

**SEPTEMBER 25, 2018**

**I-84 RESURFACING, BRIDGE REHABILITATION, AND SAFETY IMPROVEMENTS**

**FEDERAL AID PROJECT NO. 0842(310)**

**STATE PROJECT NO. 0096-0200**

**TOWN OF NEWTOWN**

**ADDENDUM NO. 1**

This Addendum addresses the following questions and answers contained on the “CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS”:

Question and Answer Nos. 6, 7, 11, 12, 14, 15, 17, 20, 23, 24, 25, 32, 34, 35, 36, 39, 40, and 42.

**SPECIAL PROVISIONS**

**NEW SPECIAL PROVISION**

The following Special Provision is hereby added to the Contract:

- **NOTICE TO CONTRACTOR – ARCHITECTURAL AND INDUSTRIAL MAINTENANCE COATINGS**

**REVISED SPECIAL PROVISIONS**

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- **SECTION 1.08 – PROSECUTION AND PROGRESS**
- **ITEM #0202456A – PAVEMENT CORE**
- **ITEM #0603479A – ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 1)**
- **ITEM #0603480A – ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 2)**
- **ITEM #0603482A – ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 4)**
- **ITEM #0603484A – ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 6)**

- ITEM #0603563A – CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)
- ITEM #0603564A – CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 2)
- ITEM #0603633A – CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 6)
- ITEM #0603715A – CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 4)
- ITEM #0980001A – CONSTRUCTION STAKING
- ITEM #1002232A – TRAFFIC CONTROL FOUNDATION - SPAN POLE – TYPE “C”

**CONTRACT ITEMS**

**NEW CONTRACT ITEMS**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
<u>0202200</u>	<u>CHANNEL EXCAVATION – EARTH</u>	<u>C.Y.</u>	<u>389</u>
<u>0202250</u>	<u>CHANNEL EXCAVATION – ROCK</u>	<u>C.Y.</u>	<u>21</u>
<u>0821393</u>	<u>JERSEY SHAPE TRANSITION TO F-SHAPE PRECAST CONCRETE BARRIER CURB</u>	<u>L.F.</u>	<u>180</u>
<u>1002015</u>	<u>ROCK IN FOUNDATION EXCAVATION</u>	<u>V.F.</u>	<u>8</u>

**REVISED CONTRACT ITEM**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
<u>0821501A</u>	<u>F-SHAPE PRECAST CONCRETE BARRIER CURB (30”X45”)</u>	<u>3686 L.F.</u>	<u>3506 L.F.</u>

**DELETED CONTRACT ITEMS**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
<u>0506001</u>	<u>CONCRETE FOR STEPS AND COPINGS</u>	<u>2 C.Y.</u>	<u>0 C.Y.</u>
<u>0601000</u>	<u>CLASS “A” CONCRETE</u>	<u>7 C.Y.</u>	<u>0 C.Y.</u>

**PLANS**

**NEW PLANS**

The following Highway Standard Sheets are hereby added to the Contract:

HW-0821\_03E and HW-0910\_01

**REVISED PLANS**

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

02.01.A1, 03.04.A1, 03.05.A1, 03.06.A1, 03.10.A1, 03.11.A1, 03.12.A1, 03.22.A1,  
03.36.A1, 10.13.A1, and 10.24.A1.

The Bid Proposal Form has been revised to reflect these changes.

The Detailed Estimate Sheets do not reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

## **NOTICE TO CONTRACTOR – ARCHITECTURAL AND INDUSTRIAL MAINTENANCE COATINGS**

This Contract includes the application of materials subject to the Volatile Organic Compounds (VOC) content limits stated in the Regulations of Connecticut State Agencies (RCSA) Sections 22a-174-41 and -41a. All architectural and industrial maintenance (AIM) coatings and applications of such coatings must comply with these regulations.

The Contractor shall submit a Material Safety Data Sheet/Safety Data Sheet or Product Technical Data Sheet developed by the manufacturer of each material that may be subject to the Regulations. The submittal must verify both the type of AIM and its VOC Content. VOC content shall be determined based on the formulation data supplied by the materials manufacturer.

The Contractor may only use AIM coatings that contain VOCs below the respective coating category Phase II limits specified in Table 1 if either:

- a) the coating was manufactured on or after May 1, 2018, **or**
- b) the coating is being applied after April 30, 2021.

The Contractor may use AIM coatings that contain VOCs exceeding the respective coating category Phase II limits specified in Table 1 only if all of the following four conditions are met:

- a) the coating is being applied on or before April 30, 2021,
- b) the coating contains VOCs below the applicable Phase I limits specified in Table 1,
- c) the coating was manufactured prior to May 1, 2018, **and**
- d) the coating container(s) are dated (or date coded) as such.

For any coating that is not categorized within Table 1, the Contractor shall classify the coating as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of  $\geq 15$  on an 85-degree meter and  $\geq 5$  on a 60-degree meter) - Nonflat Coating,
- Registers gloss of  $\geq 70$  on a 60-degree meter - Nonflat-High Gloss Coating.

The Contractor must close all containers of coating and solvent when not in use.

Coating container labels must display the date the coating was manufactured, the manufacturer's recommendation regarding thinning with solvent, and the coating's VOC content in grams per liter (g/L) of coating. Certain coating categories as noted in Table 1 have additional labeling requirements.

The Contractor may add additional solvent to a coating only if such addition does not cause the coating to exceed the applicable VOC limit specified Table 1. The Contractor must adhere to type(s) of solvent and maximum amount of solvent recommended by coating manufacturer. VOC content of a thinned coating shall be the VOC content as listed by the manufacturer after thinning in accordance with its recommendation.

<b>TABLE 1</b>		
<b>Coating Category</b>	<b>Phase I</b>	<b>Phase II</b>
	<b>manufactured prior to May 1, 2018 VOC content limit (g/L)</b>	<b>manufactured on or after May 1, 2018 VOC content limit (g/L)</b>
Aluminum roof coating	--- <sup>1</sup>	450
Antenna coating	530	--- <sup>1</sup>
Antifouling coating	400	--- <sup>1</sup>
Basement specialty coating	--- <sup>1</sup>	400
Bituminous roof coating	300	270
Bituminous roof primer	350	350
Bond breaker	350	350
Calcimine recoater	475	475
Clear wood coating - Clear brushing lacquer <sup>2</sup>	680	275
Clear wood coating - Lacquer <sup>2,3</sup>	550	275
Clear wood coating - Sanding sealer <sup>2,4</sup>	350	275
Clear wood coating - Varnish <sup>2</sup>	350	275
Concrete curing compound	350	350
Concrete or masonry sealer/ Waterproofing concrete or masonry sealer	400	100
Concrete surface retarder	780	780
Conjugated oil varnish	--- <sup>1</sup>	450
Conversion varnish	725	725
Driveway sealer	--- <sup>1</sup>	50
Dry fog coating	400	150
Faux finishing coating <sup>2</sup>	350	350
Fire resistive coating	350	350
Fire retardant coating - Clear	650	--- <sup>1</sup>
Fire retardant coating - Opaque	350	--- <sup>1</sup>
Flat coating	100	50
Floor coating	250	100
Flow coating	420	--- <sup>1</sup>
Form-release compound	250	250
Graphic arts coating (sign paint)	500	500
High temperature coating	420	420
Impacted immersion coating	780	780
Industrial maintenance coating <sup>2</sup>	340	250
Industrial maintenance coating	340	250
Low solids coating	120	120
Magnesite cement coating	450	450
Mastic texture coating	300	100

<b>TABLE 1</b>		
<b>Coating Category</b>	<b>Phase I</b>	<b>Phase II</b>
	<b>manufactured prior to May 1, 2018 VOC content limit (g/L)</b>	<b>manufactured on or after May 1, 2018 VOC content limit (g/L)</b>
<b>Metallic pigmented coating</b>	500	500
<b>Multi-color coating</b>	250	250
<b>Nonflat coating</b>	150	100
<b>Nonflat high gloss coating<sup>2</sup></b>	250	150
<b>Nuclear coating</b>	450	450
<b>Pre-treatment wash primer</b>	420	420
<b>Primer, sealer and undercoater</b>	200	100
<b>Quick-dry enamel</b>	250	--- <sup>1</sup>
<b>Quick-dry primer, sealer and undercoater</b>	200	--- <sup>1</sup>
<b>Reactive penetrating carbonate stone sealer<sup>2</sup></b>	--- <sup>1</sup>	500
<b>Reactive penetrating sealer<sup>2</sup></b>	--- <sup>1</sup>	350
<b>Recycled coating</b>	250	250
<b>Roof coating</b>	250	250
<b>Rust preventive coating<sup>2</sup></b>	400	250
<b>Shellac Clear</b>	730	730
<b>Shellac Opaque</b>	550	550
<b>Specialty primer, sealer and undercoater<sup>2</sup></b>	350	100
<b>Stain</b>	250	250
<b>Stone consolidant<sup>2</sup></b>	--- <sup>1</sup>	450
<b>Swimming pool coating</b>	340	340
<b>Thermoplastic rubber coating and mastic</b>	550	550
<b>Traffic marking coating</b>	150	100
<b>Traffic marking coating</b>	150	100
<b>Tub and tile refinish</b>	--- <sup>1</sup>	420
<b>Waterproofing membrane</b>	--- <sup>1</sup>	250
<b>Waterproofing sealer</b>	250	--- <sup>1</sup>
<b>Wood coating<sup>2</sup></b>	--- <sup>1</sup>	275
<b>Wood preservative</b>	350	350
<b>Zinc-rich primer<sup>2</sup></b>	--- <sup>1</sup>	340

1 Classify as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of ≥15 on an 85-degree meter and ≥5 on a 60-degree meter) – Nonflat Coating
- Registers gloss of ≥70 on a 60-degree meter – Nonflat-High Gloss Coating

2 Container must be appropriately labeled. See RCSA 22a-174-41a

3 “Clear Wood Coating – Lacquer” includes lacquer sanding sealer

4 “Clear Wood Coating - Sanding Sealer” does not include lacquer sanding sealer

-END-

## **SECTION 1.08 PROSECUTION AND PROGRESS**

### **Article 1.08.03 – Prosecution of Work - Add the following:**

The Contractor shall notify the project engineer on construction projects, or the district permit agent on permit jobs, when all traffic signal work is completed. This will include all work at signalized intersections including loop replacements or any relocation work including handholes. The project engineer or district permit agent will notify the Division of Traffic Engineering to coordinate a field inspection of all work.

### **Article 1.08.04 - Limitation of Operations - Add the following:**

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be permitted to perform any work which will interfere with the described traffic operations on all project roadways as follows:

#### **I-84**

On the following State observed Legal Holidays:

New Year's Day  
Good Friday, Easter\*  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day\*\*  
Christmas Day

The following restrictions also apply:

On the day before and the day after any of the above Legal Holidays.

On the Friday, Saturday, and Sunday immediately preceding any of the above Holidays celebrated on a Monday.

On the Saturday, Sunday, and Monday immediately following any of the above Holidays celebrated on a Friday.

\* From 6:00 a.m. the Thursday before the Holiday to 8:00 p.m. the Monday after the Holiday.

\*\* From 6:00 a.m. the Wednesday before the Holiday to 8:00 p.m. the Monday after the Holiday.

### Incident Management System (IMS) Requirements:

In order to maintain continuous operation of the Incident Management System, the Contractor shall adhere to the requirements in the special provision “Notice to Contractor – IMS Installation Qualifications” and “Notice to Contractor – IMS Installation”.

The Contractor will not be allowed to perform any work that will disrupt the normal operation of the Incident Management System (IMS) as follows:

- On Monday through Friday from 5:00 a.m. to 9:00 p.m.
- On Saturday and Sunday.
- On any of the Legal Holidays noted above.

### During all other times

The Contractor shall maintain and protect traffic as shown on the accompanying “Limitations of Operations” charts, which dictate the minimum number of lanes that must remain open for each day of the week.

### **Ramps and Turning Roadways**

The Contractor will not be allowed to perform any work Monday through Friday between 6:00 am and 9:00 am and between 3:00 pm and 6:00 pm.

The Contractor will be allowed to close the I-84 on-ramps and off-ramps for Exits 9 and 10 and detour traffic from 10:00 pm until 5:00 am daily. The Contractor will be allowed to close one ramp at a time during the allowable periods.

### **All Other Roadways**

The Contractor will not be allowed to perform any work Monday through Friday between 6:00 am and 9:00 am and between 3:00 pm and 6:00 pm. The Contractor will also not be allowed to work between 10:00 am and 6:00 pm Saturday and Sunday.

### **Additional Lane Closure Restrictions**

It is anticipated that work on adjacent projects will be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required to maintain proper traffic flow at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

The Contractor will not be allowed to perform any work that will interfere with traffic operations on a roadway when traffic operations are being restricted on that same roadway, unless there is at



least a one-mile clear area length where the entire roadway is open to traffic or the closures have been coordinated and are acceptable to the Engineer. The one-mile clear area length shall be measured from the end of the first work area to the beginning of the signing pattern for the next work area.

**Limitation of Operations Chart  
Minimum Number of Lanes to Remain Open**

Route: I-84 Eastbound Location: Exits 9 to 10 Number of Through Lanes: 2								Route: I-84 Westbound Location: Exits 9 to 10 Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1	1	1	1	1	1	1	Mid	1	1	1	1	1	1	1
1 AM	1	1	1	1	1	1	1	1 AM	1	1	1	1	1	1	1
2 AM	1	1	1	1	1	1	1	2 AM	1	1	1	1	1	1	1
3 AM	1	1	1	1	1	1	1	3 AM	1	1	1	1	1	1	1
4 AM	1	1	1	1	1	1	1	4 AM	1	1	1	1	1	1	1
5 AM	1	1	1	1	1	1	1	5 AM	2	2	2	2	2	1	1
6 AM	E	E	E	E	E	1	1	6 AM	E	E	E	E	E	1	1
7 AM	E	E	E	E	E	2	1	7 AM	E	E	E	E	E	2	1
8 AM	E	E	E	E	E	2	1	8 AM	E	E	E	E	E	2	2
9 AM	2	2	2	2	E	2	2	9 AM	2	2	2	2	2	2	2
10 AM	2	2	2	2	E	2	2	10 AM	2	2	2	2	2	2	2
11 AM	2	2	2	2	E	2	2	11 AM	2	2	2	2	2	2	2
Noon	2	2	2	2	E	2	2	Noon	2	2	2	2	2	2	2
1 PM	2	2	2	2	E	2	2	1 PM	2	2	2	2	2	2	2
2 PM	2	2	2	2	E	2	2	2 PM	2	2	2	2	2	2	2
3 PM	E	E	E	E	E	2	2	3 PM	E	E	E	E	E	2	2
4 PM	E	E	E	E	E	2	2	4 PM	E	E	E	E	E	2	2
5 PM	E	E	E	E	E	2	2	5 PM	E	E	E	E	E	2	2
6 PM	2	2	2	2	2	2	2	6 PM	2	2	2	2	2	2	2
7 PM	2	2	2	2	2	2	2	7 PM	2	2	2	2	2	2	2
8 PM	2	2	2	2	2	2	2	8 PM	1	1	1	1	2	1	2
9 PM	1	1	1	2	2	2	2	9 PM	1	1	1	1	1	1	2
10 PM	1	1	1	1	1	1	1	10 PM	1	1	1	1	1	1	1
11 PM	1	1	1	1	1	1	1	11 PM	1	1	1	1	1	1	1

**E = maintain existing traffic operations = all available travel lanes, including exit only lanes, climbing lanes, and lanes added during construction, and all available shoulder widths, including shoulder width added during construction, shall be open to traffic during this period**

### **Pavement Reconstruction**

Traffic is not to be allowed on HMA S1.0 at any time. The Contractor shall place a lift of PMA S0.5 or HMA S0.25 prior to opening any roadway to traffic. Traffic shall not be allowed on the HMA S0.25 pavement surface through the winter months.

Longitudinal dropdowns greater than 3” will not be allowed during those periods when the maximum number of lanes of through traffic are required. The Contractor shall temporarily provide a 4:1 traversable slope of suitable material in those areas where a longitudinal dropdown exists. The cost of furnishing, installing, and removing this material shall be included in the contract lump sum for “Maintenance and Protection of Traffic.”

**ITEM # 0202456A – PAVEMENT CORE**

**Description:** Work under this item shall consist of removing pavement cores at locations where guiderail is to be reset or installed into pavement.

**Materials:** Materials shall conform to the requirements of Section M.04 – Bituminous Concrete Materials or section M.05 – Processed Aggregate base and Pavement Surface Treatment.

**Construction Methods:** Prior to driving the guiderail posts, pavement cores are to be removed at the post locations as shown on the plans or as ordered by the Engineer.

Cores shall be cut using a diamond drill bit centered around the post location with an inside diameter of twelve (12) inches. Only the HMA/PMA shall be removed by the coring operation. All underlying base material is to remain.

After installation of the guiderail post, the core hole shall be patched with processed aggregate, cold patch, or other material as ordered by the Engineer. The patch shall be flush with the surface of the adjacent pavement.

**Method of Measurement:** This work will be measured for payment by the number of pavement cores removed, patched, and accepted by the Engineer.

**Basis of Payment:** This work will be paid for at the contract unit price each for “Pavement Core”, complete in place, which price shall include cutting and removing the core, patching the core hole after the guiderail post has been installed, and all materials, tools, equipment, and labor incidental thereto for all the work under this item on the project.

Pay Item  
Pavement Core

Pay Unit  
EA

**ITEM #0603479A - ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 1)**

**ITEM #0603480A - ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 2)**

**ITEM #0603482A - ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 4)**

**ITEM #0603484A - ABRASIVE BLAST CLEANING AND FIELD PAINTING OF BEAM ENDS (SITE NO. 6)**

**Description:** Work under this item shall consist of surface preparation and field painting of steel components with a **2-coat system** as shown on the plans, as directed by the Engineer and in accordance with these specifications.

**Components to be painted include, but are not limited to, the following: ends of beams and girders, diaphragms and cross frames, steel fixed bearings, steel components of expansion bearings, scuppers, drainage pipes and troughs, state-owned utility conduits, structural steel utility supports, all new structural steel installed for repair purposes, and all other metal components that are an integral part of the bridge system.**

Privately-owned utilities, bridge rails, stay-in-place forms, fences, elastomeric bearing pads and bronze components shall be protected from damage by surface preparation and painting operations and are not to be painted. Any damage resulting from surface preparations, containment and/or overspray from paint operations shall be repaired by the Contractor at no cost to the State.

The amount of steel to be painted under this special provision varies by bridge Site, and is to be determined by the Contractor based on the information contained in the plans. Bidders shall examine the structures in this Contract and shall make their own determinations as to the work involved and conditions to be encountered.

Lead paint is presumed to be present at all bridge Sites and in all locations.

**Submittals:** A minimum of 20 calendar days before starting any surface preparation and coating application work, the painting contractor shall submit the following to the Engineer for acceptance:

1. A copy of the firm's written Quality Control Program used to control the quality of surface preparation and coating application including, but not limited to, ambient conditions, surface cleanliness and profile, coating mixing, dry film thickness, and final film continuity.
2. A copy of the firm's written surface preparation and application procedures detailing the

Materials and Construction Methods for both accessible and inaccessible areas. All areas are deemed accessible, except those areas specifically designated as inaccessible. The Engineer will be the sole judge in determining the exact locations of said inaccessible areas. Inaccessible areas may include: Between back to back angles, edges of top flanges of steel members in contact with concrete, and areas of visible non-removable impacted rust. Such locations designated as inaccessible shall be coated with special materials, such as penetrating sealer or equivalent, as recommended by the Manufacturer of the selected paint system (see Materials section below for paint systems). This written program must contain a description of all the equipment that will be used for removal of laminar and stratified rust, for surface preparation, including the remediation of soluble salts, and for paint mixing and application, including stripe coating. Coating repair procedures shall be included for both accessible and inaccessible areas.

3. A detailed description of the Contractor's enforcement procedures and the authority of personnel.
4. If the application of heat is proposed for coating application purposes, provide information on the heat containment and procedures that will be used, with data sheets for the equipment. Note: If heat is used for coating operations, the heat and containment must be maintained to provide the required temperatures for the duration of the cure period.
5. Containment plans (paint removal/collection of debris, surface preparation, coating applications, coating applications with heat, etc.).
6. Proof of SSPC-QP 1 qualifications, CAS-certification(s) and QP 2 qualifications, as applicable.
7. Coating product information, including coating manufacturer, product name, application instructions, technical data, MSDS and color chips.
8. Abrasive product information, including abrasive manufacturer, product name, technical data, and MSDS.

The Contractor shall not begin any paint removal work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the programs does not relieve the Contractor from the responsibility to conduct the work in strict accordance with the requirements of Federal, State, or local regulations, this specification, or to adequately protect the health and safety of all workers involved in the Project and any members of the public who may be affected by the Project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

**Materials:** The materials for the coating system for this work shall conform to the requirements of Section M.07.02 amended as follows:

The coating system shall be one of the following **2-coat systems**:

Carbomastic 15  
Carbothane 133 LV, manufactured by: Carboline

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2150 Schuetz Road  
St. Louis, MO 63146  
(800) 848-4645

Epoxy Mastic Aluminum II  
HS Poly 250, manufactured by:

Sherwin Williams  
425 Benton Street  
Stratford, CT 06615  
(203) 377-1711  
(800) 474-3794

Carbomastic 90  
Carbothane 134 HS, manufactured by:

Carboline  
2150 Schuetz Road  
St. Louis, MO 63146  
(800) 848-4645

All materials for the complete coating system shall be furnished by the same coating material manufacturer with no subcontracted manufacturing allowed. Intermixing of materials within and between coating systems will not be permitted. Thinning of paint shall conform to the manufacturer's written recommendations. All components of the coating system and the mixed paint shall comply with the Volatile Organic Compounds (VOC) Content Limits and Emission Standards stated in the Connecticut Department of Energy and Environmental Protection's Administration Regulation for the Abatement of Air Pollution, Sections 22a-174-41 through 41a and 22a-174-20(s), respectively.

Note: If any of the above and/or following stipulated Contract specifications differ from those of the Manufacturer's recommended procedures or ranges, the more restrictive of the requirements shall be adhered to unless directed by the Engineer in writing.

The abrasive media for blast cleaning shall be recyclable steel grit.

### **Construction Methods:**

Contractor - Subcontractor Qualifications: Contractors and subcontractors doing this work are required to be certified by the SSPC Painting Contractor Certification Program (PCCP) to QP 1 entitled "Standard Procedure for Evaluating Qualifications of Painting Contractors ("Field Application to Complex Structures"). When the work involves the disturbance of lead-containing paint, the Contractor and subcontractor are also required to be certified to SSPC-QP 2 "Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint."

Contractors and subcontractors are required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)**-certified (Level II-Interim Status-Minimal) craft-

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worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew-member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued.

Requests for extension of time for any delay to the completion of the Project due to an inactive certification will not be considered and liquidated damages will apply. In addition, if any recoat times are exceeded, the affected areas shall be abrasive blast cleaned to SSPC-SP 6 and coatings reapplied in accordance with these specifications at no additional cost to the State. At the option of the Engineer, if such a delay will adversely impact the successful and timely completion of the Project, the Department may require the Contractor to engage another SSPC certified contractor to do the painting work at the prime contractor's expense.

Quality Control Inspections: The Contractor shall perform first line, in process Quality Control (QC) inspections. The Contractor shall implement a Quality Control Program accepted by the Engineer, including written daily reports, that ensures that the work accomplished complies with these specifications. Copies of these reports shall be provided daily to the Engineer. Contractor QC inspections shall include, but not be limited to the following:

- Suitability of protective coverings and containments
- Ambient conditions
- Surface preparation (solvent cleaning, hand/power tool or abrasive blast cleaning, etc.)
- Coating application (mixing, thinning, and wet/dry film thickness)
- Recoat times and cleanliness between coats
- Coating continuity (freedom from runs, sags, overspray, dryspray, pinholes, shadow-through, skips, misses, etc.)
- Final film acceptance

The personnel managing and performing the quality control program shall be NACE Certified Coating Inspector(s) (successfully completed Sessions I, II, III and Peer Review) or must be SSPC certified BCI level 2. The personnel performing the quality control tests shall be trained in the use of the quality control instruments. Documentation of training shall be provided. These personnel shall not perform surface preparation and painting.

Test Equipment and Materials: The Contractor shall furnish the following new test equipment and materials for use by the QC Inspector: Two PTC Surface Temperature Thermometers

1. Psychron 566 Psychrometer (Battery Operated) with two sets of batteries or a Bacharach Sling Psychrometer
2. U.S. Weather Bureau Psychrometric Tables



3. Hypodermic Needle Pressure Gage for nozzle pressure tests.
4. SSPC Visual Standards VIS 1, VIS 3, and/or VIS 4, as applicable.
5. Testex Spring Micrometer
6. Testex Press-O-Film Replica Tape, one roll (100 pieces) each of coarse and extra-coarse per bridge span, or as specified by the Engineer.
7. Wet film thickness gage
8. PosiTest, Mikrotest or Elcometer Dry Film Thickness Gauge (FM)
9. SSPC Type 2 Dry Film Thickness Gauge per PA2
10. NIST (NBS) Calibration Standards Range: 0 – 39 mils

**Quality Assurance Inspections:** The Engineer may conduct Quality Assurance (QA) observations of any or all phases of the work. The presence or activity of Engineer inspections in no way relieves the Contractor of the responsibility to provide all necessary daily Quality Control inspections of its own and to comply with all requirements of this Specification.

The Contractor shall facilitate the Engineer's inspections as required, including allowing ample time for the inspections and providing suitable lighting (50 foot candles minimum at the surface as defined later in this specification). The Contractor shall furnish, erect and move scaffolding or other mechanical equipment to permit inspection and close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work. The Contractor shall notify the Engineer in advance of plans to remove staging used in cleaning and painting operations in order to allow for inspection. The QA inspection will be performed with the QA inspector's equipment when verifying the Contractor's test results in the field.

**Safety:** All Contractor activities associated with the coating work described and specified herein shall be conducted according to all applicable Federal (OSHA), State of Connecticut safety regulations and SSPC-PA Guide 3 entitled "A Guide to Safety in Paint Application."

**Ambient Conditions:** Surface preparation and coating application work shall only be done inside a containment enclosure as specified elsewhere in these specifications. Surface preparation or coating work shall be performed inside the containment enclosure meeting the following:

- The relative humidity is at or below 90 percent.
- The substrate is not damp or covered by frost or ice.
- The surface temperature and air temperature are between 50° F and 100° F.
- The surface temperatures of the steel and air are more than 5° F above the dewpoint temperature, as determined by a surface temperature thermometer and electric or sling psychrometer.

If the requirements of the coating manufacturer differ from the ranges provided above, comply with the most restrictive requirements unless directed otherwise by the Engineer in writing.

**Protective Coverings:** The Contractor shall protect property, pedestrians, vehicular, and other

traffic upon, underneath, or near the bridge, and all portions of the bridge superstructure and substructure against abrasive blast cleaning damage or disfigurement from splatters, splashes, or spray of paint or paint materials. See the specification for “Class 1 - Containment and Collection of Surface Preparation Debris (Site No. X).” All coating overspray, drips and spills shall be contained. Maintain the integrity and security of all protective coverings and containment materials throughout the entire Project.

Any paint chips, paint removal media (e.g., abrasives), coating or solvent that has escaped the Contractor’s containment enclosure shall be cleaned up immediately. For bridges over water, the Contractor shall have on Site a sufficient quantity of spill containment boom and pads to contain a spill. The length of containment boom on Site shall be at least equal to twice the length of the active work site over the water.

Observed Steel Defects: If significant deficiencies, such as cracks or section losses, are found during cleaning or coating operations, the Contractor shall immediately notify the Engineer as to their extent. Significant deficiencies include the following:

- a) Cracks in any part of the superstructure
- b) Section loss more than 1/8” or section loss equal to or greater than 5 percent of flange thickness in the maximum moment areas (i.e. section loss in the middle one half of a single span structure).
- c) Section loss more than 1/4” or section loss equal to or greater than 25 percent of the flange thickness in other than the maximum moment areas (i.e. section loss up to quarter points of the middle one half of a single span structure).
- d) Section loss more than 1/8” or section loss equal to or greater than 33 percent of web thickness in the maximum shear areas (i.e. section loss within five feet of the bearing center line).

Heating Devices: The Contractor may use heating devices to obtain and maintain a condition within the containment enclosure that is suitable for surface preparation and painting application, up to and including the minimum time to recoat, or minimum time to dry for service or topcoat. Heating devices shall be limited to gas or oil-fired indirect air heaters in which the combustion products are discharged separately from the forced airstream to an area outside the containment enclosure. The heating devices must be configured so as not to form condensation on cold surfaces or cause rust-back and must be automatically controlled. Information describing the proposed heating devices and the proposed heating procedures shall be provided a minimum of 20 days in advance for Engineer acceptance.

Lighting Requirements: A minimum illumination level of 20 foot-candles shall be provided throughout the inside of the containment enclosure during surface preparation and coating application work. A minimum illumination level of 50 foot-candles shall be provided at the location of the specific work task and for inspection. All lighting fixtures and related connectors located inside the containment enclosure must be explosion proof and UL listed.

Material Storage: The Contractor shall provide a suitable facility for the storage of paint that

complies with all Federal and State laws and regulations.

This facility shall provide protection from the elements and ensure that the paint is stored at temperatures within the more stringent of (1) the manufacturer's written recommended temperatures, or (2) between 40° F and 100° F. If paint application takes place in conditions that require heating of the containment, then the temperature of the stored paint shall be maintained at a similar temperature. Storage of paint shall be in reasonable proximity to the painting locations. The Engineer shall be provided access to the stored paint for inspection and to witness removal of the materials. The Contractor's facility for the storage of paint shall be subject to the approval of the Engineer.

Equipment: All equipment used in surface preparation and removal of debris, such as hoses, hoppers, recycling and vacuum machines that the Contractor brings to the Site, shall be clean and free of any prior debris.

Spray equipment, brushes and rollers used in application of coatings shall be sized sufficiently and be in proper working order to accomplish the work according to the manufacturer's written recommendations.

Compressed Air: All compressed air sources shall have oil and moisture separators, attached and functional, and properly designed and sized. The compressed air sources shall deliver air to the blast nozzle, for blowing down the surfaces, or for conventional spray application that is free of oil and moisture and of sufficient pressure to accomplish the associated work efficiently and effectively. The tanks on the air compressor and moisture separator shall be drained at the end of each workday. The compressed air source shall produce a minimum pressure of 90 psi at the nozzle during abrasive blast cleaning.

The Contractor shall verify that the compressed air is free of moisture and oil contamination in accordance with the requirements of ASTM D4285. The tests shall be conducted at least every four hours for each compressor system in operation. Sufficient freedom from oil and moisture is confirmed if soiling or discoloration is not visible on the paper. If air contamination is evidenced, the Contractor shall change filters, clean traps, add moisture separations or filters, or make other adjustments as necessary to achieve clean, dry, air.

Test Sections: Prior to surface preparation, the Contractor shall prepare a test section(s) on each structure to be painted in a location(s) that the Engineer considers to be representative of the existing surface condition and steel type for the structure as a whole. The test section(s) shall be prepared using the same equipment, materials and procedures as the production operations. The Contractor shall prepare the test section(s) to the specified level according to the appropriate SSPC written specifications and visual standards. The written requirements of the specification prevail in the event of a conflict with the SSPC visual standards. Only after a test section area has been approved shall the Contractor proceed with surface preparation operations. The test section(s) shall cover approximately 10 square feet each. Additional compensation will not be allowed the

Contractor for preparation of test sections.

For the production cleaning operations, the specifications and written definitions, the test section(s), and the SSPC visual standards shall be used in that order for determining compliance with the Contract requirements.

Surface Preparation:

1 – Laminar and Stratified Rust: All laminar and stratified rust or corrosion products that have formed on any area of the existing steel surfaces and accessible rust formed along edges of connected plates or shapes of structural steel shall be removed. The tools used to remove these corrosion products shall be identified in the submittals and accepted by the Engineer. If the surface preparation or removal of rust results in nicks or gouges, the work will be suspended. The Contractor shall demonstrate that the necessary adjustments have been made to prevent a reoccurrence of the damage prior to resuming work.

2 – Commercial Blast Cleaning (SSPC-SP 6): Steel surfaces, including all new steel plates installed for structural repairs, shall be cleaned by the specified methods described in the SSPC Steel Structures Painting Manual, Volume 2 - Systems and Specifications, latest edition. The structural steel shall be abrasive blast cleaned according to SSPC-SP 6 “Commercial Blast Cleaning.” Before and after blast cleaning, all dissolvable foreign matter, such as oil, grease, and dust shall be removed by wiping or scrubbing the surface with rags or brushes wetted with solvent in accordance with the provisions SSPC-SP 1 “Solvent Cleaning.” Clean solvent and clean rags or brushes shall be used for the final wiping.

All foreign materials such as dirt, dust, rust scale, sand, bird droppings, and all materials loosened by abrasive blasting operations shall be completely removed by vacuuming before any painting operations are begun.

Following completion of the initial abrasive blast cleaning operations, the Contractor shall proceed with installation of new structural steel plates where required by the plans and as directed by the Engineer. The plates shall be delivered already coated with a zinc primer coat. After the plates have been welded in place and accepted, the new plates shall be coated with the same paint system used for the existing steel.

The cleaned surface shall be accepted by the Engineer before any painting. If the surface is determined to meet the requirements of SSPC-SP 6, painting operations can commence. The base coat shall be applied to the steel before the end of the day that preparation was performed and before the formation of any flash rusting or rerusting of the steel. Flash rusting or rerusting of the surface is unacceptable and requires additional blast cleaning prior to painting.

Failure of the Contractor to prepare and clean the surfaces to be painted according to these specifications shall be cause for rejection by the Engineer. All surfaces that are rejected shall be

re-cleaned to the satisfaction of the Engineer according to these specifications, at no additional cost to the State.

3 – Steel Grit Abrasive Mix: The recyclable steel grit abrasive mix shall be maintained and monitored such that the final surface profile is within the range specified elsewhere in these specifications.

Before each reuse, the recyclable steel grit abrasive shall be cleaned of millscale, rust, paint, and other contaminants by an abrasive reclaimer.

On a weekly basis during blast cleaning operations, the Contractor shall verify that the recycled steel grit abrasives meet the requirements of SSPC-AB 2. If the abrasive fails the testing, all abrasive blast cleaning operations shall be suspended. The abrasive reclaimer shall be repaired and another abrasive sample will be required for testing after grit recovery and reclassification. For test results within the acceptable limits, abrasive blast cleaning may resume. Test results outside of the acceptable limits will require additional equipment repairs or replacement at no cost to the State. If additional repairs were performed, another sample will be required for testing after grit recovery and reclassification. If the test results continue to remain outside of the acceptable limits, the Contractor shall replace the abrasive reclaimer at no cost to the State.

4 - Surface Profile: The specified height of the steel surface profile shall be according to the manufacturer's written instructions and shall be uniform. Verification of the profile height will be done with Testex Replica Tape. A surface profile correction factor will be measured according to SSPC-PA 2, Section 2.2.4 with the dry film thickness gauge.

Painting Operation:

1 - General: All coatings shall be supplied in sealed containers bearing the manufacturer's name, product designation, batch number and mixing/thinning instructions. Leaking containers shall not be used. Storage, opening, mixing, thinning and application of coating materials shall be accomplished in strict accordance with the written requirements and procedures published by the respective coating material manufacturer and supplier. In the event of a conflict, the Contractor shall notify the Engineer in writing, and unless directed otherwise in writing, the requirements of this specification shall prevail. The Contractor shall always have at the Project Site the current copies of all material safety data sheets (MSDS), technical data, recommendations and procedures published by the coating manufacturer for the coating materials.

2 - Paint Mixing and Thinning: Thinning shall be performed only to the extent allowed by the manufacturer's written instructions, and only with the manufacturer's approved thinner. In no case shall thinning be permitted that would cause the coating to exceed the local VOC restrictions. For multiple component paints, only complete kits shall be mixed and used. Partial mixing is not allowed.

The ingredients in the containers of paint shall be thoroughly mixed by mechanical power mixers in the original containers, or as directed by the manufacturer, before use or mixing with other containers of paint. The paint shall be mixed in a manner that will break up all lumps, completely disperse pigment and result in a uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. Excessive skinning or partial hardening due to improper or prolonged storage will be cause for rejection of the paint, even though it may have been previously inspected and accepted.

Multiple component coatings shall be discarded after the expiration of the pot life. Single component paint shall not remain in spray pots, painter's buckets or similar containers overnight. It shall be stored in a covered container and remixed before use.

The Engineer reserves the right to sample field paint (individual components and/or the mixed material) and have it analyzed. If the paint does not meet the product requirements due to excessive thinning or because of other field problems, the coating shall be removed from that section of the structure and replaced as directed by the Engineer.

3 – Methods of Application: All applicators of the specified coating material shall show proficiency on a test panel, or a portion of the structure as selected by the Engineer, to the satisfaction of the Engineer before commencing full-scale application.

The preferred method for coating application shall be by airless spray equipment. For striping and for application in areas where complex shapes or tight clearances will not allow spray application, the Contractor shall apply the coating material by appropriately designed and constructed rollers and brushes.

4 – Recoat Times: The recoat time of each coat of paint shall not deviate from the written recommendation of the manufacturer or the times specified in these specifications, complying with the most restrictive requirements unless directed otherwise by the Engineer in writing. If any individual time is exceeded, the affected areas shall be abrasive blast cleaned to SSPC-SP 6 and coatings reapplied in accordance with these specifications at no additional cost to the State.

5 – Film Continuity: All applied coatings shall exhibit no running, streaking, sagging, wrinkling, holidays, pinholes, top coat color or gloss variation, or other film defects. Failure of the Contractor to apply coatings that are free of film defects shall be cause for rejection by the Engineer. All coatings rejected shall be repaired to the satisfaction of the Engineer, at no additional cost to the State. Before doing any coating repair work, the Contractor shall submit to the Engineer for approval the procedures that will be used to repair the coating.

6 - Technical Advisor: It is mandatory that the Contractor obtain the services of a qualified technical advisor employed by the coating manufacturer. This advisor shall be familiar with the technical properties of the coating products and proper application methods. The technical advisor shall assist the Engineer and the Contractor in establishing correct application methods for the

complete coating system. He/she shall be present at the work Site before the opening of the material containers and shall remain at the Site until the Engineer is satisfied that the Contractor's personnel have mastered the proper handling, mixing and application of the material. The Engineer may call the technical advisor back to the Site if there are concerns that the Contractor is not handling, mixing or applying the material correctly.

**7 - Containment Plan:** For each individual Site, the Contractor shall submit a plan of containment to the Engineer for acceptance. The plan shall be submitted twenty days before commencing painting operation. The minimum containment enclosure for the intermediate and top coat shall conform to the requirements of SSPC Guide 6, Class 1A and the following. Components of the containment system must be made from flame retardant materials. Tarpaulin material shall be clean and impermeable to air and water. Joints shall be fully sealed except for entryways. Entryways shall use multiple flap overlapping door tarps to minimize dust escape through the entryway. All mists or dust shall be filtered with collection equipment. For truss bridges a ceiling shall also be included.

## **8 - Application:**

### **2-COAT SYSTEM:**

**A - Primer Coat Application:** All prepared surfaces shall be cleaned by vacuuming to remove dust, remaining debris, and other surface contaminants before coating. Such surfaces shall then be sprayed, brushed or rolled within the specified abrasive blast cleaning containment enclosure before the end of the day or before any visible rust-back occurs. If rust-back occurs, affected surfaces shall be recleaned to the satisfaction of the Engineer according to these specifications, at no additional cost to the state. All surfaces shall receive 1 coat of the primer coat. Temperature ranges (both steel and air) shall be the more restrictive of that specified in the Manufacturer's written application instructions or between 50° F. to 100° F., unless directed otherwise by the Engineer in writing. The dry film thickness shall be according to the Manufacturer's written instructions. The primer coat shall be of a contrasting color to the topcoat color. The dry film thickness will be checked for compliance per the guidelines of SSPC-PA 2.

All plate and shape edges, plate seams, back to back angle seams, pitted steel, and other sharp discontinuities shall be hand-stripped with a brush in the longitudinal direction with the primer coat. Bolted connections shall also have all bolt heads and nuts hand-stripped in a circular brush motion with the primer coat material. Stripe coats shall be applied before or after the full primer coat application. The primer coat material used for hand-stripping shall be tinted to distinguish it from material used for the full primer coat application.

**B - Top Coat Application:** After the primer coat has cured per the Manufacturer's written recommendations (not to exceed 10 days), all previously coated surfaces shall receive the top coat. The cured and dry primer coat shall be clean and free of all surface and embedded contamination and dry-spray. If it is not clean and free of all contamination, and dry-spray, the

surfaces shall be cleaned by using clean rags or brushes to water wipe, solvent wipe, or detergent wash and rinse. Power washing is not allowed. Temperature ranges (both steel and air) shall be the more restrictive of that specified in the Manufacturer’s written application instructions or between 50° F. to 100° F., unless directed otherwise by the Engineer in writing. The dry film thickness shall be according to the Manufacturer's written instructions.

**9 – Painting of New Steel:** All new steel shall be painted with the same coating system selected for use at the beam ends, unless permitted otherwise in writing. After the new steel has been fabricated, the steel shall be painted with the primer coat after preparation of the steel surfaces in accordance with the relevant requirements of this special provision including abrasive blast cleaning. All paint that is damaged by field welding operations or by any other operation shall be removed, the area cleaned to the satisfaction of the Engineer, and the affected areas repainted with the primer coat. The new steel shall then be painted with the rest of the paint system.

**Method of Measurement:** This item, being paid for on a lump sum basis for each bridge Site, will not be measured for payment.

**Basis of Payment:** This work will be paid for at the Contract lump sum price for “Abrasive Blast Cleaning and Field Painting of Beam Ends (Site No. X),” which price shall include all materials, equipment, abrasive blast cleaning and surface preparation, painting, coating of inaccessible areas, overspray containment enclosure, heating devices, tools, labor, and services of the technical advisor. No direct payment will be made for the cost of storage or hauling the paint and other materials to and from the bridge Site, but the cost thereof shall be included in the lump sum price as noted above.

The containment and collection of surface preparation debris shall be paid for under the item “Class 1 - Containment and Collection of Surface Preparation Debris (Site No. X).”

Disposal of spent abrasive contaminated by lead shall be paid for under the item, “Disposal of Lead Debris from Abrasive Blast Cleaning.”

Pay Item	Pay Unit
Abrasive Blast Cleaning and Field Painting of Beam Ends (Site No. X)	l.s.



**ITEM #0603563A - CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)**

**ITEM #0603564A - CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 2)**

**ITEM #0603633A - CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 6)**

**ITEM #0603715A - CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 4)**

**Description:** Work under this item shall consist of furnishing and erecting SSPC Guide 6 Class 1 containment enclosures with negative air pressure as required to contain and collect debris resulting from the removal of coatings in the preparation of steel surfaces for painting. Also included are the vacuum collection and the storage of debris in suitable containers.

The containment and collection of debris shall be done in strict conformance with current Federal Environmental Protection Agency (EPA) and Connecticut Department of Energy and Environmental Protection (DEEP) regulations.

**Materials:** Materials and equipment shall be of satisfactory quality to perform the work and shall not be used on the Project until and unless they have been reviewed and approved by the Engineer.

Rigid walls for the containment enclosure shall be comprised of plywood panels or corrugated panels of steel, aluminum or reinforced fiberglass. Flexible containment walls constructed of fire retardant tarpaulin material shall be impermeable to air and water.

Fifty Five (55) gallon barrels with resealable lids, or lined storage containers sized for the job shall be leakproof; shall conform to the Code of Federal Regulations Title 49, Chapter 1, Paragraph 173.510A (1), (5), and Paragraph 178.118; and shall not be used on the Project until and unless they have been reviewed and approved by the Engineer.

In meeting the requirements of these specifications, the Contractor shall supply portable battery-operated manometers with a pressure range of -1.00 to 10.00 in increments of 0.01 inches of water and a velocity range of 50 to 9990 feet per minute; and one or more portable lightmeters with a scale of 0.0-50.0 foot candles.

**Construction Methods:** The Contractor shall proceed with one of the following containment methods:

- A. Containment enclosure with a suspended platform, or

B. Containment enclosure without a suspended platform.

**A. Containment enclosures with a suspended platform:**

At least two (2) months prior to any abrasive blast cleaning activities, the Contractor shall submit to the Department ten (10) complete copies of detailed working drawings and calculations prepared and stamped by a Professional Engineer (Mechanical and Civil) licensed in Connecticut, which drawings shall detail as described below, the proposed methods for such activities. The Contractor shall not commence with containment enclosure erection and abrasive blast cleaning until and unless the working drawings have been reviewed and approved by the Engineer, and shall proceed with such work only within approved containment enclosures.

The working drawings shall include the following:

1. A construction plan and drawings detailing proposed coating removal operations, abrasive debris classification and separation, removal and transport of waste to a secure storage site.
2. A plan and drawings detailing the proposed containment enclosure, including details of the following:
  - A. Rigid, solid floor or platform.
  - B. Containment walls with rigid and flexible materials.
  - C. Rigid supports and bracing for the floor and wall panels, rigid or flexible supports and bracing for flexible walls.
  - D. Calculations including localized overstress conditions, member stresses, H.S. load rating and maximum dead and live load imposed on the bridge by the containment enclosure, grit blasting/recycling equipment and HVAC equipment.
  - E. Maximum allowable load for the floor/platform.
  - F. Wind load and wind stresses imposed on the bridge by the containment enclosure shall be calculated and submitted.
  - G. Airflow and air re-circulation within the enclosure including a minimum negative pressure of 0.03 inches of water column (W.C.) relative to external ambient air and calculations. Airflow shall meet the SSPC Guide 6 requirements of 100 feet/minute cross draft and 50 feet/minute downdraft and the OSHA Ventilation Standards. The maximum cross sectional area for airflow within the enclosure shall be 400 square feet.
  - H. Connections to the bridge, i.e., clamps, rollers. (Note: Welding and bolting is not allowed.) Each connection to the bridge shall be designed by the Contractor's professional engineer, including the locations of all necessary load cells to verify compliance with the containment drawings and allowable containment construction loads. A digital load indicator shall be connected to the bridge connection load cells and be located in an area accessible to the Engineer. The load cell shall be capable of storing peak load readings.
  - I. Auxiliary stationary source lighting.
  - J. Dust collection and filtration equipment, including the equipment data sheets and airflow capacity.
  - K. Air intake points including filters, louvers, baffles, etc.
  - L. Entrance/Exit compartment completely sealed with airlocks.
  - M. Location of equipment and impact on traffic.

- N. Elevation view of the containment enclosure with indications of any encroachments on the surroundings. The bridge vertical clearance shall be maintained throughout the project.

NOTE: The structure loading for containment design shall be in accordance with AASHTO using HS-20 loads. The allowable overstress for all conditions shall not exceed 20%.

**B. Containment enclosures without a suspended platform:**

At least two (2) months prior to any abrasive blast cleaning activities, the Contractor shall submit to the Department ten (10) complete copies of detailed working drawings and calculations prepared and stamped by a Professional Engineer (Mechanical and Civil) licensed in Connecticut, which drawings shall detail, as described below, the proposed methods for such activities. The Contractor shall not commence with containment enclosure erection and abrasive blast cleaning until and unless the working drawings have been reviewed and approved by the Engineer, and shall proceed with such work only within approved containment enclosures.

The working drawings shall include the following:

1. A construction plan and drawings detailing proposed coating removal operations, abrasive debris classification and separation, removal and transport of waste to a secure storage site.
2. A plan and drawings detailing the proposed containment enclosure, including details of the following:
  - A. Containment walls with rigid and flexible materials.
  - B. Rigid supports and bracing for the floor and wall panels, rigid or flexible supports and bracing for flexible walls.
  - C. Airflow and air re-circulation within the enclosure including a minimum negative pressure of 0.03 inches of water column (W.C.) relative to external ambient air and calculations. Airflow shall meet the SSPC Guide 6 requirements of 100 feet/minute cross draft and 50 feet/minute downdraft and the OSHA Ventilation Standards. The maximum cross sectional area for airflow within the enclosure shall be 400 square feet.
  - D. Connections to the bridge, i.e., clamps, rollers. (Note: Welding and bolting is not allowed.)
  - E. Auxiliary stationary source lighting.
  - F. Dust collection and filtration equipment, including the equipment data sheets and airflow capacity.
  - G. Air intake points including filters, louvers, baffles, etc.
  - H. Entrance/Exit compartment completely sealed with airlocks.
  - I. Location of equipment and impact on traffic.
  - J. Elevation view of the containment enclosure with indications of any encroachments on the surroundings. The bridge vertical clearance shall be maintained throughout the project.

In addition, if the bridge vertical clearance is greater than 30 feet, the wind load and wind stresses imposed on the bridge by the containment enclosure shall be calculated and submitted.

Reference information on enclosures can be obtained from the following sources:

- SSPC Guide 6
- Steel Structures Painting Manual, Volume 1
- NCHRP Report 265

The containment enclosure shall be sealed across the bridge deck underside between the girders with a rigid material. The floor shall be covered with a waterproof tarpaulin attached and sealed to the enclosure wall and floor around the entire enclosure perimeter. All edges of tarpaulins shall have a 2

foot flap that clamps over the connected edges around the entire perimeter. These flaps shall be completely fastened 12 inches on center for both edges and sealed completely with the tarpaulin manufacturer's recommended tape and caulk.

All equipment placement and work shall be in strict conformance with the Contract special provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic." The Contractor shall perform all work in accordance with the requirements of any permits for this Project.

During abrasive blast cleaning, if the containment enclosure is allowing debris to escape, the Contractor shall immediately stop such work until the enclosure is repaired. Any debris released from the enclosure shall be cleaned up by the Contractor immediately.

The containment enclosure shall be disassembled if the wind velocity is greater than 40 miles per hour, if it is forecast to be higher or when directed by the Engineer. However, if the wind velocity is below 40 MPH, but high enough to cause the containment enclosure to billow and emit dust, the Contractor shall immediately cease abrasive blast cleaning and, after cleaning up all the debris, disassemble the enclosure.

All debris resulting from surface preparation shall be contained and vacuum collected daily or more frequently as directed by the Engineer, due to debris buildup. Such debris, abrasive blast residue and paint chips removed by hand or power tool cleaning, shall be stored in leakproof storage containers in the secured storage site, or as directed by the Engineer. Debris storage shall be in accordance with Connecticut Hazardous Waste Management Regulations.

If 55 gallon barrels are used, staging is required: 55 gallon barrels shall be stored together in 2 rows of 5. The Contractor shall maintain a minimum lane clearance of 36 inches between each lot (10 barrels per lot).

The Contractor shall maintain a secure storage site, which shall be large enough to handle all coating debris that is collected and stored on the Project Site at any time. The Contractor shall store coating debris only in the secured storage site. During abrasive blast cleaning operations, all surface preparation debris shall be vacuum collected from the containment enclosure and removed to the abrasive recycling reclaimer unit, and the coating debris shall be conveyed to the secured storage site at the conclusion of the work shift. The Contractor shall account for all coating debris conveyed to the secured storage site and all coating debris transported from the Project to the hazardous waste treatment/disposal facility. The Contractor is responsible for the proper handling of the surface preparation debris and coating debris. All spillage shall be cleaned up immediately.

The secure storage site shall consist of an 8 foot high fenced-in area with a padlocked entrance. Storage containers shall not be used on the Project until and unless they have been reviewed and approved by the Engineer. Storage containers and sites shall be located so as not to cause any traffic hazard. Container storage sites shall be in areas that are properly drained and runoff water shall not

be allowed to pond. The containers shall be placed on pallets or other approved material and not directly on the ground.

Storage containers shall be closed and covered with a waterproof tarpaulin at all times except during placement, sampling, and disposal of the debris.

The Contractor shall furnish the inspector with two (2) new portable battery-operated manometers and light meters, per containment enclosure. Negative pressure verification with the portable manometers shall be done by the Engineer before and during abrasive blast cleaning and during vacuum collection of all surface preparation debris. The supplied instruments will become the property of the State upon Project completion.

Light at the steel surface within the enclosure shall be maintained by the Contractor at a minimum of 50 foot-candles as measured by a light meter. Such lighting shall be maintained throughout the surface preparation, painting, and inspection activities.

Equipment noise in excess of 90 decibels as measured at the closest residential, commercial or recreational areas, shall be lowered by the Contractor to a maximum of 90 decibels by the use of mufflers or other equipment approved by the Engineer prior to its use for this purpose.

Any air exhausted from the containment enclosure, abrasive-recycling equipment or vacuum equipment shall be passed through a filtering system. The Contractor is responsible for the design, effectiveness and maintenance of this filtering system. No discharge of debris dust shall be allowed.

The Contractor is liable for any fines, costs, or remediation costs incurred as a result of their failure to be in compliance with this special provision and all Federal, State, and local laws.

**Method of Measurement:** Work under this item will not be measured for payment, but will be paid for at the Contract lump sum price for each site. A site shall consist of an entire bridge structure, unless otherwise noted on the plans.

**Basis of Payment:** This work will be paid for at the Contract lump sum price for "Class 1 Containment and Collection of Surface Preparation Debris (Site No. X)," at the site designated. The price shall include all materials, equipment, tools, labor and work incidental thereto.

Pay Item	Pay Unit
Class 1 Containment and Collection of Surface Preparation Debris (Site No. X)	l.s.

## **ITEM #0980001A – CONSTRUCTION STAKING**

Work under this item shall conform to the requirements of Section 5.04 amended as follows:

**9.80.01 – Description:** Add the following after the last paragraph:

Work under this item also consists of the Contractor, or the Contractor’s representative, completing an as-built survey of the milled roadway base for all roads within this Contract that will be rehabilitated. The intent of this item is for the Contractor to certify that the milled roadway base has the correct cross-slope according to the plans and these special provisions.

**9.80.03 – Construction Methods:** Add the following after the last paragraph:

**Roadway As-Built Survey:** The as-built survey of the milled roadway base shall follow the requirements and descriptions of the specified services located in the Digital Mapping Symbols Specifications for Survey and Photogrammetry Existing Features dated September 2003 and Location Survey Manual dated June 1997, unless otherwise specified herein.

The Roadway As-Built Survey shall consist of spot elevations that conform to a “Class T-1” horizontal and vertical standard, shall have a vertical accuracy of +/- 0.02 feet (0.25 inches), and shall reference the control points defined in the construction plans. The Land Surveyor shall record the elevation of the same location on the milled surface where required.

The Contractor shall establish new control points as necessary to complete the work. Any new control points shall be horizontally and vertically referenced to the Connecticut NAD83 and NAVD88 datum.

The survey shall record horizontal and vertical data for the milled roadway base along the proposed roadway baselines, proposed lane lines, and the proposed edges of pavement at the following intervals:

1. Along tangent roadway sections: at 100-foot intervals that correspond to the roadway stationing.
2. Along curved roadway sections: at 50-foot intervals, starting at the super-elevation transition station, that correspond to the roadway stationing.

Survey will be required to record the horizontal and vertical data of the milled surface prior to installing the wedge course. The survey is to document the roadway cross slopes to ensure that the proposed cross-slopes and finished surface grades can be achieved before the placement of the surface and intermediate course pavement. If the intermediate course cannot be installed as specified due to the grades of the milled surface, the Contractor is to develop a corrective action plan to shim the milled surface prior to placing the intermediate course pavement. This shim course is the wedge course included in the project, quantified and paid under Item No. 0406173 – HMA S0.25.

Upon completion, the Roadway As-Built Survey shall be reviewed and have its accuracy certified by a Connecticut-licensed Land Surveyor. The Land Surveyor shall provide a certification as to the accuracy of the data being submitted. The documents shall be stamped and signed. Upon receiving this certification, the Roadway As-Built Survey shall be submitted by the Contractor to the State for review and approval.

The Contractor shall present the as-built survey information to the State in a clear and concise manner that includes the proposed and as-built information listed below. The data shall be provided in Microsoft Excel or a compatible file format. Prior to the beginning of construction work, the Contractor shall submit to the State for approval a spreadsheet indicating the data and format that will be submitted following the completion of the as-built survey. At a minimum, the as-built survey data presented to the State shall include the following:

- Proposed and as-built milled base elevations at the baseline;
- Proposed and as-built milled base elevations at the edges of pavement;
- Proposed and as-built milled base elevations at the shoulder lines;
- Proposed and as-built milled base elevations at the lane lines;
- Stationing and offsets for all points;
- Comparison between the proposed and as-built milled base elevations indicating whether each point meets the tolerances included in the project specifications.

The data is to be formatted as noted in the sample included at the end of this section to allow for data scoring.

Only after the Contractor has received the approval of the Roadway As-Built Survey from the State may the Contractor proceed to pave the surveyed length of roadway.

The Contractor’s attention is directed to the 15-day limitation for milled roadways noted in the plans. The Contractor will be expected to complete all aspects of the as-built survey – including any additional wedge course placement, survey, or submissions necessary to correct unsatisfactory work, as determined by the State – within this 15-day limit. No additional time will be allowed for multiple surveys or submissions.

**9.80.05 – Basis of Payment:** The first paragraph shall be amended as follows:

Construction staking shall be paid for at the Contract lump sum price for “Construction Staking,” which price shall include all survey work, establishment of geodetic control points, data processing, drafting, certification, and all work associated with obtaining approval of the as-built survey from the State, as well as all maintenance, materials, tools, equipment, labor, and work incidental thereto, including the removal of materials. The contractor shall submit to the Department a schedule of payment values for review and comment prior to payment.

<u>Pay Item</u>	<u>Pay Unit</u>
0980001A Construction Staking	L.S.





**ITEM #1002232A – TRAFFIC CONTROL FOUNDATION - SPAN POLE – TYPE C**

**Description:** This item consists of furnishing and installing a foundation of the type specified in accordance with the plans, as directed by the Engineer and in conformance with this specification.

**Materials:** Concrete for the formed top of foundation shall conform to the requirements for Class “F” Concrete in Section 6.01 of the Standard Specifications and shall attain a 28-day compressive strength of 4,000 psi (27.6 MPa).

Concrete for the drilled shaft below the construction joint shall also conform to the requirements for Class “F” Concrete, except for the following:

- Entrained air will not be allowed
- Accelerators will not be allowed
- Slump shall be at least 6” to 8” (150mm to 200mm) for placement in dry shafts and 8” (200mm) when wet or casing methods are used. Slump shall not exceed 8” (200mm).
- A trial mix study for drilled shaft concrete should include the construction of a graph of slump loss versus time after batching. A proper mix design will maintain a slump of at least 4” (100mm) for at least 4 hours (the 4-inch (100mm) slump value is the minimum at which adequate fluid pressures can be assumed to develop against the sides of the drilled shaft hole). Testing shall be performed at the approximate temperature at which the concrete will exist in the field. An increase in temperature of 18 degrees F. (10 degrees C.) will increase the rate of slump loss by a factor of approximately 2.

Type III cement is prohibited.

Reinforcing steel shall conform to the requirements of Section 6.02 and Article M.06.01.

Anchor rods shall conform to ASTM F1554, Grade 105 (Grade 725). The leveling nuts shall conform to ASTM A563, Heavy Hex Grade DH (A563M, Heavy Hex Class 12). The internal threads of nuts shall be re-tapped after galvanizing to accommodate the increased diameter of the rods. The washers shall conform to ASTM F436 (F436M), Type 1. The rods, nuts and washers shall be galvanized in accordance with ASTM A153 (A153M), Class C. Hooked anchor rods are not permitted. Welding to anchor rods is not permitted.

Anchor plates shall conform to the requirements of AASHTO M270, Grade 50 (Grade 345), galvanized. The Contractor shall not drill holes or perform other operations on plates that are harmful to the galvanizing.

Rigid metal conduit, ground rod sleeves and related hardware and end caps shall be galvanized steel conduit and shall conform to Section M.15.09.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

Ground rods shall be 5/8-inch (16mm) in diameter by 12-feet (3660mm) long copper clad steel. The copper cladding shall be a minimum thickness of 0.128 inches (4mm). The ground rod clamp shall be a square-head bolt type listed for direct soil burial.

Zinc-rich field primer for touch up of galvanized hardware shall conform to the requirements of ASTM A780. The use of aerosol spray cans will not be permitted.

Granular Fill for backfill around formed foundation shall conform to Article M.02.01.

Bituminous concrete shall be as directed by the Engineer.

Topsoil shall conform to Article M.13.01.

Fertilizer shall conform to Article M.13.03.

Seed Mixture shall conform to Article M.13.04.

Mulch Materials shall conform to Article M.13.05.

Any admixtures proposed for use in a bentonite slurry, if used to construct a drilled shaft, shall be approved by the Engineer. Bentonite slurry properties may be adjusted to suit field conditions with the approval of the Engineer. Polymer or other slurry materials may be submitted to the Engineer for review.

### **Construction Methods:**

#### **Submittals:**

The Contractor is required to submit the following:

1. Working Drawings

- The Contractor shall obtain survey elevations of the ground surface at the foundation. He shall submit to the Engineer for approval an elevation view of the foundation showing:
  - The proposed foundation with elevations at the top and bottom of the proposed foundation
  - The proposed elevation at the mandatory construction joint
  - The existing ground elevations at the high and low side of the proposed foundation

- The Contractor shall furnish the approved foundation elevations to the reinforcing bar detailer. These elevations shall be included with the foundation reinforcing shop drawings when submitted to the Designer for review.
- The Contractor shall submit a foundation constructability plan which includes the following:
    - Access to the area including the following, when applicable:
      - Temporary road
      - Removal of guide rails or concrete barriers
      - Utility locations and drainage installations that could obstruct construction
      - Clearing and grubbing (this shall be accomplished in accordance with Section 2.01)
    - Traffic Protection including the following applicable considerations:
      - Temporary guide rails and/or concrete barriers
      - Maintenance and Protection of Traffic Control Plans for work that cannot be accomplished using the Typical Traffic Control Plans (All work to install the camera pole foundation shall be accomplished in accordance with Article 1.08.04 – Prosecution & Progress and item 0971001A- Maintenance & Protection of Traffic unless otherwise approved in writing by the Engineer)
    - Drilling procedure including all calculations and specifications associated with the Contractor’s proposed drilling procedure and tools and machinery used.
    - Fabrication drawings
      - The use of hooked anchor rods is not permitted
      - Welding of anchor rods is not permitted

## 2. Shop Drawings

- The Contractor shall submit shop drawings for the reinforcement including the following:
  - A note indicating that no welding of reinforcement will be allowed.
  - Supplemental cages or ties that will be used to lift the reinforcing cage and prevent distortion. Reinforcing cages shall be tied adequately for handling, but may need internal ties or cages, which shall be detailed for approval. The support bars or cage, if intended to remain in the finished foundation, shall be arranged so as not to interfere with concrete placement. Supplemental cages, if composed of weldable bars, may be welded, but may only be secured to the designed cage by ties.
- The Contractor shall submit shop drawings for the anchor rods and plates including the following:
  - Material designations
  - Length and diameter of anchor rods
  - Number of anchor rods

- Thickness and dimensions of anchor plate
- Anchor rod hole diameters and locations, including bolt circle diameter and edge distance
- Angular orientation of the anchor rods around the bolt circle
- Galvanizing requirements

### **Constructing the Drilled Shaft Portion of the Foundation**

The Contractor is responsible for properly locating the foundation. He shall notify the Engineer two weeks before beginning to drill the foundation. Should ledge, high ground water, or unsuitable materials be encountered, the Contractor shall notify the Engineer immediately so the Engineer may determine if relocation or alteration of the foundation is necessary. Bedrock is not anticipated to be encountered within the depths of the drilled shafts.

The top of rock will be considered as the point where rock, defined as bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal as determined by the Engineer, is encountered which cannot be drilled with earth augers and/or underreaming tools configured to be effective in the soils indicated in the contract documents, and requires the use of special rock augers, core barrels, air tools, blasting, or other methods of hand excavation. Minimum required lengths of rock socket shall be determined from the table provided in the contract plans (refer to Camera Pole Foundation Details) based on the depth to the top of rock from the foundation grade level.

Boulders are anticipated to be encountered within the depths of the drilled shafts at the following structures:

- CCTV 84E-152

It is the Contractor's responsibility to utilize proper equipment and methodology to drill through the boulders. It should be noted that boulders may also be encountered at other structure locations.

Prior to drilled shaft construction, the grade in the vicinity of the shafts shall be constructed to the finished grade.

This work may require rock excavation, drilling rock or using slurry filled shafts through whatever materials are encountered to reach the depths indicated on the plans and specifications. The Contractor shall submit a sequence plan outlining drilling, casing, slurry, reinforcement and concrete placement procedures for the Engineer to review.

Temporary casing of the drilled shafts may be necessary to prevent sloughing of the granular soils. While the casing is being withdrawn, a sufficient head of concrete shall be maintained above the bottom of the casing, to prevent "necking" of the shaft due to sloughing soils. Concrete placed near the surface shall be in full contact with the undisturbed soil to provide lateral stability for the full length of the shaft.

Provisions shall be made to minimize surface water infiltration into the shaft excavations.

Construction of drilled shaft shall be in accordance with AASHTO Standard Specifications for Highway Bridges 2002 Division II, Section 5 and with U.S.D.O.T. Publication FHWA-IF-99-025, "Drilled Shafts: Construction Procedures and Design Methods."

The maximum allowable horizontal variation of the center of the top of the drilled shaft from the required location shall be 0.5% of the shaft diameter. The ground surface at each shaft location shall be re-compacted if disturbed during construction in order to minimize lateral deflection of the shafts.

The concrete shaft shall not be out of plumb by more than 1% of the total length.

Should the depth of drilled shaft extend below the depth shown on the plans, a minimum of one half of the longitudinal bars required in the upper portion of the shaft shall be extended the additional length by adding longitudinal reinforcing bars at the bottom of the cage. Tie or spiral bars shall be continued for the extra depth and the stiffener bars shall be extended to the final depth. All longitudinal and transverse bars shall be lap spliced or spliced with mechanical splices. Welding to the reinforcing steel will not be permitted.

Approved cylindrical concrete feet (bottom supports) shall be provided to insure that the bottom of the reinforcing cage is maintained the proper distance above the base.

The drilled shaft concrete shall be placed as soon as possible after the placement of reinforcing steel. Concrete shall be placed to the level of the construction joint shown on the plans. Longitudinal reinforcing shall extend above the construction joint to within 3" (75mm) of the top of foundation.

Casings, if used in drilling operations, shall be removed from the hole. The casing may be removed as concrete is placed provided a 5 foot (1525mm) head of concrete is maintained, or the casing may be removed after the concrete has been poured, provided that the concrete has not been set. Separation of the concrete by hammering or otherwise vibrating the casing during withdrawal operations shall be avoided.

Concrete may be placed by free fall in dry holes if dropped vertically and concrete does not hit the reinforcing, supporting cage or the side walls of the shaft before it reaches the base. Smaller maximum-sized aggregate in the concrete mix will increase cohesion of the mix and discourage segregation. Concrete placement down the center of the shaft shall be directed by use of a hopper and drop chute.

Concrete may be placed in wet installations by tremie or concrete pump. Groundwater may be encountered during drilled shaft construction. So, concrete shall be placed using a concrete pump or tremie pipe in accordance with the specifications. Place concrete in the slurry filled shaft by the tremie method in such a manner that the concrete displaces the slurry from bottom and rises like

a liquid, and mixing of concrete with the slurry will not occur. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie pipe sufficiently large enough to permit free flow of concrete. The tremie pipe shall be located so that it can be removed without disturbing the position of the reinforcing. Initially, there shall be a suitable plug at the bottom of the tremie pipe that will not discharge concrete until the concrete head has at least reached the top level of the slurry.

The intent is that bentonite slurry not be permitted to contaminate the concrete as the concrete is initially introduced to the tremie pipe. Thereafter, a positive concrete head shall be maintained throughout. The bottom of the tremie pipe shall be inside the concrete for at least a depth of 60 inches (1524mm), and this depth shall be maintained throughout. The concrete level shall be horizontal during the pouring operations. No horizontal movement of the tremie pipe will be permitted. The concreting of the shaft shall proceed continuously to 12 inches (305mm) above the final top of shaft elevation to produce a monolithic shaft foundation, with uncontaminated concrete for the design shaft length.

Concrete placement shall be continuous from the bottom of drilled shaft to the construction joint at the top. The elapsed time from the beginning of concrete placement in the shaft to the completion of the placement shall not exceed 2 hours. Admixtures such as water reducers, plasticizers, when approved for use, shall be adjusted for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the 2-hour placement limit. Prior to concrete placement, the Contractor shall provide test results of both a trial mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete will maintain a minimum slump of 4" (100mm) for 4 hours. Tests shall be conducted at temperatures comparable to those at which the concrete will be placed.

Cross-Hole Sonic Logging (CSL) tests are not required for the CCTV structures because the axial loads are light. Instead, careful records of concrete quantities placed shall be kept and compared with the theoretical quantities.

### **Constructing the Top of the Foundation**

The top portion of the concrete foundation shall be formed and reinforced as shown on the plans. The top surface shall be level within  $\pm 1/8"$  ( $\pm 3\text{mm}$ ). The shape may be round or square as shown to facilitate forming. If a square shape is chosen, additional reinforcing is required to reinforce the corners and flat sides.

The number of conduits in the foundation shall be as shown on the plans. Electrical conduits of the size specified on the plans shall extend 2 feet (610mm) out from the side of the formed portion of the foundation. All conduit ends terminating below grade shall be capped with a malleable iron cap. All above grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert. Conduit caps shall be installed before the concrete is placed and shall remain in place until the cable is installed.

Rigid metal conduit, drain pipe, anchor rods and the anchor plate shall be placed and secured in proper position in the formed portion of the top of foundation. A template shall be used to hold the required anchor rod assembly, ground rod sleeve and conduits in their correct positions. The orientation of the anchor rods on the bolt circle are important to the positioning of the handhole on the pole. The anchor rod locations shall be in accordance with approved shop drawings. Each anchor rod shall be fitted with two leveling nuts and double nuts above the base plate. Conduits shall extend up from the top of foundation to the height shown on the plans.

Concrete shall be placed in the forms in accordance with the applicable provisions of Subarticle 6.01.03-6.

Curing of the concrete shall be performed in accordance with Subarticle 6.01.03-9.

Forms shall not be removed until after the concrete has hardened properly and not less than 24 hours after the concrete has been placed.

The portions of the foundations that will remain exposed to view shall be finished to the satisfaction of the Engineer and in conformance with the pertinent requirements of Subarticle 6.01.03-10.

The Contractor may install the camera pole after a minimum of 7 days of proper curing of the concrete if he can show that the concrete has reached 3000 psi (21MPa) as confirmed by test cylinders. Concrete cylinders shall be cast, cured and tested in accordance with Subarticle 6.01.03-4. A sufficient number of cylinders shall be cast to enable further testing at a later date if the compressive strength is determined to be below the minimum strength specified.

Where a foundation is placed within or adjacent to a concrete sidewalk, the entire section of sidewalk between joints shall be replaced in accordance with Section 9.21, unless otherwise directed by the Engineer.

The disturbed ground along the access path to the shaft locations shall be restored and protected from erosion within 5 calendar days of the completion of the foundation construction.

**Method of Measurement:** This work will be measured for payment by the number of foundations completely installed and accepted.

**Basis of Payment:** The work will be paid for at the contract unit price each for “Traffic Control Foundation - Span Pole – Type C” complete in place, which price shall include layout, cutting and removing existing pavement, excavation, drilling, temporary casing, slurry, granular fill, backfill, concrete, reinforcing, anchor rods and plates, nuts and washers, rigid metal conduit sweeps, pvc weepholes, ground rod, ground wire, clamps, bonding bushings and grounding bolts. It shall include construction access path, topsoil, grading, seeding, fertilizing, mulching, riprap, restoration of bituminous concrete sidewalk and pavement surfaces treatments to be restored, as directed by the Engineer, and all materials, equipment, labor, tools and work incidental thereto.



No additional payment will be made for the Contractor to test the slurry when it is used to construct a drilled shaft foundation.

All concrete sidewalk replaced due to foundation installation shall be paid for at the Contract unit price for “Concrete Sidewalk.”

When rock is encountered within the limits of excavation, its removal will be paid for at the Contract unit price per vertical foot (vertical meter) for “Rock-in-Foundation Excavation,” which price includes any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock-in-foundation excavation is defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures or Portland cement concrete pavement with a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

The protection and restoration (if necessary) of existing underground wiring, conduits, drainage structures, pipes and underdrain systems within the excavation limits will not be paid for separately, but will be included as part of the work.

The removal of existing roadside barrier systems, installation and removal of temporary roadside barrier systems and resetting existing roadside barrier systems will not be paid for separately, but will be included as part of the work.

The restoration of existing surface treatments (pavement, access roads, slope protection, topsoil & seed, etc.) in all areas disturbed by the work will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surface treatments to be restored.

No direct payment will be made for the work of testing the concrete from the drilled shaft or formed top of foundation in accordance with Subarticle 6.01.05. Concrete cylinder curing boxes will be included under Item #0969062A – Construction Field Office, Medium.

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Control Foundation - span pole – Type C	EA