shall be flat and parallel to the front. The cross section of the posts shall be symmetrical about the central axis perpendicular to the front and back.

The posts shall be straight, free from excessive bow, twist, and other injurious or unsightly defects.

S-77.4 Table 3401-1 is hereby deleted and the following substituted therefore:

<b>TABLE 3401-1</b>					
NOMINAL DIMENSIONS					
<b>Mass per Unit of Length</b>	3.0 kg (2.0 pound)	3.7 kg (2.5 pound)	4.1 kg (2.75 pound)	4.5 kg (3.0 pound)	6.0 kg (4.0 pound)
Wide overall across front	76 mm (3 inches)	76 mm (3 inches)	76 mm (3 inches)	83 mm (3¼ inches)	89 mm (3½ inches)
back surface	25 mm (1 inch)	25 mm (1 inch)	25 mm (1 inch)	32 mm (1¼ inches)	32 mm (1¼ inches)
flanges (bearing surface)	13 mm (½ inch)	13 mm (½ inch)	13 mm (½ inch)	16 mm (⅝ inch)	19 mm (¾ inch)
Depth overall, front to back	35 mm (1⅜ inches)	35 mm (1⅜ inches)	38 mm (1½ inches)	38 mm (1½ inches)	43 mm (1.7 inch)
Thickness of Metal, Flanges & Back	3 mm (1/8 inch)	3 mm (1/8 inch)	5 mm (3/16 inch)	4 mm (0.16 inch)	5 mm (0.20 inch)
Sides	3 mm (1/10 inch)	3 mm (1/8 inch)	3 mm (1/8 inch)	4 mm (0.15 inch)	4 mm (0.15 inch)

NOTE: Dimension requirements are for flat flange sections.

**S-78 (3403) ROLLED STEEL FENCE POSTS**

The provisions of MnDOT 3403 are hereby modified and/or supplemented with the following:

S-78.1 MnDOT 3403.2 is hereby deleted and the following substituted therefore:

**3403.2 REQUIREMENTS**

Rolled steel line posts and all angle post assemblies (for end, gate, corner, or intermediate brace assemblies) shall be furnished in accordance with ASTM A 702 and the details in the Plans.

Standard Plates 9321E and 9324C are modified as follows:

- a) The 21 square inch anchor plate is not required; the anchor plate must meet ASTM A 702.
- b) Line Posts shall be 7' - 0" and the posts shall be driven into the ground 3' - 0".

**S-79                    (3406) STRUCTURAL METAL FENCE POSTS**

MnDOT 3406 is hereby deleted and replaced with the following:

**3406.1    SCOPE**

This Specification covers tubular metal posts and rails, and metal rolled-formed "C" posts, and fittings, for fencing.

**3406.2    REQUIREMENTS**

**A            Materials**

The posts and rails shall be manufactured in accordance with AASHTO M181, except as noted.

Round posts shall be Grade 1.

When the "ALTERNATE ROLL FORMED" posts as shown on Standard Plate 9322 are used, the weights and other properties shall conform to the requirements of ASTM F1043 for heavy industrial fence with Type A coating. Pull, end, and corner posts shall be 5.10 pounds per foot nominal weight. Line posts shall be 2.40 pounds per foot nominal weight. Brace Bars shall be 1.35 pounds per foot nominal weight.

Coatings on posts, rails, and fittings shall be applied after welding and fabrication activities.

Tie wires, clips, and bands used for fastening chain link fabric to posts, rails, and braces shall be as specified in 3376.

Type IV (PVC) posts, rails, frames, sleeves, and hardware items shall be first coated with zinc and then Class B bonded to a minimum polymer thickness of 250  $\mu\text{m}$  (**0.010 inch**).

**B            Dimensions**

Posts, rails, and stretcher bars shall be as shown in the Contract. The AASHTO M 181 acceptable tolerance shall govern, except that posts more the 25 mm (**1.0 inch**) under the specified length will not be accepted.

All fittings and hardware shall be designed in the proper manner. The tops shall be designed to fit securely over the posts.

**3406.3    INSPECTION AND TESTING**

Inspection for compliance with the foregoing requirements will be at such time and place as the Engineer elect.

Along with the samples, The Contractor shall provide a manufacturer's certificate that the material was manufactured, sampled, tested, and inspected in accordance with these Specifications and has been found to meet these requirements.

**S-80**      **(3590) EPOXY RESIN PAVEMENT MARKINGS (FREE OF TOXIC HEAVY METALS)**

The provisions of MnDOT 3590.3 are hereby deleted and replaced with the following:

**3590.3 SPECIFIC REQUIREMENTS**

**A Epoxy Resin Material**

The material shall be composed of epoxy resins and pigments only. No solvents are to be given off to the environment upon application to a pavement surface.

The composition shall be within the tolerance permitted for the product tested and approved by MnDOT. Type II material shall be completely free of TMPTA (Tri-Methylol Propane Tri-Acrylate) and other multi-functional monomers.

All materials shall be free of lead, cadmium, mercury, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.

Color:

The color of the white epoxy shall be a pure flat white, free of tints. The color of the yellow epoxy shall closely match Color Number 33538 of Federal Standard 595 and shall conform to the following CIE Chromaticity limits using illuminant "C":

x | 0.470 | 0.485 | 0.520 | 0.480  
y | 0.440 | 0.460 | 0.450 | 0.420

Daylight Directional Reflectance (Y), white, minimum 83  
Daylight Directional Reflectance (Y), yellow, minimum 50

Testing will be according to:

Daylight Directional Reflectance.....ASTM D 2805  
Color .....ASTM D 2805

Adhesion Capabilities:

When the adhesion of the material to portland cement concrete (the concrete shall have a minimum of 2 070 kPa [**300 psi.**] tensile strength) is tested according to American Concrete Institute Committee 403 testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32°C [**0°F**] when

the material is applied, after which the material shall be allowed to cure for 72 hours at  $23 \pm 2^{\circ}\text{C}$  [ **$73 \pm 36^{\circ}\text{F}$** ].

Abrasion Resistance:

When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The wear index is the weight in milligrams that is abraded from the sample under the test conditions).

Hardness:

The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested according to ASTM D2240 after the material has cured for 72 hours at  $23 \pm 2^{\circ}\text{C}$  [ **$73 \pm 36^{\circ}\text{F}$** ].

Tensile Strength:

The tensile strength of the material, when tested according to ASTM D 638, shall not be less than 41 370 kPa [**6,000 psi.**] after 72 hours cure at  $23 \pm 2^{\circ}\text{C}$  [ **$73 \pm 36^{\circ}\text{F}$** ].

Compressive Strength:

The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 82,700 kPa [**12,000 psi.**] after 72 hours cure at  $23 \pm 2^{\circ}\text{C}$  [ **$73 \pm 36^{\circ}\text{F}$** ].

Thickness:

The epoxy pavement marking wet film thicknesses shall be a minimum of 508  $\mu\text{m}$  [**20 mil**] on all pavement surfaces. For the Spec 2360 SUPERPAVE wearing courses the epoxy pavement marking wet film thicknesses shall be increase from a minimum of 508  $\mu\text{m}$  [**20 mil**] to a minimum thickness of 635  $\mu\text{m}$  [**25 mil**] wet film.

## **B Glass Beads**

Glass beads shall meet the requirements of AASHTO M247, Type I, and:

- a. Coatings -- the beads shall be treated according to the manufacturers recommendations and meet the requirements of Section 4.4.2 of M247, and
- b. Roundness-- the beads shall have a roundness of at least 80%.

For 508  $\mu\text{m}$  [**20 mil**] applications, glass beads shall be applied at a rate of at least 3.0 kg/L [**25 pounds per gallon**]. A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.

Time to No-Track:

Type I material shall be in "no-tracking" condition in 15 minutes or less and within 45 minutes for Type II material. The "no-tracking" condition shall be determined on an application of specified thickness to the pavement and covered with glass beads at the rate of at least 3.0 kg/L [**25 pounds per gallon**]. The lines for this test shall be applied with striping equipment operated so as to have the material at manufacturer's recommended application temperature. This maximum "no-tracking" time shall not be exceeded when the pavement temperature varies from 10 to 49° C [**50 to 120° F**] and under all humidity conditions, providing the pavement is dry. The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 40 to 55 km/hr [**25 to 35 mph**] in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 15 m [**50 feet**] shall be considered as showing "no-tracking" and conforming to this requirement for time to "no-track."

**S-81**            **(3592) DROP-ON GLASS BEADS**

The provisions of MnDOT 3592.3 are hereby deleted and replaced with the following:

**3592.3**            **SPECIFIC REQUIREMENTS**

Glass beads shall meet the requirements of AASHTO M247, Type I, "standard gradation" except the beads will have a minimum of 80 percent true spheres. The dual treated beads will meet the moisture resistant requirements of AASHTO M 247 Section 4.4.2 and pass the adherence treatment Dansyl Chloride Test. The moisture resistant silicone treated beads will meet AASHTO M 247 Section 4.2.2.

**S-82**            **(3753) TYPE 1-D MEMBRANE CURING COMPOUND**

The following is hereby added to the MnDOT Standard Specifications:

**3753**            **TYPE 1-D MEMBRANE CURING COMPOUND**

**3753.1**        **SCOPE**

Provide clear or translucent liquid membrane forming curing compounds with a Type 1-D fugitive dye for spray application on portland cement colored or stamped surfaces, where a finished white surface would mask the decorative finished concrete surface when exposed to the air.

**3753.2**        **REQUIREMENTS**

**A**              **General**

Provide membrane curing compound meeting the following requirements:

- All membrane-curing compounds pre-approved by the Department before use. The most current approved lots and batches with product expiration dates are available from the Approved Products list,

- Meets the requirements of the MnDOT Curing Compound Manufacturer Approval Program, as listed in the MnDOT Approved Products List, including pre-testing of materials by the manufacturer,
- Meets the requirements of ASTM C 309, Type 1-D Curing Compound, and
- The Engineer will not allow the use of curing compound that is over 1 year from the manufacture date.

The Contractor may use Type 1-D curing compound in other concrete applications as approved by the Engineer or as shown on the Special Provisions. Use of any other Type 1 curing compound is at the discretion of the Engineer in conjunction with the Concrete Engineer.

**3753.3 SAMPLING AND TESTING**

Provide samples for testing meeting the requirements of the Schedule of Materials Control.

Test the material at an application rate of 200 sq. ft. per gal [5 sq. m per L].

**S-83**

**(3754) POLY-ALPHA METHYLSTYRENE (AMS) MEMBRANE CURING COMPOUND**

MnDOT 3754 is hereby deleted and replaced with the following:

**3754 POLY-ALPHA METHYLSTYRENE (AMS) MEMBRANE CURING COMPOUND**

**3754.1 SCOPE**

Provide poly-alpha methylstyrene liquid membrane curing compounds for spray application on portland cement concrete surfaces exposed to the air.

**3754.2 REQUIREMENTS**

Provide membrane-curing compound meeting the following requirements:

- (1) All membrane-curing compounds pre-approved by the Department before use. The most current approved lots and batches with product expiration dates are available from the Approved Products list.
- (2) Meets the requirements of the MnDOT Curing Compound Manufacturer Approval Program, including pre-testing of all materials by the manufacturer.
- (3) Meets the requirements of ASTM C 309 for the type required by the Contract.
- (4) The Engineer will not allow the use of curing compound that is over 1 year from the manufacture date.
- (5) White pigmented Type 2, Class B.
- (6) Resin is 100 percent poly-alpha methylstyrene.

<b>Table 3754-1 Requirements for 3754 AMS Curing Compound</b>	
<b>Properties</b>	<b>Range</b>
Total solids, % by weight of compound	≥ 42
% reflectance in 72 h (ASTM E 1347)	≥ 65
Loss of Water, kg/sq. m in 24 h (ASTM C 156)	≤ 0.15
Loss of Water, kg/sq. m in 72 h (ASTM C 156)	≤ 0.40
Settling Test, ml/100 ml in 72 h*	≤ 2
V.O.C. Content, g/L	≤ 350
Infrared Spectrum, vehicle	100% α methylstyrene
* Test in accordance with the method on file at the Materials Laboratory.	
Match the infrared scan for the dried vehicle from the curing compound to the infrared scan on file at the Materials Laboratory	

**3754.3 SAMPLING AND TESTING**

Provide samples for testing meeting the requirements of the Schedule of Materials Control.

Test the material at an application rate of 200 sq. ft per gal [**5 sq. m per L**].

**S-84 (3755) LINSEED OIL MEMBRANE CURING COMPOUND**

The following is hereby added to the MnDOT Standard Specifications:

**3755 LINSEED OIL MEMBRANE CURING COMPOUND**

**3755.1 SCOPE**

Provide extreme service white pigmented, heavy bodied linseed oil emulsion for application as a membrane cure and sealer.

**3755.2 REQUIREMENTS**

Provide membrane curing compounds meeting the following requirements:

- (1) All membrane-curing compounds pre-approved by the Department before use. The most current approved lots and batches with product expiration dates are available from the Approved Products list.
- (2) Meets the requirements of the MnDOT Curing Compound Manufacturer Approval Program, including pre-testing of materials by the manufacturer,
- (3) Composed of a blend of boiled linseed oil and high viscosity, heavy bodied linseed oil emulsified in a water solution meeting the requirements of ASTM C 309, Type 2, except the Department will waive the drying time,



- (4) The Engineer will not allow the use of curing compound that is over 1 year from the manufacture date,
- (5) Sprayable at temperatures of at least 40° F [4° C], and
- (6) Chemical requirements in accordance with the following table:

<b>Table 3755-1</b>	
<b>Chemical Requirements of Linseed Oil Membrane Curing Compound (volumes exclusive of added pigment)</b>	
<b>Material Requirements</b>	<b>Percent by Weight</b>
Oil phase (50% ± 4% by volume):	
Boiled linseed oil	80
Z-8 viscosity linseed oil	20
Water phase (50% ± 4% by volume)	
	100

**3755.3 SAMPLING AND TESTING**

Provide samples for testing meeting the requirements of the Schedule of Materials Control.

Test membrane curing compound at an application rate of 200 sq. ft per gal [**5 sq. m per L**].

**S-85 (3876) SEED**

The provisions of MnDOT 3876 are supplemented and/or modified with the following:

S-85.1 The second paragraph of MnDOT 3876.1 is hereby deleted and replaced with the following:

Pure live seed (PLS) is the percent of seed germination plus dormant and/or hard seed times the percent of seed purity of each species divided by 100.

S-85.2 MnDOT 3876.2A General Requirements is hereby deleted and replaced with the following:

**A General Requirements**

All seed lots shall conform to the latest seed law of the State (Minnesota Statutes 21.80-21.91, last revised 8/2/06), and any applicable federal regulations, including those governing labeling and weed seed tolerances. Seed lots sold or offered for sale in the state of Minnesota are subject to inspection, sampling, and testing for verification of label claims and compliance with the Minnesota Seed Law by the Department of Agriculture (M.S. 18J.04). Tolerances for germination and purity factors will be applied as established in Rules 1510.0050, 1510.0060, 1510.0070, 1510.0080, 1510.0090 and 1510.0100 to seed lots sampled and tested by official methods. For all seed used in MnDOT mixes or projects, tests for viability

(including germination and TZ tests) are valid for 12 months from the test date, exclusive of the month the test was completed. Seed shall be installed while tests are still valid.

All legume seed, including native legumes, shall have been pre-inoculated with the proper bacterial culture for the species being inoculated and with the bacteria culture designed for this purpose (pre-inoculation), in the manner and within the time specified by the manufacturer.

#### **A1 Labeling**

Contractor shall supply seed that is labeled according to the labeling requirements for agricultural seed as set forth in the Minnesota Seed Law, section 21.82. The Contractor shall supply seed that also contains the following information:

- a) County of genetic origin for each native component (List at least two counties for germplasm comprising accessions from multiple counties)
- b) PLS percent for each mix component (Purity x Total Germination and Hard or Dormant Seed/100) for each mix component (**For PLS component of mix's**)
- c) Total PLS weight for the bag. The tag shall identify this as the pay item. (**For PLS component of mix's**)
- d) Total bulk weight for the bag
- e) Area covered by the amount of seed in the bag when applied at the rate specified for the mix
- f) All information pertaining to individual components in a mix is required for all components, including those that constitute less than 5% of the total mix.

Tags must not be hand written. If any of the above mentioned information is not included on the tag the material will be subject to specification 1503. When multiple bags are required to keep certain species or groups of species separate for the purpose of seeding those bags may be placed inside of a larger bag as long as each bag is labeled separately and the outer bag is labeled with the name of the mix.

Each package of seed must include a "Certified Vendor" tag that is issued by MnDOT Erosion Control unit. This will indicate that the seed has come from a MnDOT Approved Seed Vendor as described in 3876.3.

#### **A2 Seed Cleaning**

Contractor shall use seed that has been cleaned to an extent sufficient to allow its passage through appropriate seeding equipment. Seed of introduced species must be suitable for use in conventional seeders. Seed of native species must be suitable for use in native seed drills without plugging up the boxes, drop tubes, or

planting units of the seed drills. Contractor shall not use seed that has been conditioned so much that it suffers reduced viability as a result.

**A3 Substitutions**

Alternate species or germplasm may only be used by requesting permission from the Office of Environmental Services Turf and Erosion Control Engineering Unit. Requests for permission must include written proof from three potential suppliers that the specified germplasm is not available. Approved substitutions will be named in a memo at the time they are approved. All currently approved substitutions will be posted on the Office of Environmental Services Erosion Control Unit website. Use of germplasm not listed herein will be considered unacceptable and will be subject to 1503.

**A4 Requirements for seed of native species**

Contractor shall supply and plant all seed in the 300 series mixes as pure live seed (PLS). This includes the cover crop, grass, sedge, and forb components. All seed in the cover crop component of mixes in the 300 series must be certified by the Minnesota Crop Improvement Association (MCIA) or the appropriate seed certifying agency in the seed's state of origin, if other than Minnesota.

All native seed used in mixes in the 300 series shall be certified by the Minnesota Crop Improvement Association (MCIA) in the Source Identified class. The genetic origin for this seed shall be within Minnesota or eastern North Dakota, eastern South Dakota, northern Iowa, or western Wisconsin.

Source Identified seed shall be accompanied by the appropriate quality mark documentation from the MCIA, in the form of a MCIA-labeled yellow tag or certification certificate. County of genetic origin shall be clearly identified on the seed label for all native seed. Selected class and Tested class germplasm of native species listed in Table 3876-1 located on the website of the Office of Environmental Services Erosion Control unit may be used in 100 and 200 series seed mixtures.

If a specified species or germplasm is not available, substitutions will be granted for native seed in the 300 series mixes according to the following order of preference:

- 1) First preference, MCIA certified Source Identified class with a genetic origin in Minnesota or eastern North Dakota, eastern South Dakota, northern Iowa, or western Wisconsin
- 2) Second Preference: Source Identified seed certified by a seed certifying agency other than MCIA but with a genetic origin in Minnesota or eastern North Dakota, eastern South Dakota, northern Iowa, or western Wisconsin
- 3) Third Preference: Certified seed of varieties/germplasm listed in Table 3876-

- 1.
- 4) Fourth Preference: Wild Type from Minnesota or eastern North Dakota, eastern South Dakota, northern Iowa, or western Wisconsin. Wild type seed is defined as seed of a local or regional ecotype that has originated from remnant native stands and that has not undergone any intentional selection process.

S-85.3 MnDOT Table 3876-1 is hereby deleted and replaced with the following:

<b>TABLE 3876-1 NATIVE GRASSES SEED COUNTS AND ACCEPTABLE GERmplasm</b>			
Trade Name	Scientific Name+	Acceptable Varieties/Germplasm*	Seeds Per Pound
Big Bluestem	<i>Andropogon gerardi</i>	Bonilla, Bison	131,200
Sideoats Grama	<i>Bouteloua curtipendula</i>		96,000
Blue Grama	<i>Bouteloua gracilis</i>		640,000
Fringed Brome	<i>Bromus ciliatus</i>		160,000
Kalm's Brome	<i>Bromus kalmii</i>		128,000
Hairy wood chess	<i>Bromus purgans</i>		121,600
Buffalo grass	<i>Buchloe dactyloides</i>		51,200
Blue-joint grass	<i>Calamagrostis Canadensis</i>		3,360,000
Bottle Brush Sedge	<i>Carex comosa</i>		384,000
Tussock Sedge	<i>Carex stricta</i>		848,000
Fox Sedge	<i>Carex vulpinoidea</i>		1,440,000
Canada Wild Rye	<i>Elymus canadensis</i>	Mandan	67,200
Bottle brush grass	<i>Elymus hystrix</i>		75,200
Slender Wheat Grass	<i>Elymus trachycaulus</i>	Revenue	135,000
Virginia Wild Rye	<i>Elymus virginicus</i>		62,400
Western Wheat Grass	<i>Elytrigia smithii</i>		113,600
Reed Manna Grass	<i>Glyceria grandis</i>		1,280,000
Fowl Manna Grass	<i>Glyceria striata</i>		2,560,000
Common rush	<i>Juncus effusus</i>		16,000,000
June Grass	<i>Koeleria macrantha</i>		2,400,000
Switch Grass	<i>Panicum virgatum</i>	Forestburg, Dacotah	224,000
Fowl Bluegrass	<i>Poa palustris</i>		2,080,000
Canada Bluegrass	<i>Poa compressa</i>		2,400,000
Little Bluestem	<i>Schizachyrium scoparium</i>	Itasca Germplasm	140,800
Green Bulrush	<i>Scirpus atrovirens</i>		2,240,000
Wool-grass	<i>Scirpus cyperinus</i>		2,880,000
Soft-stem Bulrush	<i>Scirpus validus</i>		496,000
Indian Grass	<i>Sorghastrum nutans</i>	Tomahawk	132,800
Prairie Cordgrass	<i>Spartina pectinata</i>	Red River Germplasm	105,600
Rough Dropseed	<i>Sporobolus asper</i>		480,000
Sand Dropseed	<i>Sporobolus cryptandrus</i>		3,200,000

TABLE 3876-1 NATIVE GRASSES SEED COUNTS AND ACCEPTABLE GERmplasm			
Trade Name	Scientific Name+	Acceptable Varieties/Germplasm*	Seeds Per Pound
Prairie Dropseed	<i>Sporobolus heterolepis</i>		224,000
Green Needle Grass	<i>Stipa viridula</i>		120,000
* Varieties listed are approved for use in 100 and 200 series mixes. Their substitution for MClA Source Identified seed in 300 series mixes is only allowed upon satisfaction of the requirements of 3876.2 A5. When multiple varieties are listed for a single species, they are listed in order of preference.			

- S-85.4 Delete MnDOT 3876.2B Requirements for Native Grasses, Sedges, Rushes (label and paragraphs) and replace with:
- B Requirements for Native Grasses, Sedges, and Rushes..... Table 3876-1**  
(Keep table 3876-1)
- S-85.5 Delete MnDOT 3876.2E Requirements for Native Forbs (Wildflowers): (label and paragraphs) and replace with:
- E Requirements for Native Forbs (Wildflowers)..... Table 3876-4**  
(Keep table 3876-4)
- S-85.6 Mixtures 260 and 270 in MnDOT Table 3876-5 are hereby deleted and replaced with the following:

<b>Mixture: 260</b>			
<b>Common Name</b>	<b>Bulk Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Bluegrass, Kentucky "Certified Park"	35.8	40	32.0
Bluegrass, Canada	11.2	12.5	10.0
Bluegrass, Kentucky - Low Maintenance <sup>1</sup>	33.6	37.5	30.0
Fescue, hard	9.0	10	8.0
Rye-grass, perennial	22.4	25	20.0
<b>GRAND TOTALS:</b>	<b>112</b>	<b>125</b>	<b>100.0</b>
<sup>1</sup> Any accepted low maintenance Kentucky Bluegrass Except "Park" <i>Purpose: Commercial Turf</i>			

<b>Mixture: 270</b>			
<b>Common Name</b>	<b>Bulk Rate</b>		<b>% of Mix Component</b>
	<b>kg/ac</b>	<b>lb/ac</b>	
Bluegrass, Kentucky - Elite	33.6	37.5	25.0
Bluegrass, Kentucky - Improved	33.6	37.5	25.0
Bluegrass, Kentucky - Low Maintenance	33.6	37.5	25.0
Red fescue, creeping	10.8	12	8.0
Rye-grass, perennial	22.8	25.5	17.0
<b>GRAND TOTALS:</b>	<b>134.4</b>	<b>150</b>	<b>100.0</b>
<i>Purpose: Residential Turf</i>			

S-85.7 The 300 series mixes from MnDOT Table 3876-5 are hereby deleted and replaced with the following:

**Table 3876-5**

Mixture: 310			
Common Name	PLS Rate		% of Mix Component
	kg/ha	lb/ac	
Bluestem, big	2.8	2.5	25.0
Indian grass	2.8	2.5	25.0
Wild-rye, Virginia	2.2	2.0	20.0
Switch grass	0.6	0.5	5.0
Blue-joint grass	0.3	0.25	2.5
Green bulrush	0.3	0.25	2.5
Wool grass	0.3	0.25	2.5
Giant bur reed	0.3	0.25	2.5
Cordgrass, prairie	1.7	1.5	15.0
<b>Grass Totals:</b>	<b>11.3</b>	<b>10.0</b>	<b>100.0</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Winter Wheat*	62.7	56.0	80.0
Rye-grass, annual	12.5	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>78.3</b>	<b>70</b>	<b>100.0</b>
Wet Forbs Mixture (Table 3876-6)	<b>2.2</b>	<b>2.0</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>91.8</b>	<b>82.0</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Purpose: Native mix for wetter areas. Infiltration ponds, dry ponds, wet ditches. Tall height.</b>			

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<b>Mixture: 325</b>			
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Bluestem, big	1.7	1.5	15.0
Fringed brome	1.7	1.5	15.0
Wheat grass, slender	1.7	1.5	15.0
Virginia wild-rye	1.7	1.5	15.0
Switch grass	0.6	0.5	5.0
Fowl bluegrass	1.7	1.5	15.0
Indian grass	1.7	1.5	15.0
Prairie cord grass	0.6	0.5	5.0
<b>Grass Totals:</b>	<b>11.4</b>	<b>10.0</b>	<b>100.0</b>
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Blue-joint grass	0.22	0.2	10.0
Bottlebrush sedge	0.34	0.3	15.0
Tussock sedge	0.22	0.2	10.0
Fox sedge	0.22	0.2	10.0
Reed manna grass	0.22	0.2	10.0
Fowl manna grass	0.22	0.2	10.0
Green bulrush	0.22	0.2	10.0
Wool grass	0.22	0.2	10.0
Soft-stem bulrush	0.34	0.3	15.0
<b>Sedge Totals:</b>	<b>2.22</b>	<b>2.0</b>	<b>100.0</b>
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Winter Wheat*	61.6	56	80.0
Rye-grass, annual	12.3	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>77</b>	<b>70</b>	<b>100.0</b>
Wet Forbs Mixture (Table 3876-6)	<b>2.2</b>	<b>2.0</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>92.8</b>	<b>84.0</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Purpose: Native sedge/prairie meadow mix. Reaches a height of 915 mm to 1220 mm (36 to 48 inches). Developed for use on hydric soils and for wetland restoration.</b>			



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<b>Mixture: 328</b>			
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Bluestem, big	2.2	2	12.5
Brome, fringed	2.2	2	12.5
Wild-rye, Virginia	4.4	4	25.0
Switchgrass	1.1	1	6.3
Bluegrass, fowl	5.5	5	31.2
Indian grass	2.2	2	12.5
<b>Grass Totals:</b>	<b>17.6</b>	<b>16.0</b>	<b>100.0</b>
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Winter Wheat*	61.6	56.0	80.0
Rye-grass, annual	12.3	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>77</b>	<b>70</b>	<b>100.0</b>
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Milkweed, marsh	0.33	0.3	15.0
Prairie clover, purple	0.33	0.3	15.0
Tic-trefoil, showy	0.33	0.3	15.0
Sunflower, early	0.33	0.3	15.0
Black-eyed Susan	0.55	0.5	25.0
Vervain, blue	0.33	0.3	15.0
<b>Economy Forbs Totals:</b>	<b>2.2</b>	<b>2.0</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>96.8</b>	<b>88.0</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Purpose: Native mix for infiltration ponds, dry ponds, temporary wet ditches. Tall height.</b>			

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<b>Mixture: 330</b>			
Common Name	PLS Rate		% of Mix Component
	kg/ha	lb/ac	
Grama, sideoats	3.4	3.0	21.5
Grama, blue	2.8	2.5	18.0
Bluestem, little	3.9	3.5	25.0
June grass	1.1	1.0	7.0
Dropseed, sand	1.1	1.0	7.0
Wild-rye, Canadian	3.4	3.0	21.5
<b>Grass Totals:</b>	<b>15.7</b>	<b>14.0</b>	<b>100.0</b>
Common Name	PLS Rate		% of Mix Component
	kg/ha	lb/ac	
Winter Wheat*	62.7	56.0	80.0
Rye-grass, annual	12.5	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>78.3</b>	<b>70</b>	<b>100.0</b>
<b>Dry Forbs Mixture (Table 3876-6)</b>	<b>0.6</b>	<b>0.5</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>94.6</b>	<b>84.5</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Application: Native mix for Sandy/dry areas. Short height.</b>			

<b>Mixture: 340</b>			
Common Name	PLS Rate		% of Mix Component
	kg/ha	lb/ac	
Bluestem, big	3.3	3.0	21.5
Bluestem, little	2.8	2.5	18.0
Wild-rye, Canadian	2.2	2.0	14.0
Grama, sideoats	2.2	2.0	14.0
Switch grass	0.6	0.5	4.0
Dropseed, sand	0.6	0.5	3.5
Bluegrass, Canada	3.4	3.0	21.5
June grass	0.6	0.5	3.5
<b>Grass Totals:</b>	<b>15.7</b>	<b>14.0</b>	<b>100.0</b>
Common Name	PLS Rate		% of Mix Component
	kg/ha	lb/ac	
Winter Wheat*	62.7	56.0	80.0
Rye-grass, annual	12.5	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>78.3</b>	<b>70</b>	<b>100.0</b>
<b>Dry Forbs Mixture (Table 3876-6)</b>	<b>0.6</b>	<b>0.5</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>94.6</b>	<b>84.5</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Purpose: Native mix for Sandy/Dry areas. Mid-height.</b>			

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<b>Mixture: 350</b>			
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Bluestem, big	3.4	3.0	21.5
Indian grass	2.8	2.5	18.0
Bluestem, little	2.8	2.5	18.0
Gramma, sideoats	3.4	3.0	21.5
Wild-rye, Canadian	2.2	2.0	14.0
Switch grass	1.1	1.0	7.0
<b>Grass Totals:</b>	<b>15.7</b>	<b>14.0</b>	<b>100.0</b>
<b>Common Name</b>	<b>PLS Rate</b>		<b>% of Mix Component</b>
	<b>kg/ha</b>	<b>lb/ac</b>	
Winter Wheat*	62.7	56.0	80.0
Rye-grass, annual	12.5	11.2	16.0
Wheatgrass, slender	3.1	2.8	4.0
<b>Cover Crop Totals:</b>	<b>78.3</b>	<b>70</b>	<b>100.0</b>
<b>Mesic Forbs Mixture (Table 3876-6)</b>	<b>0.6</b>	<b>0.5</b>	<b>100.0</b>
<b>GRAND TOTALS:</b>	<b>94.6</b>	<b>84.5</b>	<b>100.0</b>
*Oats to be substituted for spring plantings			
<b>Application: Native mix for general roadside areas.</b>			

S-85.8 MnDOT Table 3876-6 is hereby deleted and replaced with the following:

**Table 3876-6**

<b>Mixture: Mesic Forbs</b>		
<b>Common Name</b>	<b>Botanical Name</b>	<b>% of Mix</b>
Aster, smooth-blue	<i>Aster laevis</i>	5.0
Milkvetch, Canada	<i>Astragalus canadensis</i>	5.0
Prairie clover, white	<i>Dalea candidum</i>	5.0
Prairie clover, purple	<i>Dalea purpureum</i>	5.0
Tick-trefoil, Showy	<i>Desmodium canadense</i>	5.0
Coneflower, narrow-leaved	<i>Echinacea angustifolia</i>	5.0
Ox-eye, common	<i>Heliopsis helianthoides</i>	5.0
Coneflower, grey-headed	<i>Ratibida pinnata</i>	5.0
Blazingstar, rough	<i>Liatris aspera</i>	5.0
Blazingstar, tall	<i>Liatris pycnostachya</i>	5.0
Bergamot, wild	<i>Monarda fistulosa</i>	5.0
Penstemon, showy	<i>Penstemon grandiflorum</i>	5.0
Mint, mountain	<i>Pycnathemum virginianum</i>	5.0
Coneflower, columnar	<i>Ratibida columnifera</i>	5.0
Black-eyed Susan	<i>Rudbeckia hirta</i>	5.0
Goldenrod, stiff	<i>Solidago rigida</i>	5.0
Vervain, blue	<i>Verbena hastata</i>	5.0
Vervain, hoary	<i>Verbena stricta</i>	5.0
Alexanders, heart-leaved	<i>Zizia aptera</i>	5.0
Alexanders, golden	<i>Zizia aurea</i>	5.0
	<b>Total:</b>	<b>100.0</b>
<b>Rate: 0.6 kg/ha (½ pounds per acre) PLS.</b>		
<b>Mixture: Dry Forbs</b>		
<b>Common Name</b>	<b>Botanical Name</b>	<b>% of Mix</b>
Leadplant	<i>Amorpha canescens</i>	10.0
Milkweed, butterfly	<i>Asclepias tuberosa</i>	2.0
Aster, heath	<i>Aster ericoides</i>	4.0
Tic-seed, stiff	<i>Coreopsis palmate</i>	2.0
Yarrow	<i>Achillea millefolium</i>	2.0
Long-leaved bluets	<i>Hedyotis longifolia</i>	1.0
Bushclover, round-headed	<i>Lespedeza capitata</i>	3.0
Blazingstar, rough	<i>Liatris aspera</i>	4.0
Blazingstar, dotted	<i>Liatris punctata</i>	3.0
Lupine, wild	<i>Lupinus perennis</i>	5.0
Prairie clover, white	<i>Dalea candidum</i>	5.0
Prairie clover, purple	<i>Dalea purpureum</i>	16.0
Prairie rose	<i>Rosa arkansana</i>	1.0
Black-eyed susan	<i>Rudbeckia hirta</i>	18.0
Goldenrod, gray	<i>Solidago nemoralis</i>	3.0
Goldenrod, upland	<i>Solidago ptarmicoides</i>	1.0
Goldenrod, stiff	<i>Solidago rigida</i>	2.0
Goldenrod, showy	<i>Solidago speciosa</i>	2.0
Vervain, hoary	<i>Verbena stricta</i>	14.0
Alexander's, golden	<i>Zizia aurea</i>	2.0
	<b>Total:</b>	<b>100.0</b>
<b>Rate: 0.6 kg/ha (½ pounds per acre) PLS</b>		

<b>Mixture: Wet Forbs</b>		
<b>Common Name</b>	<b>Botanical Name</b>	<b>% of Mix</b>
Hyssop, fragrant giant	<i>Agastache foeniculum</i>	2.0
Water plantain	<i>Alisma subcordatum</i>	4.0
Meadow garlic	<i>Allium canadense</i>	1.0
Anemone, Canada	<i>Anemone Canadensis</i>	1.0
Milkweed, marsh	<i>Asclepias incarnata</i>	2.0
Aster, panicked	<i>Aster simplex</i>	3.0
Aster, New England	<i>Aster novaeangliae</i>	3.0
Aster, red-stalked	<i>Aster puniceus</i>	3.0
Aster, flat-topped	<i>Aster umbellatus</i>	1.0
Tick trefoil, Canada	<i>Desmodium glutinosum</i>	1.0
Joe-pye weed	<i>Eupatorium maculatum</i>	17.0
Boneset	<i>Eupatorium perfoliatum</i>	10.0
Goldenrod, grass-leaved	<i>Solidago graminifolia</i>	2.0
Sneezeweed	<i>Helenium autumnale</i>	1.0
Giant sunflower	<i>Helianthus giganteus</i>	2.0
Ox-eye, common	<i>Heliopsis helianthoides</i>	1.0
Great St. John's wort	<i>Hypericum pyramidalatum</i>	2.0
Iris, wild	<i>Iris versicolor</i>	1.0
Blazingstar, tall	<i>Liatris pycnostachya</i>	8.0
Bergamot, wild	<i>Monarda fistulosa</i>	1.0
Prairie clover, white	<i>Dalea candidum</i>	1.0
Prairie clover, purple	<i>Dalea purpureum</i>	2.0
Mountain mint	<i>Pycnathemum virginianum</i>	1.0
Black-eyed susan	<i>Rudbeckia hirta</i>	6.0
Goldenrod, stiff	<i>Solidago rigida</i>	2.0
Tall meadow rue	<i>Thalictrum dasycarpum</i>	2.0
Vervain, blue	<i>Verbena hastata</i>	14.0
Ironweed	<i>Veronia fasciculate</i>	1.0
Culver's root	<i>Veronicastrum virginicum</i>	3.0
Alexander's, golden	<i>Zizea aurea</i>	2.0
	<b>Total:</b>	<b>100.0</b>
<b>Rate: 2.2 kg/ha (2 pounds/acre) PLS</b>		

**S-86            (3877) TOPSOIL BORROW**

MnDOT 3877 is hereby modified as follows:

S-86.1        MnDOT 3877.2A (Topsoil Borrow) is hereby deleted and the following substituted therefore:

**A            Topsoil Borrow**

Topsoil borrow for general use as a turf growing medium shall meet the requirements of Table 3877-1:

<b>TABLE 3877-1 TOPSOIL BORROW REQUIREMENTS</b>		
<b>Requirement</b>	<b>Range</b>	<b>Test Method</b>
Material passing 1/4 inch [6.35 mm]	≥ 85%	—
Clay	5% – 30%	ASTM D 422
Silt	10% – 70%	ASTM D 422
Sand	10% – 70%	ASTM D 422
Organic matter	3% – 20%	ASTM D 2974
pH	6.1 – 7.8	ASTM G 51

S-86.2 MnDOT 3877.2B (Select Topsoil Borrow) is hereby deleted and the following substituted therefore:

**B Select Topsoil Borrow**

Select topsoil borrow for use as a plant growing medium in designated areas, such as landscape beds, shall meet the requirements of Table 3877-2:

<b>TABLE 3877-2 SELECT TOPSOIL BORROW</b>		
<b>Requirement</b>	<b>Range</b>	<b>Test Method</b>
Material passing 1/4 inch [6.35 mm]	≥ 90%	—
Clay	5% – 30%	ASTM D 422
Silt	10% – 50%	ASTM D 422
Sand	20% – 70%	ASTM D 422
Organic matter	3% – 20%	ASTM D 2974
pH	6.1 – 7.5	ASTM G 51
Soluble salts	≤ 0.15 siemens/m [1.5 mmho/cm]	<i>American Society Agronomy Chapter 62.2</i>

S-86.3 MnDOT 3877.2C (Premium Topsoil Borrow) is hereby deleted and the following substituted therefore:

**C Premium Topsoil Borrow**

Premium topsoil borrow for use as a plant growing medium in critical areas and top dressing erosion stabilization mats shall meet the requirements of Table 3887-2 and shall be screened and pulverized.

**S-87**            **(3889) TEMPORARY DITCH CHECKS**

The provisions of MnDOT 3889 are supplemented and/or modified with the following:

- S-87.1           MnDOT 3889.2B Type 2: Bioroll, is revised to read as follows:  
Type 2 ditch checks shall consist of 3897 Filter Log Type; Straw Bioroll or Wood Fiber Bioroll.
- S-87.2           MnDOT 3889.2C Type 3: Bioroll Blanket System, is revised to read as follows:  
Type 3 ditch checks shall consist of two components; Filter Log Type; Straw Bioroll or Wood Fiber Bioroll in accordance with 3897, staked on top of a Category 3, specification 3885 erosion control blanket. The blanket shall form a minimum width of 3.7 m (**12 feet**) perpendicular to the ditch gradient.

**S-88**            **(3891) STORM DRAIN INLET PROTECTION**

The provisions of MnDOT 3891 are supplemented and/or modified with the following:

- S-88.1           MnDOT 3891.3A Rock Log, is revised to read as follows:  
Rock logs shall meet the requirements of 3897.2 Filter Log Type Rock Log.
- S-88.2           MnDOT 3891.3B Compost Log, is revised to read as follows:  
Compost logs shall meet the requirements of 3897.2 Filter Log Type Compost Log