

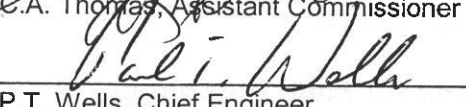
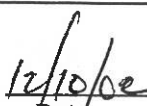
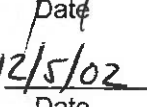


To: <b>SUPERSEDED BY</b> <b>EI 07-032</b> <b>EFFECTIVE 1/10/08</b>		New York State Department of Transportation <b>ENGINEERING          INSTRUCTION</b>	<b>EI</b> <b>02-040</b>
<b>Title: MAINTENANCE CLEANING AND WASHING OF BRIDGES</b>			
Distribution: <input type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ ( )	Approved:  C.A. Thomas, Assistant Commissioner  P.T. Wells, Chief Engineer		 Date 12/10/02  Date 12/5/02

**ADMINISTRATIVE INFORMATION:**

- **Effective date:** This EI is effective with projects submitted for the letting of 05/08/03.
- **Superseded issuances:** EI 02-032. This EI reissues specifications issued by EI 02-032, but with different item numbers. This was necessary due to the logistics of entering 1600 new item numbers and disapproving 1486 item numbers.
- *This EI and attendant specifications do not apply to cleaning bridges in preparation for painting.*

**PURPOSE:** To issue new specifications for maintenance cleaning and washing of bridges that include environmental and bird protections, to issue a new specification for maintenance cleaning and washing of weathering steel bridges, and to issue a new specification for maintenance cleaning and washing of bridges with no lead based paint.

**TECHNICAL INFORMATION:**

● **Guidance for Project Designers:**

Item 15633.94M Maintenance Cleaning and Washing of Bridges is the general specification for washing bridges that may contain lead based paints, i.e. those bridges built before 1989. However, it should not be specified to wash bridges with paint ratings of 3 or lower based on the latest Inspection report. Washing structural steel with a paint rating of 3 or lower is likely to dislodge significant amounts of lead based paint. Disturbance of lead based paint must be avoided because the specifications makes no provisions for collecting, separating, and disposing of lead based paint chips.

Item 15633.96M Maintenance Washing of Bridges, No Lead Based Paint may be used to wash bridges built after 1988 regardless of the condition of the paint. This specification may also be used for bridges built before 1989 if the bridge was deleaded by removing all the paint and applying a non-lead based paint or if the structural steel was replaced after 1988.

Item 15633.97M Maintenance Cleaning and Washing of Weathering Steel Bridges should be used to wash weathering steel bridges, including those which have paint on portions of the steel near bearings.

All painted bridges may be washed under Item 15633.95M Maintenance Washing of Bridges, Concrete Surfaces, because the structural steel is not washed. Not washing the structural steel avoids the possibility of contamination from lead based paints, but does not remove salts and other debris that promotes corrosion of the steel.

Bridges that span sensitive streams, including those categorized as CT and CT(s) (i.e. trout

streams) are sensitive to thermal shock and other pollutants. These structures should be washed only at times when stream flows are high enough to ameliorate these effects. Therefore, streams that are classified by DEC as CT(s) i.e. trout spawning shall be washed prior to July 1. In addition, so as to not interfere with D.E.C.'s stocking program and the peak fishing season, bridges located at DEC yearling trout stocking sites should not be washed during the month of April.

The designer must indicate in the proposal all structures for which there will be date restrictions imposed on the Contractor. Information on the location of streams categorized as CT or CT(s) to develop such Special Notes may be obtained from the Regional Environmental Coordinator or the D.E.C. regional office.

● **Guidance for Field Personnel:** Before washing the bridge, all trash and other debris must be collected from the bridge. All trash and debris, such as paper, rubber, metal, wood and similar materials shall be properly disposed of off-site according to § 107-16 Solid Waste Management.

If any steel portions of the bridge surface have flaking paint and Item 15633.94 M Maintenance Cleaning and Washing of Bridges was specified then that portion of the steel surface where flaking paint is present should not be washed. All other portions of the bridge including the underside, should be washed.

It is very important to note that flaking lead based paint should not be removed from bridges prior to washing. This is due to practical and economical concerns over methods used to collect paint chips. Nonetheless there remain environmental and health concerns over the alternative of non-collection which are being addressed during design by the judicious selection of structures to be included in the contract and the appropriate selection of which of the four bridge washing items to use. Errors in either of these selections can occur and in addition paint condition can continue to deteriorate between the time the bridge was selected for washing and the time the work is actually performed. Therefore it is acknowledged that the Engineer may have to use discretion and field staff should be prepared to exercise judgement regarding which surfaces are to be cleaned. The specifications allow the exercise of that judgement. It should be noted that small amounts of loose lead based paint chips which have settled on the flanges of beams will be considered *diminimus* with minimal environmental effect, and therefore need not be removed prior to the washing operations.

Item 15633.96M Maintenance Washing of Bridges, No Lead Based Paint should have been specified when there is knowledge that the paint on the bridge does not contain lead. Flaking paint on these bridges may be removed during the washing operation.

Contrasted with the need to not remove flaking paint that might contain lead, there is a very real need to remove all loose rust on weathering steel bridges. Loose rust that remains will eventually drop off and trap moisture on the bottom flange of girders causing accelerated deterioration.

● **Policy:** It is the policy of the Department of Transportation to conduct its operations and require Contractors to conduct their operations in a lawful manner that protects the environment and wildlife.

● **Cost Impact:** The changes are not expected to have a significant change in the cost of the work.

● **Changes:** The new specifications for bridge washing include the following new provisions:

1. An advisory to Contractors of the penalties that can be imposed for disturbing migratory

- birds and their nests.
2. Directions for washing bridges so as not to disturb occupied migratory bird nests.
  3. Requirements for disinfecting washing equipment and water tanks to prevent the spread of zebra mussels to uninfected bodies of water.
  4. A ban on onsite disposal of any removed debris.
  5. New requirements for washing weathering steel, requiring the removal of rust that is not tightly adhered.
  6. New requirements for washing bridges that do not have lead based paint on them.

#### **IMPLEMENTATION:**

- Design Quality Assurance Bureau will insert the modified and new specifications in appropriate projects starting with the 05/08/2003 letting.
- Active contracts are subject to the same regulatory requirements and should be evaluated for necessary changes to be brought into compliance.
- Modified Specifications:
  - Item 15633.94 M - Maintenance Cleaning and Washing of Bridges
  - Item 15633.95 M - Maintenance Cleaning and Washing of Bridges, Concrete Surfaces
- New Specifications:
  - Item 15633.96 M - Maintenance Cleaning and Washing of Bridges, No Lead Based Paint
  - Item 15633.97 M - Maintenance Cleaning and Washing of Weathering Steel Bridges

**TRANSMITTED MATERIALS:** The text of the specifications are available on the Department's web site at [www.dot.state.ny.us](http://www.dot.state.ny.us), "Site Index", "S", "Special Specifications", prefix 16. On the Department's intranet the specifications can be accessed on the Design Division's server at \\co\_design\_fs01\TOOLBOX\Documents & Resources\Special Specifications\BYREGION\16\_STRU.

#### **BACKGROUND:**

NYSDOT performs maintenance washing of highway bridges in order to increase bridge life, facilitate bridge inspection, improve bridge appearance and benefit bridge safety of vehicular traffic, pedestrians and cyclists using the bridge. In doing so however, the Department must not violate water quality standards and protections for migratory birds.

DOT projects are highly visible and are under increasing scrutiny regarding their impacts on water quality and wildlife from local, state and federal resource/regulatory agencies, the general public, environmental and conservancy groups, sportsmen and municipal officials. The increased scrutiny will likely result in more potential water quality and wildlife violations involving bridge washing unless appropriate steps are taken to address resource concerns.

Paint condition is an important factor in determining whether the steel with lead based paint should be washed. The table below describes the paint ratings for non-weathering steel.

PAIN T CONDITION RATINGS

Rating	Description
7	The paint or coating system is in new or like-new condition.
6	The paint or coating system is in generally good condition with isolated areas requiring touch-up, such as along top flanges adjoining stay-in-place metal deck forms or in roadway splash zones. There may be some thinner areas of paint/coating. Isolated areas of wrinkling due to excessive paint thickness or temperature during application might be observed.
5	The paint or coating system is shows signs of deterioration at isolated locations. Typical signs of deterioration include peeling of the finish coat, bleeding with localized areas of rust staining, alligator crackling, and chalking.
4	The paint or coating system has localized areas in poor condition. Bleeding of soluble pigments from the undercoat, peeling, minor blistering, and/or light pinpoint rusting may be present. Reconditioning normally would require local sand blasting and touchup.
3	The paint or coating system is generally in poor condition throughout the structure. Many areas of peeling, blistering, bleeding, chalking, shallow pinpoint rusting, rust undercutting at scratches, and surface scale are common. Reconditioning would require the entire superstructure be sand blasted, cleaned, primed, and re-painted/re-coated.
2	The paint/coating is often peeling, chalking, and/or bleeding and very widespread.
1	Large areas have no paint/coating remaining and where present, paint/coating is faded, peeling, and/or chalking.

“Weathering steel” refers to a carbon based steel that is alloyed with fractional percentages of nickel, chromium and vanadium. These additions are intended to inhibit the steel’s natural tendency to rust in an outdoor environment. When used in a suitable environment, this steel eliminates the need for painting because the steel “weathers” to form a patina or thin layer of protective oxide that reduces the rate of rusting to practically zero. The patina will start as a light yellow orange color and gradually change to a dark chocolate or purple.

The patina will not form if the steel remains wet for extended periods or is contaminated with salt or other chemicals. If the patina does not form, the steel will continue to rust and flakes or sheets of rust that are easily dislodged will be in evidence. A dark black color is an indication that the patina is not forming. A bridge may show areas with a formed patina adjacent to areas where the patina is not forming.

In late 1988 the Department changed from lead based paints to an epoxy and polyurethane system for all new painted bridges. Because the cured paint is inert, there are no adverse effects from dropping minor amounts of paint chips into waterways or wetlands or onto the ground.

The New York State Department of Environmental Conservation (DEC) has established water quality standards, which are contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 700-705). These standards include, but are not limited to:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;
2. There shall be no suspended, colloidal and settleable solids that will cause deposition or impair the waters for their best usage; and
3. There shall be no residue from oil and floating substances, visible oil film, globules or grease.

Also, Article 24 of the Environmental Conservation Law (ECL), pursuant to Section 24-0701(2), prohibits any form of pollution in or within 100 feet of state regulated wetlands without a permit.

Many of DOT's bridges span wetlands, streams and other water bodies, and some bridge washing contractors have been cited for water quality violations by regulatory agencies. The primary concerns involved with bridge washing over waterbodies with respect to water quality are degradation of trout spawning habitat and decreased fish egg survival due to heavy sediment (sand) loads, and various fish wildlife and invertebrate vitality concerns due to concentrated spot loadings of salt, lead (from lead paint), ammonia (from bird droppings), and thermal discharges.

The Migratory Bird Treaty Act of 1918 made it "...unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed..."

The act and amendments now provide that: "Except as otherwise provided in this section, any person, association, partnership, or corporation who shall violate any provisions of said conventions or of this subchapter, or who shall violate or fail to comply with any regulation made pursuant to this subchapter shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than \$15,000 or be imprisoned not more than six months, or both."

Some bridge washing contractors have been cited for intentionally destroying migratory bird nests and fledglings while conducting their operations. Disturbances of occupied nests are unlawful and must be prevented.

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**1. DESCRIPTION**

**1.01 General.** This work shall consist of cleaning bridges by collecting and properly disposing of trash and debris from the bridge, pressure washing the deck, exposed concrete, asphalt and steel bridge surfaces, and cleaning the drainage system and other drainage ways as described herein.

**1.02 Scope.** The cleaning and washing of bridges is divided into various pay items based on the type of bridge and the condition of the paint as follows.

**Maintenance Cleaning and Washing of Bridges** - General specification for washing concrete bridges, or steel bridges with intact lead based paint. If localized areas of flaking paint exist on the bridge, then the steel surface on that portion of the span where paint is flaking shall not be washed.

**Maintenance Cleaning and Washing of Bridges, No Lead Based Paint** - Specification for washing painted steel bridges which do not have lead based paint present. Surfaces with flaking paint shall be washed.

**Maintenance Cleaning and Washing of Weathering Steel Bridges** - Specification for washing unpainted, controlled oxidizing (weathering) steel bridges. Flakes and delaminations shall be washed off metal surfaces with a water pressure of 22 MPa (3,000 psi) minimum with the wand held 300 mm or less from the steel surface and moved parallel to the surface. Any dislodged material resting on the top of girder flanges shall be washed clean.

**Maintenance Cleaning and Washing of Bridges, Concrete Surfaces** - Specification for washing steel bridges with deteriorating lead based paint. All steel surfaces are excluded from washing and the lead based paint shall not be disturbed.

**1.03 Definitions.**

- |                     |   |
|---------------------|---|
| Loose paint chips   | paint chips that are no longer adhered to bridge surface  |
| Flaking paint chips | paint chips that are still partially adhered to bridge surface  |
| Patina              | Iron oxide coating that forms on weathering steel over time under proper environmental conditions. Dark chocolate or purple when properly formed with a tightly adhered texture. Capable of withstanding hammering or vigorous wire brushing. |

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Loose flakes	Coarse flakes of rust that do not tightly adhere to the weathering steel surface. Easily dislodged by a wire brushing. Early indication of a non-forming patina.
Delaminations	Larger sheets of rust that are separating from the weathering steel base metal. More severe indication of a non-forming patina.
Trash and debris	Including but not limited to sand, soil, cinders, silt, dirt, mud, salt, glass, paper, rubber, metal, wood, loose paint chips and loose pieces of concrete and asphalt and rock or stones.
Protected Migratory Birds	Includes all waterfowl, herons, hawks, owls, eagles and songbirds. Excludes rock doves (pigeons), house sparrows, European starlings and monk parakeets.
Migratory Bird Treaty Act of 1918 with amendments	Federal law that protects migratory birds and their nests, eggs, and feathers. Conviction of violating the act can result in a fine of \$15,000 or imprisonment for six months or both.

**2. MATERIALS**

Water for pressure washing shall be clean, fresh water. Heater water may be used except over water or other sensitive areas. Detergents or other agents shall not be used.

**3. CONSTRUCTION DETAILS**

**3.02 General.** The Contractor shall provide the Engineer with a bridge by bridge schedule of the work and a work plan including maintenance and protection of traffic procedures, equipment proposed for use, identification of water source(s) that will be used, and identification of the disposal facility(s) that will be used.

Unless otherwise indicated below or in the contract documents, all bridge surfaces shall be cleaned, including but not limited to bridge decks, sidewalks, curbs, approach slabs and shoulders, wing walls, back walls, bridge seats, railings, parapets, bridge bearings, piers and pier caps, columns, drainage features, structural steel, light standards, signs, concrete paving block, concrete beams and other surfaces. Limited paved drainage ways and gutters off-structure shall also be cleaned of debris

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that if permitted to remain would cast runoff back onto the structure or into its drainage ways including those that may exist underneath the structure. The extent of such removal shall be less than thirty meters (30 m) but it is intended that they be only the minimum necessary to ensure that runoff is not cast back onto the structure being cleaned or its drainage ways.

Block paving and paved surfaces other than asphalt paving between adjacent or parallel bridges shall also be cleaned if indicated in the contract documents. Such cleaning shall be limited to narrow areas less than eight meters in width.

### **3.02 Environmental Protection.**

**3.02 A. Waste.** The provisions of § 107-16 Solid Waste Management shall apply to the collection, storage, transport and disposal of waste generated by this work. All sand, dirt, cinders, and other trash and debris collected from the bridge shall be disposed of at a suitable off-site disposal facility.

**3.02 B. Water.** The contractor may either withdraw water from local on-site sources or use water from a municipal source for bridge washing. If water is to be drawn from a local on-site water source, to protect aquatic life, there may not be any loss of water elevation at the site of withdrawal or immediately downstream of the site. To further protect aquatic life, water withdrawal shall be accomplished with use of a screened hose, with a screen size not to exceed 6 mm square. To prevent the unintentional spread of invasive species such as zebra mussels, wash water withdrawn from a local on-site water source may not be transported to be used at another bridge site in a different watershed. If water is withdrawn from an onsite source, cleaning of equipment will be conducted prior to leaving that watershed. All small equipment (pumps, hoses, barriers, silt fences, floating booms, cofferdams, shovels, rakes, jumping jacks, plate tampers, boots, buckets, industrial vacuums etc.) and large equipment (backhoes, excavators, trucks, tankers, rollers, trailers, etc.) that comes into direct contact with water withdrawn from a local on-site water source must be cleaned (internally and externally) by soaking, dipping in, or scrubbing with a chlorine solution, and/or hot water or steam cleaned and allowed to dry before the next use. If approved by the Engineer, wash water may be drained back into the original body of water, as long as conditions are such that this would not cause chemical or biological contamination. Otherwise, wash water will be collected in suitable containers and disinfected prior to final disposal.

**3.02 C. Birds.** All nests of protected migratory birds on bridges should be presumed to be active and occupied between April 15 and August 15. The areas within 1 meter laterally of the nest should not be cleaned or washed, pressure washing should start at the 1 meter line and progress away from the nest.

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Before April 15 and after August 15 nests of protected migratory birds on bridges will most likely be inactive and unoccupied. If confirmed to be unoccupied, the nests should be removed as part of the cleaning operation.

Nests of unprotected species should be removed as part of the cleaning operations. However, pigeons should be treated as humanely as possible, in socially and environmentally sensitive situations removal of young from the nest for raising by a wildlife rehabilitator should be considered.

**3.02 D. Schedule.** All structures or bridge drainage systems over water courses shall be washed during the periods indicated in the Contract Documents. The following shall apply:

- Washing shall occur only when adequate flow in the stream exists to dilute possible contaminants.
- Operations shall be sequenced so as to clean structures over small bodies of water or small streams in the spring of the year when flows are greatest.
- Streams categorized by DEC as Ct(s) ie. trout spawning, shall be washed prior to July 1 and bridges located at DEC yearling trout stocking sites shall not be washed during April.
- Washing, whether during a scheduled period or not, shall be stopped if stream flow drops below normal.

**3.03 Maintenance and Protection of Traffic.** Maintenance and protection of traffic shall be in accordance with MUTCD, contract documents, and Section 619 of the Standard Specifications. High pressure spray and high volume drainage of wash water shall be controlled so as to not present a hazard to traffic or to cause erosion of adjacent ground or drainage ways. Under no circumstances shall high pressure spray or high volume drainage of wash water be discharged directly into active traffic lanes.

**3.04 Preparation.** Confirm that the bridge drainage system is not blocked by rodding with a sewer rod or similar tool prior to other cleaning work. If the Engineer has been notified, and concurs that the drainage system is blocked prior to other cleaning work, then clearing the drainage system will be extra work. If the Contractor does not inspect the bridge drainage system and notify the Engineer prior to beginning work, all clearing and cleaning of the drainage system will be done as part of the work of this specification.

All loose trash and debris shall be collected by sweeping, shoveling, vacuuming and other suitable methods. Equipment for collecting trash and other debris from bridge decks shall be determined by

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the Contractor, subject to the approval of the Engineer, and will normally consist of, but not be limited to, industrial vacuums, brushes, brooms, and shovels. Plastic shovels shall be used when other shovels are damaging coated surfaces. The contractor shall not cause or allow trash and/or debris from the bridge to be deposited into a wetland, stream, other water body, bridge drainage system, or active traffic lanes during the cleaning of the bridge.

**3.05 Washing.** When trash and debris collection from the bridge is complete, all bridge surfaces, including the underside of the bridge, shall be pressure washed with clean, fresh water. The washing shall be adequate to remove all visible dirt, salt, animal waste and similar debris.

The equipment for pressure washing shall be operated at pressures that do not damage the paint or other coatings on the bridge or undercut the grout or harm the masonry plates beneath the bearings. When washing bridges over streams and wetlands, the quantity and flow rate of the water used shall be the minimum necessary to clean foreign materials from the surfaces where they are encountered.

Pressure washing will not be allowed when ambient temperatures are less than 5°C or when ambient temperatures are expected to drop below 5°C before the bridge is dry. The Engineer will be the sole determiner as to when temperatures lower than 5°C are likely to occur.

Scuppers, troughs, and downspouts to the first cleanout above ground level or to their outlet if above ground shall be cleaned by using high pressure water, vacuum, or other techniques satisfactory to the Engineer. Chemical cleaning compounds shall not be used during flushing operations, unless their use has been approved by the D.E.C. and clearance has been given by the Regional Director for their use. Debris from the cleaning operations shall not be deposited in, or around the structure, highway roadway slopes, drainage systems or streams. It shall be disposed of at a suitable off-site disposal facility.

Cleaned scuppers, downspouts and troughs shall allow the unimpeded flow of water. After cleaning has been completed the flow characteristics of the cleaned system will be evaluated. If flow is still impeded because of the presence of dirt or other removable matter or object in the system, the Engineer will direct the Contractor to reclean the system, including dismantling and reinstalling, if required, at no additional cost to the State. Any damage to the system or structure that occurs during cleaning operations shall be repaired by the Contractor to the satisfaction of the Engineer at no additional expense to the State.

When concrete paving block is cleaned and washed, the removal of weeds between the blocks will not be required under this item.

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Work shall be conducted in such a manner so as not to damage or remove existing epoxy protective coatings or any other protective coating on the bridge. Any damage to the structure being worked on or to surrounding structures and property shall be repaired by the Contractor at no cost to the State.

After all trash and debris has been collected, the drainage system cleaned and washing is completed, the bridge will be inspected by the Engineer. The cleaned bridge surfaces shall be free of trash and debris as described under Construction Details and the drainage system free running except those systems the Engineer agrees were damaged prior to any cleaning work on the bridge.

**METHOD OF MEASUREMENT**

The work will be measured for payment on a lump sum basis for each bridge.

**BASIS OF PAYMENT**

The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete work including the cost of cleaning the drainage system; collecting, removing and disposing of trash and debris including that off structure but necessary to prevent backup of runoff onto the structure or its drainage ways, and repair of any damage caused by the Contractor. Maintenance and Protection of Traffic will be paid separately. Clearing a blocked drainage system will be paid as extra work.

Payment will be made under:

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
15633.94nnnn M -	Maintenance Cleaning and Washing of Bridges	Lump Sum (for each structure)
15633.95nnnn M -	Maintenance Cleaning and Washing of Bridges, Concrete Surfaces	Lump Sum (for each structure)
15633.96nnnn M -	Maintenance Cleaning and Washing of Bridges, No Lead Based Paint	Lump Sum (for each structure)
15633.97nnnn M -	Maintenance Cleaning and Washing of Weathering Steel Bridges	Lump Sum (for each structure)

Note: nnnn denotes serialized pay item. See §101-02.