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I hereby certify that the special provisions for the Bridge Construction (Division SB) contained in 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.

Ronald Benson Ronald Benson

Date: 1/30/08 Lic. No. 22737

Attachment: Notification of Intent to Perform a Bridge Demolition

**SPECIAL PROVISIONS**

**DIVISION SB**

**BRIDGE 07586**

**SPECIAL REQUIREMENTS**

SB-1        (1507) UTILITY PROPERTY AND SERVICE

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

SB-1.1        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."

SB-1.2        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.

Benco Electric (Overhead Power)	507-387-7963
Hickory Tech (Buried Telephone)	406-541-9571

SB-1.3        The County's Contractor shall call Gopher State One Call prior to commencement of construction and shall coordinate his/her work and cooperate with all utility owners and their forces in a manner consistent with the provisions of Mn/DOT 1507 and the applicable provisions of Mn/DOT 1505.

SB-2        (1701) LAWS TO BE OBSERVED (BRIDGE)

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

SB-2.1        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 Mn/DOT written notice of intention to demolish or move a structure - see the attached form "Notification of Intent to Perform a Bridge Demolition". This form is also available at <http://www.dot.state.mn.us/environment>. Such notice shall be given 10 working days before any demolition.

(C) And if the bridge(s) contains any asbestos, the Contractor shall:

- (1) Depending on the amounts and types of asbestos on the premises Submit "Notification of Asbestos Related Work", to the MPCA, and/or the Minnesota Department of Health (MDH) 10 working days prior to commencement of abatement activities. The Contractor shall submit a copy of the completed notification(s) to Mn/DOT at the same time.
- (2) Submit all documentation required by the MPCA and the MDH. 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 MDH can be found at <http://www.health.state.mn.us/divs/eh/asbestos/index.html>.
- (3) Transport all asbestos containing waste in compliance with USDOT packaging and transportation requirements. The Contractor shall provide Mn/DOT with all Asbestos Containing Material Transportation shipping papers/manifests. A Shipping paper can be obtained in part 61.145 on the following website: <http://www.epa.gov/opptintr/asbestos/40cfr61.pdf>
- (4) Dispose of all asbestos containing waste in Minnesota solid waste landfills (not demolition debris landfills) permitted to accept asbestos containing wastes. Provide Mn/DOT with all landfill disposal receipts.

(D) Comply with Mn/DOT's manual "Asbestos and Regulated Waste Manual for Building Demolition Or Relocations for Construction Projects" which is available on the following website: <http://www.dot.state.mn.us/environment>.

SB-2.2 The successful Contractor shall comply with all laws, regulations and/or rules regarding the removal and recycling/disposal of any or all of the following wastes:

1. Polychlorinatedbiphenols (PCB's)
2. Mercury
3. Lead
4. Treated Timber

The transportation of all the above wastes shall be in compliance with USDOT packaging and transportation requirements. The Contractor shall provide Mn/DOT with all shipping papers or manifests.

The Contractor shall use only Mn/DOT approved hazardous waste/problem waste contractors and recyclers to deal with waste PCB's, mercury, and lead (other than paint).

The Contractor shall provide the Engineer with copies of disposal or recycling receipts.

SB-2.3 Owner responsibility for recording the Contractor's testing, waste transport and disposal processes are described in Mn/DOT's manual "Asbestos and Regulated Waste Manual For Building Demolition or Relocations for Construction Projects" available on the

following website: <http://www.dot.state.mn.us/environment>. All asbestos and/or regulated waste shall be disposed in accordance with the manual (see (2442)).

SB-3 (1702) PERMITS, LICENSES, AND TAXES

The provisions of 1702 are supplemented by the following:

The various permits included in the Proposal for these project(s), as issued, shall be construed to be a part of the Special Provisions in the Proposal. The conditions, requirements and restrictions of these permits shall be binding on the Contractor's operations under this Contract.

SB-4 (1706) EMPLOYEE HEALTH AND WELFARE

The provisions of Mn/DOT 1706 are supplemented as follows:

SB-4.1 The Contractor shall submit a plan, at the preconstruction conference, for providing all OSHA required safety equipment (safety nets, static lines, false decks, etc.) for all work areas whose working surface is 1.8 meters (**6 feet**) or more above the ground, water, or other surfaces. Submittal of this plan will in no way relieve the Contractor of his/her responsibility for providing a safe working area.

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

The installation of safety lines, safety nets, or other systems whose purpose is to reduce the hazards of bridge work may require the attachment of anchorage devices to beams, girders, diaphragms, bracing or other components of the structure. Clamp type anchorage systems which do not require modification of structural members may be used provided they do not interfere with proper execution of the work; however, if the Contractor desires to use an anchorage system which requires modification of structural members, s/he shall request approval, in writing, for plan modification as provided in Mn/DOT Specifications. Requests to install systems which require field welding or drilling of primary stress carrying members of a bridge will not be approved. The Contractor shall indicate any portions of anchorage devices which will remain permanently in the structure.

On both ends of each pier cap extending 1.8 meters (**6 feet**) or more above the ground, the Contractor shall install an insert or other suitable anchorage to which safety lines can be attached. Any portion of said device extending outside the finished lines of the pier cap shall be removed unless otherwise approved by the Engineer. Any void or cavity resulting from the installation or removal of this device shall be repaired or sealed to prevent the ponding or entry of water as directed by the Engineer.

Approved anchorage systems shall be furnished, installed, and removed at no increased cost to the State for materials, fabrication, erection, or removal of the bridge component or anchorage system.

SB-4.2 The Contractor shall not use any motor vehicle equipment on this Project having an obstructed view to the rear unless:

- A) The vehicle has a reverse signal alarm which is audible above the surrounding noise level; or
- B) The vehicle is backed up only when an observer signals that it is safe to do so.
- C) A **\$50.00 penalty (per incident)** will be assessed against the Contractor each time failure to comply with these backup requirements is observed on the Project site.
- D) None of the penalty(ies) listed above shall be considered by the Contractor as allowance of noncompliance incidents of these backup requirements on this Project. The Contractor is advised that at any time the Contractor is not in compliance, the Engineer may take additional remedial measures which may include, but not be limited to, contacting the Contractor's insurance company and/or MN/OSHA.

SB-5 (1717) AIR, LAND AND WATER POLLUTION

The provisions of 1717 are supplemented as follows:

The Contractor's attention is hereby directed to MPCA Rule 7011.0150 as it relates to sandblasting and/or concrete removal operations (<http://www.pca.state.mn.us/index.cfm>).

The Contractor shall contain waste materials on the project site and provide for their handling, storage, transportation and disposal in accordance with Minnesota Pollution Control laws and regulations. The Contractor shall document the storage, transfer and disposal of waste materials in accordance with the Mn/DOT Environmental Services publication titled "Removing Paint from Bridge Steel Structures", a current copy of which is available at <http://www.dot.state.mn.us/environment> then go to publications, then into "Removing Paint (Dry Abrasive Blasting) from Bridge Steel Structures". Waste materials are defined as paint overspray and drippings, used paint pails, rags, spent solvents, cleaning solutions, and other related debris from cleaning operations including spent abrasive materials or paint chips. Painting, and all work associated therewith, shall be so conducted as to preclude waste materials from falling upon public waters.

It is the responsibility of the Contractor to provide the following safeguards at all times during cleaning and painting operations. All safeguards shall be in place and operable before cleaning and painting operations begin.

- A. Primary safeguards such as containment (curtains and floor coverings), together with adequate structural support such as scaffolding or rope nets, shall be utilized to contain waste materials in the work area. Catchment systems shall be emptied as often as necessary to maintain their structural integrity.

B. Safeguards such as floating booms, mats of absorbent material, skimmers, or similar systems shall be placed in streams to avoid nuisance conditions in the stream caused by cleaning or painting operations.

C. Locked storage of cleaning and painting materials to prevent access by vandals.

Cleaning and painting operations shall be suspended during periods when unfavorable weather conditions may reduce the effectiveness of the above noted safeguards. In situations where use of some of the safeguards listed are not feasible, other innovative safeguards shall be employed. Emphasis shall be placed on containment of waste materials rather than placing reliance on safeguards such as booms, straw dams, skimmers, or absorbent mats. These shall be considered backup systems to guard against water pollution which may result from the failure of primary safeguards.

Materials such as paint chips and sand which are readily recoverable from bridge decks or stream banks, empty paint pails, and rags and debris from cleaning operations shall be disposed of in a proper manner. Paint chips and spent sand shall be removed from the bridge deck on a daily basis and in an approved manner. Recoverable sand and paint chips from blasting operations may be recycled, but the ultimate disposal shall be to an appropriate waste facility. Spent aqueous cleaning solutions shall be discharged to a recognized sewage collection and treatment system. Spent solvents and cans or pails containing waste paint shall be taken to an incinerator approved by the MPCA for disposal, or to an MPCA approved hazardous waste storage area.

In the event of an accidental loss of painting or cleaning materials or debris into public waters, the Contractor shall take immediate action to recover the lost materials, and the incident shall be promptly reported by telephone to the State Duty Officer at 1-800-422-0798 followed by a written report addressed to MPCA, Water Quality Division, Compliance and Enforcement Section, 520 Lafayette Road, St. Paul, Minnesota, 55155.

Unless otherwise provided in these special provisions, construction, demolition and/or removal operations conducted over or in the vicinity of public waters shall be so controlled as to prevent materials from falling into the water. Any materials which do fall into the water, or onto areas where there is a likelihood that they will be picked up by rising water levels, shall be retrieved and stored in areas where such likelihood does not exist.

SB-6 IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

By signing this bid, the bidder will be deemed to have stipulated as follows:

(a) That any facility to be utilized in the performance of this Contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et. seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq., as amended by Pub. L. 92-500), Executive Order

11738, and regulations in implementation thereof (40 CFR, Part 15), is not listed on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

(b) That the State Transportation Department shall be promptly notified prior to contract award of the receipt by the bidder of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

SB-7 (1806) DETERMINATION AND EXTENSION OF CONTRACT TIME

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

SB-7.1 Construction operations shall be started within 8 Calendar Days after date of notice of Contract Approval, unless the Contractor and County make an agreement in writing based on a different schedule.

SB-7.2 All work required under this Contract as shown on the plans, except maintenance work and Final Clean Up shall be completed within 35 Working Days from commencement of bridge construction.

SB-7.3 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 issue a Suspension of Work Order in conformance with 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.

SB-7.4 Within 15 days after the date of mailing to the Contractor of a notice that the Contract has been approved unless the Contractor and County agree to a different schedule, the Contractor shall furnish evidence to the Engineer that the Contractor has placed orders for all material. The Contractor shall furnish a list of material and equipment suppliers and proposed delivery dates for traffic control system components. Any items to be used from the Contractor's stock shall be noted. Also see 2405 (SB-11) for prestressed beam requirements.

SB-8 (1901) MEASUREMENT OF QUANTITIES

Add the following paragraph to Specification 1901.

The basis for conversion to United States standard measure on this contract shall be ASTM E 380, Standard Practice for use of the International System of Units (SI). Measurement to determine compliance with contract requirements may be by either United States standard measure or metric system procedures and devices with results converted to the system specified in the plans and specifications.

When the Plan and Special Provision for a project contain English units of measure, all reference to the metric unit in the Minnesota Department of Transportation Standard Specifications for Construction, the Standard Plates, the Standard Plans and these Special Provisions shall be converted to United States standard measure.

SB-9            (2401) CONCRETE BRIDGE CONSTRUCTION

The provisions of Mn/DOT 2401 are modified and/or supplemented with the following:

SB-9.1            Concrete Aggregate for Bridges

The provisions of 2401.2A shall apply except as modified herein:

Delete the second paragraph of 2401.2A and substitute the following therefor:

Class A Coarse Aggregate, as defined in 3137.2B, shall be used in all concrete for bridge superstructures, except that coarse aggregate requirements for precast concrete members fabricated under 2405 shall be as specified in 2461.2D.

SB-9.2            Bridge Slabs

The provisions of Mn/DOT 2401.3E1 are deleted and the following substituted therefor:

Immediately prior to placing concrete against a construction joint in the bridge slab, the surface of the in-place concrete shall be coated with an approved bonding agent or grout.

SB-9.3            Joint Filler and Sealing

Preformed joint shall be as detailed in the Plans and in conformance with the following requirements.

1. Bituminous felt shall comply with AASHTO M33, modified to the extent that the load required to compress the test specimen to 50 percent of its thickness before test shall be not more than 8274 kPa (**1200 psi**).
2. Cork shall comply with Mn/DOT 3702 and AASHTO M153 Type II.
3. Polystyrene shall comply with the following:



Type	Minimum Compressive Strength (5 percent deflection)	Characteristics
A	207 kPa ( <b>30 psi</b> )	Closed Cell Expanded Polystyrene
B	69 kPa ( <b>10 psi</b> )	Molded Polystyrene

Testing for compressive strength of polystyrene shall be in accordance with ASTM D 1621. The Contractor shall, if requested by the Engineer, furnish evidence that the material meets these requirements.

The quantity of preformed joint filler material given in the Plans is for the Contractor's convenience only. Any additional joint filler required shall be furnished by the Contractor with no additional compensation.

#### SB-9.4 Finish of Concrete

##### A. Special Surface Finish

The provisions of 2401.3F2c shall apply except as modified herein:

A "special surface finish", as described below will be required on the following formed concrete surfaces:

1. Outside surfaces of fascia beams
2. Edges of slabs
3. Bottom of slab overhang

The finish color shall generally be lighter in color than the original concrete, but not white. Paint shall be free of toxic metals and shall not contain toxic pigments.

The following sentence shall be added after the fourth sentence in the second paragraph of 2401.3F2c.

The blended mixture of mortar, bonding agent, water, and 100% acrylic paint shall produce the color specified in these Special Provisions for the project.

##### B. Basis of Payment

Finishing of concrete surfaces, except as otherwise provided in these special provisions, special surface finish, application of topcoat, and painting are considered an incidental expense to the respective concrete mixes for this construction, and no additional compensation will be made for this work.

## SB-9.5 Curing Bridge Deck Slabs

Delete the first sentence of the 11<sup>th</sup> paragraph of 2401.3G and substitute the following:

After completion of the fine texturing for bridge deck slabs and after free water has disappeared from the surface, the Contractor shall apply a white pigmented linseed oil curing emulsion.

The linseed oil curing emulsion shall be in accordance with one of the following, or an approved equal.

- A. "TK-L368 White" as manufactured by TK Products, 11400 West 47th Street, Minnetonka, Minnesota 55343.
- B. "TRI-DAR 33/2" as manufactured by Tamms Industries Co., 3835 State Route 72, Kirkland, Illinois 60146.
- C. "Lin-Seal White" as manufactured by W.R. Meadows Inc., P.O. Box 543, Elgin, Illinois 60121.

## SB-9.6 Falsework and Forms and Bridge Slab Placement

Add the following to 2401.3F3b(1):

At least two weeks in advance of casting Bridge Slab concrete, the Contractor shall provide the Engineer with detailed plans for placing the concrete, including the Contractor's scheme for supporting screed rails for the Bridge Slab and schedules setting forth the rate of concrete delivery. The minimum rate of concrete placement shall be 50 cubic yards per hour.

If concrete is cast by means of a pumping operation, the Contractor shall maintain a standby pump or crane capable of delivering an uninterrupted flow of concrete in case of a pump breakdown.

SB-10 (2402) METAL RAILING

This work shall consist of furnishing, installing and galvanizing Metal Railing, including all anchorages and fittings in accordance with the applicable provisions of 2402, 2471, 2554, and the following:

## A. Materials

The materials and workmanship shall be in accordance with the Plan details.

Pipe and pipe sleeves shall comply with 3362. Pipe and tubing sections shall be galvanized. Factory galvanized pipe or tubing may be used. If galvanized before fabrication, the cut ends, holes, and welded areas shall be stick galvanized.

All structural steel shall comply with ASTM A709 grade 36, except structural tubes shall comply with ASTM A500 grade B per 3361.

Threaded rods, bolts, nuts, and washers shall be galvanized in accordance with 3392 or be electroplated in accordance with ASTM B 633, Type III, SC 4.

Galvanize other material in accordance with 3394 after fabrication.

#### B. Anchorages

Drilled in anchorages shall not be permitted on the traffic rail (Structural Tube Railing, Design Special) for Bridge No. 07586. Cast in place anchorages as detailed on the plans shall be used.

Except when part of an approved proprietary anchorage assembly, threaded rods and bolts shall meet the requirements of 3385 and 3391, respectively.

As an alternate to galvanizing or electroplating, threaded rods, bolts, nuts, and washers which are part of an approved proprietary anchorage may be fabricated from stainless steel in accordance with 3391.

Anchorage for fastening rail posts shall be installed as shown on the plans. Bolt heads and/or nuts shall be in contact with the adjacent surface and shall be torqued to approximately 108 Nm (**80 foot pounds**) unless a different torque is recommended by the manufacturer.

Any voids occurring between the top of the anchorages and the concrete in which it is embedded shall be filled with approved caulk.

#### C. Construction Requirements

The steel posts shall be adjusted to obtain the grade and alignment as shown in the Plans by the following method:

The steel posts shall be shimmed with steel shims or washers to the proper grade and alignment, not to exceed 6 mm ( $\frac{1}{4}$ " ) of shim height. Before attaching the nuts, coat the surface between the base plate and concrete rail with an approved silicone caulk. Tighten the anchor rod nuts firmly and neatly smooth the caulk around the perimeter of the railpost base plate.

The railing shall be grounded at the locations shown in the Plans with copper wire brazed or clamped to a post and brazed or clamped to the ground connection. Clamps shall be an approved type metal clamp.

D. Method of Measurement

Measurement will be by length in meters (**feet**) based on Plan dimensions.

E. Basis of Payment

Payment for all work described above is considered to be included in the bid price for "Structural Tube Railing, Design Special".

SB-11 (2405) PRESTRESSED CONCRETE BEAMS

The provisions of Mn/DOT 2405 are modified and/or supplemented with the following:

Delete the first paragraph of 2405.3M and substitute the following:

Prestressed concrete beams shall be erected in a manner that will provide safety to the workers, inspectors, and the public, at all times, as well as reasonable assurance against damage to the prestressed members. Prior to the placement of grout between the beams and tensioning of the transverse ties, the prestressed beams shall be temporarily anchored, braced, and stabilized as they are erected so as to preclude sliding, tipping, buckling, or other movement that may otherwise occur. The Contractor shall arrange the work schedule so that each beam will be braced and stabilized before operations are suspended for the day.

SB-11.1 Prestressed Concrete Fabricator Certification

The Fabricator's quality control office shall maintain documentation containing the data required by the specifications and the State Materials Engineer. This documentation shall contain test data and measurements taken at times and locations approved by the Engineer, assuring that monitoring, by personnel not directly involved in production, is sufficient to ensure compliance with approved procedures.

If the Engineer's review of fabrication work discloses that approved procedures are not being followed, the Fabricator shall immediately correct the procedure.

The Engineer will determine what additional testing work must be done by the Fabricator or, if necessary, what part of the work must be repaired or replaced if fabrication work is not properly monitored and documented by the Fabricator.

Any and all costs of required additional monitoring and testing shall be at the expense of the Contractor with no additional compensation.

SB-11.2 Possible suppliers include, but are not limited to, the following:

Coreslab Structures, Inc.  
802 Allied Road  
Bellevue, NE 68123  
402-291-0733

Cretex Concrete Products North, Inc.  
925 Basin Ave  
Bismarck, ND 59601  
701-223-7178

County Materials Corporation  
702 N. Edwin Street  
Champaign, IL 61821  
217-352-4181

Spancrete, Inc.  
2448 Century Road  
P.O. Box 10508  
Green Bay, WI 54307  
920-494-0274

Other possible suppliers may be found by contacting PCI.  
PCI web address: [www.pci.org](http://www.pci.org)

### SB-11.3 Prestress Transfer

The Fabricator of prestressed concrete beams shall closely monitor the ends of the beams during the strand release process. The following sequence of releasing the individual prestressing strands will be required if cracks occur in the ends of the beams during the fabricator's releasing sequence.

Delete the first sentence of the second paragraph of 2405.3H.

Add the following to 2405.3H:

Prestress transfer shall be conducted in a sequential and alternating manner symmetrical to the vertical axis of the beam in order to minimize the lateral eccentricity of the prestress forces and diminish cracking of the concrete. The sequence of individual prestressing strand release shall be in accordance with the following criteria unless different criteria are approved by the Engineer.

- 1) Beginning with the *straight* strands closest to the vertical axis of the beam and in the second row from the bottom of the beam, release the strands each side of center. Then, progress outward in the same row at every other strand alternating each side of the vertical axis. Repeat the sequence for the third and subsequent rows from the bottom upward until approximately one-fourth of the straight strands have been released.
- 2) Release one-half of the *draped* strands alternating about the vertical axis.
- 3) Release the hold-down anchors for the draped strands.
- 4) Release the remainder of the *draped* strands alternating about the vertical axis.
- 5) Release the remainder of the *straight* strands beginning with the strand in the bottom row nearest the vertical axis. Release all the strands in that column moving upward. Proceed two columns away from this column and release the strands bottom to top. Next move to the outer most column and release strands bottom to top. The

remainder of the strands shall be released bottom to top starting with the inner most column.

Once release has started, all strands of that beam shall be released in the sequence described above even if cracking is noticed near the end of the beam. The Engineer shall be notified immediately of any cracking and no other beams with the same strand pattern may be fabricated until the Engineer has approved a revised release sequence.

#### SB-11.4 Alternate Beam Designs

As an alternate to the 4 foot wide box beam designs detailed in the plans, the contractor may submit for review detailed plans for 3 foot wide box beams. All costs associated with an alternate beam design, including but not limited to the redesign costs, costs for revising bridge layout, and material and construction costs, shall be the responsibility of the Contractor with no adjustment in the Contract price.

#### SB-11.5 Mn/DOT required Shop Inspections

Fabrication of the prestressed box beams shall be done at a PCI-certified facility. If fabrication is to take place at a manufacturing facility not normally receiving Minnesota DOT inspection, the QA/QC program for the facility shall be submitted for approval at least sixty days before the planned start of production. Manufacturing facilities normally receiving inspection by Minnesota DOT are Cretex North at Elk River, MN, County Materials at Roberts, WI, and Andrews Prestressed Concrete at Clear Lake, IA. For the required pre-approval and other details regarding Mn/DOT shop inspection, contact Steve Grover in the Mn/DOT Materials Lab at 651-366-5540.

All costs of providing inspection at the manufacturing facility, including time, meals, mileage, daily living expenses, etc., will be deducted from payments for "Prestressed Concrete Beams, Type 1." This will include expenses incurred for providing inspection at manufacturing facilities normally receiving Minnesota DOT inspection, as listed above, or at facilities that do not normally receive Minnesota DOT inspection.

All costs incurred by the manufacturer for meeting the requirements for Mn/DOT shop inspections of the prestressed box beam manufacturing facility shall be considered included in the bid price for Item "Prestressed Concrete Beams, Type 1."

#### SB-12 GROUT BETWEEN POST-TENSIONED BEAMS

##### A. Loading

No post-tensioning of any span will be permitted until the following events have occurred:

- 1) All of the longitudinal joints between beams have been filled with grout.
- 2) At least 48 hours have elapsed from the time the last joint was filled.

There shall be no force in the transverse tie rods or strands until the grout between the beams has been allowed to cure for at least 48 hours.

#### B. Preparation for Grout Placement

All joint surfaces shall be thoroughly cleaned using a high pressure wash. The ends and bottoms of the joint shall be tightly sealed prior to placing grout material to prevent grout loss during placement. The work shall be done in such a manner that the sealing material shall be within 75mm (3") of the bottoms and ends of the beams. Joints that have not been coated with a penetrating sealer shall be continuously prewetted over all surfaces for a minimum of 24 hours.

Prior to grouting and tensioning of the transverse ties, seal washers, as detailed in the plans, shall be installed at each joint at each post-tensioned duct to prevent grout from entering the ducts.

#### C. Mixing – General

The following mixing requirements shall be adhered to:

- 1) Mixing shall be done as close as possible to the joint to be filled.
- 2) All necessary equipment for mixing and placing shall be present at the work site prior to the start of mixing. All equipment shall be in good working order as approved by the Engineer.
- 3) Material which, in the Engineer's opinion is not pourable, exhibits signs of setting or hardening, prior to placement, shall not be incorporated in the work. It shall be removed from the work site.

#### D. Placement of Cement Based Grout Material for Joints Between Beams

- 1) Use one of the following mixes, proportioned by weight for the grout between the post-tensioned beams:

Mix 1:

<u>Component</u>	<u>Quantity (pounds per cubic yard)</u>
Type I Portland Cement	468
Type N Masonry Cement (ASTM C270)	349
Fine Aggregate	1991
Net Water (approx.)	415

Mix 2:

<u>Component</u>	<u>Quantity (pounds per cubic yard)</u>
Type I Portland Cement	930
Fine Aggregate	1966
Net Water (approx.)	415

Provide an entrained air content in the mix of 14% +/- 4% by using Portland air-entraining cement, masonry cement, or a department-approved air entraining admixture.

Add water if necessary, to obtain a consistency that ensures that the space between beams is completely filled.

- 2) Grout shall not be placed during rainfalls.
- 3) Grout shall not be placed if the ambient temperature is outside the range of 7° C to 32° C (45° F to 90° F), or if the ambient temperature is expected, or predicted, to become lower than 7° C (45° F) for a period of 12 to 15 hours after placement. The temperature of the surface against which the grout is to be placed shall be at least 7° C (45° F). After the grout has been placed, it shall be dusted with the same brand and type of cement used in the production of the concrete units. The color shall match the surrounding concrete surface.
- 4) No placement interruptions will be permitted. Grout shall be thoroughly rodded as it is placed in the joint to ensure that all voids are filled. Care shall be taken to ensure that no grout enters the post-tensioning ducts prior to tensioning of the transverse ties. Grout shall be finished flush with the top of joint. When a camber differential exists between beams at the joint, the grout shall be filled to the highest beam and trowel finished at a 1 to 4 slope to the lower beam.
- 5) Grout shall be wet cured for a minimum of 48 hours and coated with an approved curing compound as directed by the Engineer.

#### E. Tensioning of Transverse Ties

Tensioning shall be completed prior to performing any further work on the superstructure (see next section). Transverse ties shall be tensioned to the force shown on the plans. Tensioning shall not be done until the requirements of Section "D" – Placement of Cement Based Grout Material for Joints Between Beams have been accomplished.

#### F. Basis of Payment

Grouting of joints between the beams including all materials, work, and incidentals as described above shall be considered an incidental expense to the price bid for "Prestressed Concrete Beams, Type 1."



SB-13      POST-TENSIONING

This work shall consist of furnishing, installing, stressing and grouting post-tensioned prestressing steel in accordance with the details shown on the working drawings approved by the Engineer, the requirements of these specifications, and the applicable provisions of Mn/DOT 2401 and 2405.

It shall also include the furnishing and installing of any appurtenant items necessary for the particular post-tensioning system and pressure grouting of ducts.

## A.      General

Working drawings of the proposed post-tensioned concrete members shall be submitted in accordance with the requirements of 1502 and these special provisions.

The Contractor shall prepare composite drawings in plan, elevation and section which show to scale the relative positions of all items that are to be embedded in the concrete, the concrete cover, and the embedment depth. Such embedded items include prestressing ducts, vents, anchorage reinforcement and hardware, and reinforcing steel strand. Such drawings shall be adequate to ensure that there will be no conflict between the planned positions of any embedded items, and that concrete cover will be adequate. If, during the preparation of such drawings, conflicts are discovered, the Contractor shall revise the working drawings for one or more of the embedded items, or proposed changes in the dimensions of the work as necessary to eliminate the conflicts or provide proper cover. Any such revisions shall be approved by the Engineer before work on an affected item is started.

The drawings shall show the method and procedure of jacking and the type, size, and properties of the strands or bars and the anchorage assemblies. The number of strands per tendon shall be shown. Details in addition to those shown on the contract plans shall be included for any additional reinforcing steel required to resist the concrete bursting stresses in the vicinity of the anchorage assemblies. The force or stress diagram shall be shown on the drawings. The sizes, shapes, and dimensions shall be shown for the ducts. Vent locations and details of the vents shall also be included on the drawings.

The drawings shall include complete details of the method, materials, and equipment proposed for use in the prestressing operations. Such details shall outline the method and sequence of jacking, show complete details of the prestressing steel, anchoring devices, type of enclosures, block-outs, and show all other data pertaining to the post-tensioning system or operations.

Calculations shall be submitted showing, at each stage of erection, the elongation of the strands at the time of jacking, the initial forces in the strands, prestress losses, parameters, and the final working forces. Calculations shall show the stresses in the anchorages and distribution plates.

Final prestress losses and final working forces are not required when the post-tensioning system is fully designed and detailed in the Plans and the Contractor does not propose to change the system.

Complete details for the grouting shall conform to the following Special Provision section, or details shall be submitted for grouting prestressing tendons including the materials and proportions for grout, details of equipment for mixing and placing grout and methods of mixing and placing grout.

The Contractor will not be required to duplicate in the working drawings any aspect of the system that is fully detailed in the plans or special provisions unless a change is proposed.

#### B. Post-Tensioning System Requirements

- 1) The prestressing steel shall be one of the following:
  - a) Grade 270 low relaxation 7-wire strand meeting the requirements of AASHTO M203, ASTM A 416.
  - b) Grade 150, high strength, threaded bar meeting the requirements of ASTM A 722, Type II.
- 2) The net force in the transverse tensioning ties after all losses shall meet the minimum required by the plans.
- 3) Concrete allowable stresses shall not be exceeded.
- 4) All provisions of the design criteria, as noted on the plans, shall be satisfied.

#### C. Protection of Prestressing Steel

All prestressing steel shall be protected against physical damage at all times from manufacture to grouting or encasing in concrete. Prestressing steel that has sustained physical damage at any time shall be rejected. Any reel of prestressing steel that is found to contain broken wires shall be rejected and the reel replaced.

##### 1) Packaging

Prestressing steel shall be packaged in containers or shipping forms for protection of the steel against physical damage and corrosion during shipping and storage. A corrosion inhibitor, which prevents rust or other results of corrosion, shall be placed in the package or form, or shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the Inspector, a corrosion inhibitor may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or concrete or bond strength

of steel to concrete. Inhibitor carrier type packaging material shall conform to the provisions of Federal Specification MIL-P-3420. Packaging or forms damaged from any cause shall be immediately replaced or restored to original condition.

2) Storage

The prestressing steel shall be stored in a manner which at all times prevents the packaging material from becoming saturated with water and allows a free flow of air around the packages. If the useful life of the corrosion inhibitor in the package expires, it shall immediately be rejuvenated or replaced.

3) Installation

At the time the prestressing steel is installed in the work, it shall be free from loose rust, loose mill scale, dirt, paint, oil, grease or other deleterious material. Removal of tightly adhering rust or mill scale will not be required. Prestressing steel which has experienced rusting to the extent that it exhibits pits visible to the naked eye shall not be used in the work. The shipping package or form shall be clearly marked with the heat number and with a statement that the package contains high strength prestressing steel, and care is to be used in handling. The type and amount of corrosion inhibitor used, the date when placed, safety orders and instructions for use shall also be marked on the package or form.

4) Protection After Installation

If the period of time between installation of prestressing steel and grouting of the duct will exceed 10 calendar days, the prestressing steel shall be protected from corrosion during the entire period it is in place but ungrouted as provided below.

When corrosion protection of in-place prestressing steel is required, a corrosion inhibitor which prevents rust or other results of corrosion shall be applied directly to the prestressing steel. The corrosion inhibitor shall have no deleterious effect on the prestressing steel or grout or bonding of the prestressing steel to the grout. The inhibitor shall be water soluble. The corrosion inhibitor, the amount and time of initial application, and the frequency of reapplication shall be approved by the Engineer.

D. Post-Tensioning Operations

1) Tensioning

All post-tensioning steel shall be tensioned by means of hydraulic jacks so that the force of the prestressing steel shall not be less than the value shown on the approved installation drawings. The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 80 percent of the specified minimum ultimate tensile strength of the prestressing steel. The prestressing

steel shall be anchored at initial stresses in a way that will result in the ultimate retention of permanent forces, not less than those shown on the approved installation drawings, but in no case shall the initial stress at the anchors, after anchor set, exceed 70 percent of the specified minimum ultimate tensile strength of the prestressing steel. Permanent force and permanent stress will be considered as the force and stress remaining in the prestressing steel after all losses, including creep and shrinkage of concrete, elastic shortening of concrete, relaxation of steel, losses in posttensioned prestressing steel due to sequence of stressing, friction and take-up of anchorages, and all other losses peculiar to the method or system of prestressing have taken place or have been provided for.

2) Friction

When friction must be reduced, water soluble oil or graphite with no corrosive agents may be used as a lubricant subject to the approval of the Engineer. Lubricants shall be flushed from the duct as soon as possible after stressing is completed by use of water pressure. These ducts shall be flushed again just prior to the grouting operations. Each time the ducts are flushed, they shall be immediately blown dry with oil-free air. The Contractor shall submit a plan for capturing all fluids generated by the flushing method for approval by the Engineer. No lubricants or flushing water will be allowed to enter any waterways or environmentally sensitive areas.

3) Stressing Jacks

Each jack used to stress tendons shall be equipped with a pressure gauge having an accurately reading dial at least 150 mm in diameter for determining the jack pressure or jack force.

4) Calibration

Prior to use for stressing on the project, each jack and its gauge shall be calibrated as a unit by a testing laboratory approved by the Engineer. Calibration shall be done with the cylinder extension approximately in the position that it will be when applying the final jacking force and with the jacking assembly in an identical configuration to that which will be used at the job site (i.e., same length hydraulic lines). Certified calibration calculations and a calibration chart shall be furnished to the Engineer/Inspector for each jack.

5) Recalibration

Recalibration of each jack shall be done at six-month intervals and at other times when requested by the Engineer/Inspector. At the option of the Contractor, calibrations subsequent to the initial laboratory calibration may be accomplished by the use of a master gauge. The master gauge shall be supplied by the Contractor in a protective waterproof container capable of protecting the calibration of the master gauge during shipment to a laboratory. The Contractor shall provide a quick-attach coupler next to the permanent gauge in the hydraulic

lines which enables the quick and easy installation of the master gauge to verify the permanent gauge readings. If any repair to, or modification of, a jack is accomplished, such as replacing the seals or changing the length of the hydraulic lines, the jack shall be recalibrated by the approved testing laboratory. No extra compensation will be allowed for the initial or subsequent jack calibrations or for the use and required calibration of a master gauge.

6) Stressing of Tendons

- a) The tensioning process shall be conducted so that the tension being applied and the elongation of the prestressing steel may be measured at all times. A permanent record shall be kept of gauge pressures and elongations at all times and shall be submitted to the Inspector. The post-tensioning force may be verified as deemed necessary by the Engineer. The tendon force measured by gauge pressure shall agree within five percent of the theoretical elongation or the entire operation shall be checked and the source of error determined and remedied to the satisfaction of the Inspector before proceeding with the work. Elongations shall be measured to the nearest millimeter. Equipment for tensioning the tendons must be furnished by the manufacturer of the system. Should agreement between gauge readings and measured elongations fall outside the acceptable tolerance, the Inspector may require, without additional compensation to the Contractor, additional in-place friction tests in accordance with this specification.
- b) In the event that more than two percent of the individual strand wires in a tendon break during the tensioning operation, the strand (or strands) shall be removed and replaced. Previously tensioned strands shall not be allowed unless approved by the Inspector.
- c) Post-tensioning bars used to apply temporary post-tensioning may be reused if they are undamaged.
- d) Prestressing steel shall be cut using an abrasive saw between 20 to 40 mm (**0.75 to 1.5 inch**) from the anchoring device, or as shown on the installation drawing.

E. Basis of Payment

All costs associated with the materials, labor, and incidentals necessary for post-tensioning as described above shall be included in the price bid for "Prestressed Concrete Beams, Type 1" including but not limited to tensioning ties, anchorage assemblies, additional reinforcement for supporting ducts, lubricants, cleaning of ducts, grout and grouting, testing, anchorage protection systems, labor, materials, tools, equipment and incidentals necessary for completing the work in accordance with Contract requirements.

SB-14      GROUTING OF DUCTS

After post-tensioning and anchoring has been completed and accepted, the duct shall be grouted in accordance with this specification, or alternate as submitted. In the interval between the post-tensioning and grouting operations, the prestressing steel shall be protected. Immediately after post-tensioning, all grout vents of each duct shall be temporarily sealed with plugs to prevent entrance of air or water. The plugs shall be left in place until just prior to duct grouting.

## A.      Materials

Use a grout composition of 94 pounds of Type I cement, 5 gallons of water and 1 pound of approved plasticizer or a pre-mixed packaged grout that is approved by the engineer, in the post-tensioned ducts.

## B.      Batching Equipment

Equipment for batching component materials shall be capable of accurately measuring and dispensing the materials.

## C.      Mixer

The mixer shall be capable of continuous mechanical mixing of the ingredients to produce a grout which is free of lumps and in which the ingredients are thoroughly dispersed.

## D.      Screen

The grouting equipment shall contain a screen having clear openings of 3 mm (**1/8 inch**) maximum size to screen the grout prior to its introduction into the grout pump. If a grout with a thixotropic additive is used, a screen opening of 5 mm (**3/16 inch**) is satisfactory. This screen shall be easily accessible for inspection and cleaning.

## E.      Grout Pump

Grout pumps shall be capable of pumping the grout in a manner which complies with the provisions of this specification. Pumps shall be a positive displacement type capable of producing an outlet pressure of not less than 1 MPa (**145psi**) and shall have seals which are adequate to prevent introduction of oil, air or other foreign substance into the grout and to prevent loss of grout or water. Backup pumps shall be available.

## F.      Pressure Gauge

A pressure gauge having a full scale reading of no greater than 2 MPa (**290psi**) shall be placed at some point in the grout line between the pumping outlet and the duct inlet. The grouting equipment shall utilize gravity feed to the pump inlet from a hopper attached to and directly above it. The hopper must be kept at least partially full of grout

at all times during the pumping operation to prevent air from being drawn into the post-tensioning duct.

#### G. Pipes and Other Fittings

Pipes or other suitable devices shall be provided for injection of grout and to serve as vent holes during grouting. The material for these pipes shall be at least 13 mm (**1/2 inch**) inside diameter and may be either metal or a suitable plastic which will not react with the concrete or enhance corrosion of the prestressing steel and is free of water soluble chlorides. These pipes shall be fitted with positive mechanical shut off valves capable of withstanding grouting pressures. All connections between a grout pipe and a duct shall be made with metal or plastic structural fasteners and taped with a waterproof tape as necessary to assure a water tight connection.

#### H. Mixing Grout

The sequence for charging the mixer shall be to add water, start the mixer and then add cement. When cement and water are reasonably well mixed, admixtures shall be introduced in accordance with written instructions of the manufacturer of each admixture. The mixing procedures shall avoid having the admixture catch on the blades or the sides of the mixing drum and from forming gel globules. The mixing procedure may be varied in accordance with the written recommendations of the manufacturer of the admixtures. The grout shall be mixed until a uniformly blended mixture is obtained and shall be continuously agitated until it is introduced into the grout pump. Batches of grout shall be placed within 30 minutes of completion of mixing. No water shall be added to the grout to modify its consistency after the initial mixing operation is completed.

#### I. Cleaning and Flushing Tendons

If a water soluble lubricating oil or corrosion inhibiting oil is applied to the prestressing steel or an embedded tendon is discontinuous through a joint between segments, the tendon shall be flushed as provided below.

Immediately prior to grouting operations, the inside of the tendon shall be flushed with water meeting the requirements of this specification (under pressure) to remove all traces of the corrosion inhibitors used to protect the prestressing steel. Flushing operations shall continue until the discharge water is free of any traces of the corrosion inhibitor. All water containing corrosion inhibitor chemicals shall be collected in containers and disposed of as required by governmental regulations. Following the cleaning operations, water shall be totally drained from within the tendon and it shall be blown out with compressed oil-free air to the extent necessary to dry the prestressing steel and the inside surfaces of the pipe.

#### J. Placing Grout

Grouting shall start at the lowest injection point with all vent holes open. The pumping pressure through the pipe shall be maintained until grout is continuously

wasted at the next vent hole and no visible slugs or other evidence of water or air are ejected and the grout being ejected has the same consistency as the grout being injected. The vent valve shall then be closed, the pumping pressure held momentarily and the valve at the injection port closed.

1) Pressure

The pumping pressure at the tendon inlet shall not exceed 1.75 MPa (**250psi**), however, normal operations shall be performed at 0.50 MPa (**72.5psi**). If the actual grouting pressure exceeds the maximum recommended pumping pressure, grout may be injected at any vent hole which has been or is ready to be closed as long as a one-way flow of grout is maintained. When one-way flow of grout cannot be maintained, the grout shall be immediately flushed out of the duct with water. The shut-off valves on the pipes serving as injection ports or vent ports shall not be opened until the grout has taken its final set.

2) Temperature

When it is anticipated that the air temperature will fall below 0° C (**32° F**), ducts shall be kept free of water so as to avoid freeze damage to ducts. No grouting shall be done when the temperature of the grout is below 7° C (**45° F**). The temperature of the concrete or air surrounding the tendon shall be maintained at 2° C (**35° F**) or above from the time grout is placed until the compressive strength of the grout, as determined from tests on 50 mm (**2 inch**) cubes cured under the same conditions as the in-place grout, exceeds 5.5 MPa (**800psi**).

Under hot weather conditions, grouting shall take place early in the morning when daily temperatures are lowest. No grouting shall be done when the temperature of the grout exceeds 32° C (**90° F**). It may be necessary to chill mixing water or take other special measures to lower the temperature of the grout. After the grout has set, pipes used as injection or vent ports shall be cut off. Metal pipes shall be cut off 25 mm (**1 inch**) below the surface of the concrete. Plastic pipes shall be cut off flush with the surface of the concrete.

K. Protection of Prestress Anchorages

As soon as possible after tensioning and grouting is completed, but not exceeding 14 days, exposed end anchorages, strands, and other metal accessories shall be cleaned of rust, misplaced mortar, grout, and other such materials. Immediately following the cleaning operation, the entire surface of the anchorage recess (all metal and concrete) shall be thoroughly dried and uniformly coated with an epoxy bonding compound conforming to AASHTO Specification M235, Class III in accordance with the manufacturer's recommendations.

Immediately following application of the epoxy bonding compound, tight fitting forms shall be installed and the anchorage recess shall be filled with a non-shrink cement based grout. Proportion by weight the cement, fine aggregate, and non-shrink



admixture for the grout in the stress pockets, as indicated in the following table. Use Type I cement. Add water as necessary to obtain a 75 mm (**3 inch**) maximum slump. Furnish a metallic aggregate non-shrink admixture such as Embecco, Ferrolith-G, Groutex, Iso-Vol., Vibrofoil, or equal.

<b>Cement</b>	<b>Fine Aggregate</b>	<b>Non-Shrink Admixture</b>
188 lbs	300 lbs	100 lbs

The following non-chloride, pre-mixed commercial non-shrink grouts, placed according to the manufacturer's instructions, may be used in the stress pockets in lieu of the cement grout above. Limit slump to a 75 mm (**3 inch**) maximum.

<b>Product</b>	<b>Source</b>
SET Non-Shrink Grout, Cleveland, OH	Master Builders
Sonogrout, Sonneborn Building Prod. Div., Minneapolis, MN	Sonneborn-Contech
Five Star 400 Grout, Old Greenwich, CT	U.S. Grout Corporation
Sure-Grip Grout, Oregon, IL	Dayton-Superior

L. Basis of Payment

Grouting of ducts is considered an incidental expense as specified in the previous section of these Special Provisions.

SB-15 (2442) REMOVAL OF EXISTING BRIDGES

The provisions of Mn/DOT Specification 2442 shall apply except as modified herein.

Disposal of materials by the Contractor shall be in accordance with 1506, 2104.3C, 2442 and the following: The Contractor shall furnish written information to the Engineer as to disposal of steel bridge beams and other steel bridge components coated with lead paint. This information shall include method of disposal; name, address, and telephone number of disposal site; certification that Contractor has notified disposal site of presence of lead paint; acknowledgement by Contractor of OSHA requirements relating to lead; and certification that Contractor is familiar with proper handling and disposal of materials with lead-based paint systems. Information shall be furnished on a form supplied by the Engineer. Certification shall consist of the signature on the form of the authorized Superintendent verifying that the information is correct.

All asbestos and/or regulated waste shall be disposed of in accordance with applicable rules and laws and Mn/DOT's manual "Asbestos and Regulated Waste Manual For Building Demolition Or Relocations for Construction Projects" available on the following website: <http://www.dot.state.mn.us/environment>. Only those listed in this manual as pre-approved for asbestos and/or regulated waste will be allowed to work on this Project.

Except as otherwise provided in the Contract, payment of the lump sum amount will be compensation in full for all operations necessary or incidental to bridge removal, including excavation, removal, disposal, backfill and grading of the work area.

Delete the second paragraph of 2442.5 Basis of Payment and substitute the following:

Payment for Item No. 2442.501 "Remove Existing Bridge" at the Contract price therefor, shall be compensation in full for all costs of performing all of the work described above.

SB-16      (2451) STRUCTURE EXCAVATIONS AND BACKFILLS

This work shall be performed in accordance with the provision of Mn/DOT 2451 except as modified below:

SB-16.1      Structure Excavation

The item Structure Excavation shall include all excavation, sheeting, and shoring and/or other protection, preparation of foundation, and placing of backfill necessary for construction of Bridge No. 07586 which is not specifically included in the grading portion of the Contract. It shall also include the disposal of surplus material.

No measurement will be made of the excavated or backfill material. All work performed as specified above will be considered to be included in a single lump sum for which payment is made under Item No. 2401.601 "Structure Excavation."

For purposes of partial payments, the portion of the lump sum Structure Excavation at each substructure unit will be defined as follows:

Bridge 07586	Each Abutment 50%
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SB-17      SLOPE PREPARATION

The Contractor shall excavate and/or construct embankment as necessary, and dress the slopes between the new abutments to the slope lines and limits noted in the Plans, in accordance with the applicable provisions of Mn/DOT 2105.

Surplus excavated material shall be disposed of on the approach roadway inslopes as directed by the Engineer. Disposal shall include shaping and leveling the material.

The Contractor shall blend new berm slopes to the natural channel slopes at the outer limits of this work.

Payment for Item No. 2401.601 "Slope Preparation" at the Contract price per lump sum shall be compensation in full for performing all of the work described above. Excavation for placement of riprap and filter material is not included in this item and will be paid for under the provisions of 2511.

SB-18      (2452) PILING

The provisions of Mn/DOT 2452 are modified and/or supplemented with the following:

Delete the second paragraph of 2452.3H and substitute the following:

Pile welders shall be qualified using AWS D1.1 standards or current Mn/DOT welding certification.

## SB-18.1      Equipment for Driving

Delete the first and second paragraph of 2452.3C1 and substitute the following:

All pile driving equipment to be furnished by the Contractor shall be subject to approval by the Engineer. Approval is based on the satisfactory results of a wave equation analysis.

At least 30 calendar days prior to the start of pile driving operations, the Contractor shall submit the following:

1. A completed pile and driving equipment data form for each hammer proposed for the project. The form may be downloaded from the following website:  
<http://www.pile.com/pdi/users/grlweap/equipdatafrm-en.pdf>
2. A wave equation analysis in accordance with GRL WEAP or similar program for each pile type and hammer. A hard copy of the results of the analysis, including a WEAP bearing graph, shall be submitted to the Engineer.

For the pile driving equipment to be acceptable, the required number of hammer blows indicated by the wave equation at 155% of the pile factored design load as shown in the Plans shall be between 30 and 180 blows per foot.

The pile stresses indicated by the wave equation shall be reviewed to determine that the piles can be driven as described in 2452.3D without failure. If stress levels are such that damage to the piling is considered to be likely, adjustments shall be made to the pile driving system or to the strength of the pile until satisfactory results are obtained. Substantial refusal is defined in subsequent paragraphs.

All costs associated with providing the wave equation analysis and submittals as described above shall be an incidental expense to the test piles and no additional compensation will be made for this work.

## SB-18.2      Penetration and Bearing

Delete 2452.3E and substitute the following:

## A. General

The nominal pile bearing resistances shown in the Plans were calculated using design loadings and indicate the factored loads that the piles are required to support. The nominal resistance determined using the dynamic methods, defined under Determination of Nominal Bearing Resistance, is the basis for establishing the minimum criteria for pile acceptance in which the driving resistance is not less than the resistance specified in the Plans. It may be necessary to drive the piles beyond the resistance shown until the required penetration as shown in the Plans is reached, or until the pile has been driven to a penetration and resistance as determined by the Engineer based on the test pile results. Substantial refusal shall be considered to have been attained when the penetration rate is equal to 0.05 inches per blow. Test piles shall be driven to at least 15 percent more than the nominal resistance required for the foundation piles.

## B. Determination of Nominal Bearing Resistance

The nominal pile bearing resistance will be determined using the pile driving analyzer and the Case Pile Wave Analysis Program (CAPWAP) in accordance with the following section, Dynamic Monitoring of Pile Driving.

### SB-18.3 Dynamic Monitoring of Pile Driving

#### A. Description of Work

The Contractor shall provide all equipment and personnel necessary to perform dynamic pile testing of driven piles using a Pile Driving Analyzer (PDA). The work shall be performed in accordance with the requirements of ASTM 4945. The dynamic pile testing shall be performed on the initial driving and redriving of the test piles as directed by the Engineer. Testing may also be required on additional piles as designated by the Engineer.

#### B. Pile Preparation and Wave Matching

The Contractor shall prepare each pile to be tested by attaching instrumentation to the piles except that for testing on initial driving of steel shell piles, the Contractor shall attach the instrumentation after the pile has been placed in the leads. In addition, the Contractor shall perform wave matching of the PDA data using the Case Pile Wave Analysis Program (CAPWAP). This work shall be performed by an engineer experienced in dynamic testing and CAPWAP analysis. The program shall be run on all piles dynamically tested, or as directed by the Engineer.

#### C. Wave Equation Analysis

Following the wave matching, the Contractor shall use the GRLWEAP program and CAPWAP data to produce a refined Wave Equation Analysis Program (WEAP) bearing graph and inspector's chart to be used as the basis for pile acceptance. The bearing graph shall be used to determine the foundation pile's nominal bearing

resistance that is to be recorded on the pile driving report. The wave matching analysis and wave equation analysis shall be performed in a timely manner.

D. Reference Geotechnical Recommendations

For pile driving recommendations, see Geotechnical Evaluation Report Project Number BL-07-01089 by Braun Intertec dated April 30, 2007. Pile "set-up" as determined by the Engineer in the field may be utilized to avoid unnecessary extended pile lengths beyond those recommended.

E. Deliverables

The Contractor shall provide the following items to the Engineer within the specified time intervals described herein:

1. Results from each dynamic test performed with the PDA and checked with the CAPWAP program. The results shall be in the form of a hard copy of columnar data produced with the PDAPLOT program. The data shall consist of blow counts, stresses in the pile, pile capacities, hammer energies and hammer strokes for each one foot (0.25 meter) depth increment. The results shall be provided in a timely manner. In addition, the Contractor shall provide expert advice regarding the analysis of the PDA and CAPWAP data.
2. A WEAP bearing graph and inspection chart showing blow count-versus-pile resistance and stroke-versus-blow count that will be used for determining the nominal bearing resistance of the foundation piles. The graph/charts shall be developed based on the results of the PDA and CAPWAP data. Both the maximum force and maximum transferred energy calculated by WEAP shall match within 10% of those calculated by the CAPWAP. The bearing graphs shall be delivered to the Engineer within two days after completion of driving the test piles at any single substructure unit. These graphs/charts shall also be documented in the appropriate reports listed below.
3. A brief report for the piles at each substructure tested including a summary of the PDA and CAPWAP results. In addition, the Contractor shall supply one or more 3.5 inch diskettes or CD containing all data for the piles tested for that substructure. The data shall be in the form of X01 (PDA file) and Q00 (PDAPLOT file) files and shall be properly labeled. These reports shall be sent to the Engineer no later than three working days after dynamic pile tests have been completed at any given substructure unit.
4. A PDA summary report which summarizes the findings from the PDA and the associated CAPWAP computer program and the developed GRLWEAP bearing graphs. This report shall be sent to the Engineer no later than one week following the completion of the dynamic pile tests, addressed separately.

#### F. Method of Measurement

The Pile Driving Analyzer field control method is required by this contract, measurement will be by the number of piles on which the pile driving analysis is performed. Initial analysis and redrive analysis on an individual pile shall be counted as one pile analysis. The Department reserves the right to increase or decrease the number of piles which are required to be dynamically monitored.

#### G. Basis of Payment

Payment for Item No. 2452.602 "PILE ANALYSIS" will be made at the Contract price per each and shall be compensation in full for all of the Contractor's expenses associated with the dynamic testing of a pile during initial driving and re-driving. This includes, but is not limited to, additional time needed in driving operations, labor, consultants and equipment necessary for performing all of the work described above, including all incidentals thereto. This includes the payment for the dynamic testing of the redrive and all other work associated with the redrive itself if required.

No unit price adjustment will be made in the event of increased or decreased Contract quantities for Pile Analysis.

#### SB-18.4 Alternate Pile Sections

An alternate pile section may be substituted for the section called out in the plans. The alternate section shall meet or exceed the minimum section properties listed in the plans. All costs associated with a change in the pile section including but not limited to design, dimensional layout changes for all affected bridge components, and increased or decreased quantities shall be the responsibility of the contractor for no change in the contract price.

#### SB-19 PAINTING ABUTMENT STEEL

All surfaces of the steel sheet piling and all attached steel including any hardware that is not completely buried 1'-6" below finished grade (including front face and back face) shall be coated after any field welding or bolting and all steel installation is complete. Prior to bearing pad placement, beam placement, or any backfilling, all steel including beam seat plate shall be coated with Polyamide Epoxy – Coal Tar to an elevation 4'-0" below top of riprap elevation or 1'-6" below finished ground surface. Coating shall be done as much as practical at a time when the water is at its lowest elevation, but if water is encountered prior to attaining the aforementioned elevations, coating may cease at the water elevation.

Coating shall be Tnemec No. 46H-413 Hi-Build Tneme-Tar and applied in accordance with manufacturer's specifications. This project requires SSPC-SP10 Near-White Blast Cleaning of all steel and prime coat that is approved by manufacturer for this use. Contact for the above product is Randy Bartz, Coating Resources, phone 952-746-1909.

Painting of all abutment steel as specified above and all associated costs shall be considered to be included in bid item "Polyamide Epoxy-Coal Tar" at the unit bid price per Lump Sum.

SB-20      DRAINAGE SYSTEM FOR ABUTMENTS

The following provision applies to Bridge No. 07586:

This work shall consist of the construction of subsurface drains for abutments, installed to intercept and carry off underground water. It shall include all appurtenances, including but not limited to geotextiles, metal oversleeves with rodent screens, precast concrete headwalls, piping, polystyrene, and incidentals. The work shall be performed in accordance with applicable provisions of 2502, 3245, 3733 and as detailed in the Plans.

Payment for drainage systems at both ends of the bridge shall be included in the single lump sum under Item 2502.601 "Drainage System Type Special."

SB-21      (2461) STRUCTURAL CONCRETE

The provisions of 2461 shall apply except as modified herein.

Add the following to Item (c) in the fourth paragraph of 2461.3B2:

The minimum cementitious content for bridge deck concrete shall be 362 kg per m<sup>3</sup> (611 pounds per yd<sup>3</sup>).

SB-22      (3741) ELASTOMERIC BEARING PADS

The provisions of 3741 shall apply except as modified below:

Replace the first sentence in 3741.2A with the following:

The elastomeric portion of the bearing pads shall be in accordance with AASHTO M251-04. The elastomer compounds shall be classified as of low-temperature Grade 4 as specified by the grade requirements of Table 14.7.5.2-2, "Low temperature Zones and Minimum Grade of Elastomer", of the *AASHTO LRFD Bridge Design Specifications*.

Delete all of 3741.2B1 except for the last paragraph.



# Minnesota Pollution Control Agency Notification of Intent to Perform a Bridge Demolition for Mn/DOT Operations.



Type of Notification: [ ] Original [ ] Amended [ ] Project Cancellation

Notification must be postmarked or received ten (10) WORKING days before demolition begins.

### Demolition Contractor:

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Phone Number(s): \_\_\_\_\_

### Bridge Information:

Bridge Name: \_\_\_\_\_

Mile Point/Trunk Highway: \_\_\_\_\_

Miles and direction (N,E,W,S) From Nearest Town: \_\_\_\_\_

County: \_\_\_\_\_

Project Engineer Phone Number(s): \_\_\_\_\_

Age of Brdg. (years): \_\_\_\_\_ Size of Brdg. (sq. ft.): \_\_\_\_\_

Type of Bridge: \_\_\_\_\_

**Suspect Materials to be checked for asbestos: pipes, asphalt underlay, spray-on and joint compounds.**

**Dates when demolition will Begin \_\_\_\_\_ & End \_\_\_\_\_**

**Both Beginning and Ending dates should be amended in writing as necessary to reflect current project dates.**

### Bridge Owner:

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Contact person: \_\_\_\_\_

Phone Number(s): \_\_\_\_\_

### There is no Asbestos Containing Material (ACM) present in the structure to be demolished

1. Company and/or individual that conducted the bridge inspection or record review, certification#, and the procedure used to determine the presence or absence of ACM (including analytic method): *Prior to demolition all bridges must be inspected by an MDH certified asbestos inspector.* \_\_\_\_\_

2. Description of planned demolition and the specific method(s) that will be used: \_\_\_\_\_

**Demolition Material will be recycled on site or a metal scrap recycler, Material not recycled will be sent to:**

#### 3. Demolition Waste Transporter(s) Information:

Transporter Name: \_\_\_\_\_

Transporter Contact: \_\_\_\_\_

Transporter Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_

#### 4. Demolition Waste Disposal Information:

Landfill Name: \_\_\_\_\_

Owner/Operator: \_\_\_\_\_

Address/Location: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_

5. I certify that the above information is correct and I am a bonafide representative of the demolition contractor or bridge owner and have authority to enter into agreements for my employer. In event that unexpected asbestos containing material is found, the material will be removed by a MDH certified asbestos abatement contractor.

Signature of Contractor, Owner Agent \_\_\_\_\_

Date \_\_\_\_\_

Send to: Minnesota Pollution Control Agency  
Regional Environmental Management Division  
520 Lafayette Road North  
St. Paul, MN 55155-4194

For questions call:  
651-296-6300  
1-800-657-3864  
FAX: 651-215-1593

**PCB Removal Information** Polychlorinated Biphenyls (PCBs) will be removed from the bridge prior to demolition.

**Mercury Removal Information** Material containing mercury will be removed from the bridge prior to demolition.