



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0016

JOHN ELIAS BALDACCI
GOVERNOR

DAVID A. COLE
COMMISSIONER

July 2, 2009
Subject: **York**
Federal Project No's: BH-1511(000)X,
BH-1511(100)X, BH-1511(200)X
State Pin No's: 015110.00, 015111.00,
015112.00
Amendment No. 2

Dear Sir/Ms:

Make the following changes to the Bid Documents:

In the Bid Book (pages 4 through 13) **REMOVE** the "SCHEDULE OF ITEMS", 10 pages dated 060608 and **REPLACE** with the attached new "SCHEDULE OF ITEMS", 10 pages dated 060702.

In the Bid Book, after page 99, **INSERT** the attached "SPECIAL PROVISION, SECTION 534, PRECAST STRUCTURAL CONCRETE, (Precast Structural Concrete Arches, Box Culverts), 4 pages dated November 28, 2007.

The following questions have been received:

Question: Bid Schedule Item # 503.14 – 257900 and QTY Schedule SHT 2 of 53 Item # 503.14 – 40890 – What is included?

Response: The reinforcing steel quantity includes the reinforcing for the approach slabs, abutments, and pier caps. All other reinforcing steel is incidental to related contract items. The correct quantity for items 503.14 and 503.15 is 40,890 lbs. Please see the revised schedule of items.

Question: Can pipe piles use hoops vs spirals shown?

Response: Hoops may be used in the pipe piles instead of the spirals.

Question: Plan Sheet 40 of 53, Precast Deck Panel Detail shows 2 – S801 or S800 bars in the top of the curb but not shown in the deck reinforcement on Sheet 49 of 53. If required, which ones S801 or S800, and does this apply only to the panel option? Sidewalk/Curb?



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Response: The referenced detail on sheet #40 incorrectly shows additional bars included in the curb placement. No S800 or S801 bars are required in the curbs or sidewalk.

Question: Is the next 7" deck reinforced as shown on Sheet 45?

Response: Yes, the deck reinforcing is the same for both options.

Question: We cannot find Special Provision 534, Precast Concrete Box Culvert.

Response: Please see attached Special Provision 534.

Question: Bid Item 501.231, Dynamic Load Test, has a quantity of 10 each. It is our understanding that the dynamic tests on Station 44 Bridges are incidental; therefore, the bid quantity should be reduced to 8 each. Please confirm and revise the bid quantity.

Response: 8 dynamic load tests are required by the Plans, 2 additional tests have been included in the estimated quantity as a contingency.

Question: Bid Items 503.14 and 503.15, Epoxy Reinforcing Steel has a bid quantity of 257,900 lbs. It is our understanding that these pay items are for the abutments, piers and approach slabs on the New Bridge. All other reinforcing, including the reinforcing steel for Station 44 Bridge is incidental. We estimate the bid quantity for item 503.14 and 503.15 should be 155,000 lbs. Please confirm and revise the bid quantity.

Response: The correct quantity for 503.14 and 503.15 is 40,890 lbs, please see the revised schedule of items.

Question: Special Provision, Section 209, Construction Requirements, sheet 3 of 6 advises the Contractors that there may be construction equipment height restrictions as indicated on the drawings or in the notes. We could not find any additional information in regards to these restrictions. Please confirm there are not any height restrictions.

Response: There are no height restrictions

Question: The preload fill limits and elevations for the Station 34 Bridge replacements are not shown on the plans. Please provide this information.

Response: Preload fill limits should extend from Station 32+00 to 33+00, with toes of the preload fills coinciding with the toes of the embankment slopes shown on the cross sections. The minimum elevation of the preload should coincide with the grade

elevations shown on the plans. The preload may be overbuilt by a maximum of 12 inches to account for the expected primary consolidation of the underlying soils.

Question: What are the pay limits the State used to determine the Granular Borrow quantity on the Station 34 Bridge replacement?

Response: Granular Borrow Pay limits are based on volume of material below Aggregate Sub base that will be used to fill the area where the existing bridge is, minus the new concrete box volume.

Question: Item 503.14 Epoxy Coated Reinforcing Steel Fabricated and Delivered and Item 503.15 Epoxy Coated Reinforcing Steel Placed show a bid quantity of 257,900 lbs. Plan sheet 2 of 53 - -Estimated Quantities. Items 503.14 and 503.15 show an estimated quantity of 40,890 lbs each. Which quantity is correct?

Response: The correct quantity for 503.14 and 503.15 is 40,890 lbs, please see the revised schedule of items.

Question: Paragraph C is as follows “C. Drill a 4.5 inch diameter borehole using schedule HW, flush joint casing. Casing shall be advanced by driving with a 300-lb hammer falling a distance of 16 inches, sampling as designated bt the Resident, to 2 feet below the desired bottom transducer elevation. Sampling shall be with 1-3/8 inch split spoon sampler, driven with a 140 lb hammer falling a distance of 30 inches. Transducer elevations shall be as follows:

P-1: one at Elevation -30 feet and one at Elevation -650 feet.

P-2: one at Elevation -35 feet and one at Elevation -55 feet.”

Is the elevation 650” correct?

Response: No, elevation -65 is correct.

Question: Plan Sheet 2 of 53 – General Notes. Where is the Special Provision relating to road closure periods referred to in note 2 located

Response: STATION 107+652

Question: Neither the existing or final location of the water main is shown except on one x-section on the Station 34 Bridge. Is this information available?

Response: The waterline for Station 44 bridge shall be designed to be in the same location as it is located currently unless approved by the York Water District.

The waterline for NEW Bridge will be relocated by the York Water District by directional boring to the Easterly direction. This is anticipated to be prior to the removal of the existing NEW bridge.

The York Water district are currently working on contracting with a Contractor to do this work and can be contacted for more information.

Question: Plan Sheets 31 and 32 of 53. The top of the cathodic protection is shown at elevation -7.6. In light of the variability of penetration and the extreme cost to weld the studs under water, would it be acceptable to attach the cathodic protection with stainless steel straps around the piles?

Response: It would be acceptable

Question: Plan Sheet 34 of 53, what is required for repair of the epoxy coating subsequent to the splicing of the pipe piles?

Response: Repair splice in accordance with the fabricators recommendation and coating material to be supplied by the fabricator.

Question: Plan Sheet 2 and 4 of 9, construction note 8 requires the rip rap shelf be constructed at elevation 7.5, while plan sheet 4 shows no shelf. What is required?

Response: A shelf will be required to be built to elevation 7.5

Question: Plan Sheet 5 of 9. The Transverse Bridge Section shows the water main and a future sewer line supported by the fascia. Will this location be maintained with a concrete slab on a steel bridge? Who designs the connection details and pays for any required strengthening of the deck and/or curb?

Response: Currently the York Water District expects the line to be located and maintained in a similar location. The connection details will be designed by the Contractor with approval of the York Water district depending on what type of bridge is designed.

Question: The Transverse Bridge Section shows a concrete leveling slab. Would it be acceptable to crown the voided slabs by crowning the abutment and eliminate the concrete leveling slab?

Response: Yes

Consider these changes and information prior to submitting your bid on July 8, 2009.

Sincerely,


Scott Bickford
Contracts & Specifications Engineer

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 015110.00

PROJECT(S): BH-1511(000)X
 BH-1511(100)X
 BH-1511(200)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 COMMON ITEMS

0010	202.19 REMOVING EXISTING BRIDGE	LUMP		LUMP			
0020	202.202 REMOVING PAVEMENT SURFACE	SY	730.000				
0030	203.20 COMMON EXCAVATION	CY	1255.000				
0040	203.24 COMMON BORROW	CY	200.000				
0050	203.25 GRANULAR BORROW	CY	1615.000				
0060	206.082 STRUCTURAL EARTH EXCAVATION - MAJOR STRUCTURES	CY	1055.000				
0070	209.29 VERTICAL DRAINAGE WICKS	LF	21000.000				
0080	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	CY	1275.000				
0090	403.210 HOT MIX ASPHALT 9.5 MM HMA	T	916.000				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0100	403.213 HOT MIX ASPHALT 12.5 MM BASE	230.000 T				
0110	409.15 BITUMINOUS TACK COAT - APPLIED	230.000 G				
0120	501.231 DYNAMIC LOADING TEST	10.000 EA				
0130	501.301 STEEL SHEET PILING	LUMP	LUMP			
0140	501.49 STEEL H-BEAM PILES 84 LBS/FT, DELIVERED	530.000 LF				
0150	501.491 STEEL H-BEAM PILES 84 LBS/FT, IN PLACE	530.000 LF				
0160	501.70 STEEL PIPE PILES, DELIVERED	2410.000 LF				
0170	501.701 STEEL PIPE PILES, IN PLACE	2410.000 LF				
0180	501.72 STEEL CASINGS, DELIVERED	120.000 LF				
0190	501.721 STEEL CASINGS, IN PLACE	120.000 LF				
0200	501.90 PILE TIPS	34.000 EA				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0210	501.91 PILE SPLICES	56.000 EA				
0220	501.92 PILE DRIVING EQUIPMENT MOBILIZATION	LUMP	LUMP			
0230	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS	LUMP	LUMP			
0240	502.239 STRUCTURAL CONCRETE PIERS	LUMP	LUMP			
0250	502.261 STRUCTURAL CONCRETE ROADWAY & SIDEWALK SLAB ON CONCRETE BRIDGE	LUMP	LUMP			
0260	502.31 STRUCTURAL CONCRETE APPROACH SLABS	LUMP	LUMP			
0270	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALK	LUMP	LUMP			
0280	503.14 EPOXY COATED REINFORCING STEEL, FABRICATED AND DELIVERED	40890.000 LB				
0290	503.15 EPOXY COATED REINFORCING STEEL PLACING	40890.000 LB				
0300	506.9101 GALVANIZING (AND TOP COATING)	LUMP	LUMP			

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0310	507.0821 STEEL BRIDGE RAILING, 3 BAR	LUMP	LUMP			
0320	507.0831 STEEL BRIDGE RAILING, 4 BAR	LUMP	LUMP			
0330	508.14 HIGH PERFORMANCE WATERPROOFING MEMBRANE	LUMP	LUMP			
0340	512.081 FRENCH DRAINS	LUMP	LUMP			
0350	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES	LUMP	LUMP			
0360	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP	LUMP			
0370	526.34 PERMANENT CONCRETE TRANSITION BARRIER	EA	4.000			
0380	527.303 ENERGY ABSORBING SYSTEM (ET-PLUS)	EA	1.000			
0390	531.50 BRIDGE STRUCTURE - DESIGN BUILD	LUMP	LUMP			
0400	534.71 PRECAST CONCRETE BOX CULVERT	LUMP	LUMP			

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0410	603.175 18 INCH REINFORCED CONCRETE PIPE CLASS III	92.000 LF				
0420	604.262 CATCH BASIN TYPE B5-C	6.000 EA				
0430	606.1721 BRIDGE TRANSITION - TYPE 1	8.000 EA				
0440	606.22 GUARDRAIL TYPE 3B - OVER 15 FOOT RADIUS	63.000 LF				
0450	606.23 GUARDRAIL TYPE 3C - SINGLE RAIL	175.000 LF				
0460	606.258 CABLE RELEASING TERMINAL ANCHORAGE ASSEMBLY	4.000 EA				
0470	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	6.000 EA				
0480	606.358 GUARDRAIL, MODIFY, TYPE 3B TO 3C	475.000 LF				
0490	606.36 GUARDRAIL REMOVED AND RESET	475.000 LF				
0500	606.47 SINGLE WOOD POST	1.000 EA				

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			DOLLARS	CTS	DOLLARS	CTS
0510	606.55 GUARDRAIL TYPE 3 - SINGLE RAIL	763.000 LF				
0520	607.29 STONE WALL	270.000 LF				
0530	609.11 VERTICAL CURB TYPE 1	356.000 LF				
0540	609.237 TERMINAL CURB TYPE 1 - 7 FOOT	2.000 EA				
0550	609.31 CURB TYPE 3	460.000 LF				
0560	610.08 PLAIN RIPRAP	2155.000 CY				
0570	613.319 EROSION CONTROL BLANKET	146.000 SY				
0580	615.07 LOAM	34.000 CY				
0590	618.1401 SEEDING METHOD NUMBER 2 - PLAN QUANTITY	5.000 UN				
0600	618.1411 SEEDING METHOD NUMBER 3 - PLAN QUANTITY	2.000 UN				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0610	618.15 TEMPORARY SEEDING	6.000 LB				
0620	619.1201 MULCH - PLAN QUANTITY	7.000 UN				
0630	619.1401 EROSION CONTROL MIX	20.000 CY				
0640	620.54 STABILIZATION GEOTEXTILE	317.000 SY				
0650	620.58 NONWOVEN GEOTEXTILE	891.000 SY				
0660	627.711 WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE (PLAN QUANTITY)	5670.000 LF				
0670	629.05 HAND LABOR, STRAIGHT TIME	20.000 HR				
0680	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	20.000 HR				
0690	631.171 TRUCK - SMALL (INCLUDING OPERATOR)	20.000 HR				
0700	638.02 NAVIGATION LIGHTS	LUMP	LUMP			

SCHEDULE OF ITEMS

REVISED:

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PROJECT(S): BH-1511(000)X
 BH-1511(100)X
 BH-1511(200)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0710	638.0212 NAVIGATION SIGNS	LUMP	LUMP			
0720	639.18 FIELD OFFICE TYPE A	1.000 EA				
0730	639.26 INSTRUMENTATION - GEOTECHNICAL	LUMP	LUMP			
0740	639.261 INSTRUMENTATION GEOTECHNICAL - TRADITIONAL SETTLEMENT PLATFORM	LUMP	LUMP			
0750	645.106 DEMOUNT REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	6.000 EA				
0760	645.116 REINSTALL REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	6.000 EA				
0770	652.31 TYPE I BARRICADE	4.000 EA				
0780	652.312 TYPE III BARRICADE	6.000 EA				
0790	652.33 DRUM	50.000 EA				
0800	652.34 CONE	50.000 EA				

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 015110.00

PROJECT(S): BH-1511(000)X
 BH-1511(100)X
 BH-1511(200)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0810	652.35 CONSTRUCTION SIGNS	624.000 SF				
0820	652.361 MAINTENANCE OF TRAFFIC CONTROL DEVICES	LUMP	LUMP			
0830	652.38 FLAGGER	580.000 HR				
0840	655.50 CATHODIC PROTECTION SYSTEM	LUMP	LUMP			
0850	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			
0860	659.10 MOBILIZATION	LUMP	LUMP			
	SECTION 0001 TOTAL					.

SECTION 0002 ALTERNATE BRIDGE 1 (NEBT BEAM)
 ALT GROUP AB1

0870	523.52 BEARING INSTALLATION	120.000 EA				
0880	523.5402 LAMINATED ELASTOMERIC BEARINGS, EXPANSION	120.000 EA				

SCHEDULE OF ITEMS

REVISED:

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PROJECT(S): BH-1511(000)X
 BH-1511(100)X
 BH-1511(200)X

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0890	535.61 PRESTRESSED STRUCTURAL CONCRETE I-GIRDERS NEBT BEAM	LUMP	LUMP			
	SECTION 0002 TOTAL					.
SECTION 0003 ALTERNATE BRIDGE 2 (NEXT BEAM) ALT GROUP AB2						
0900	523.52 BEARING INSTALLATION	EA 96.000				
0910	523.5402 LAMINATED ELASTOMERIC BEARINGS, EXPANSION	EA 96.000				
0920	535.61 PRESTRESSED STRUCTURAL CONCRETE I-GIRDERS NEXT BEAM	LUMP	LUMP			
	SECTION 0003 TOTAL					
	TOTAL BID					

SPECIAL PROVISION
SECTION 534
PRECAST STRUCTURAL CONCRETE
(Precast Structural Concrete Arches, Box Culverts)

534.10 Description The Contractor shall design, manufacture, furnish, and install elements, precast structural concrete structures, arches, or box culverts and associated wings, headwalls, and appurtenances, in accordance with the contract documents.

534.20 Materials Structural precast elements for the arch or box culvert and associated precast elements shall meet the requirements of the following Subsection:

Structural Precast Concrete Units 712.061

Grout, concrete patching material, and geotextiles shall be one of the products listed on the Department's list of prequalified materials, unless otherwise approved by the Department.

534.30 Design Requirements The Contractor shall design the precast structural concrete structure in accordance with the AASHTO Standard Specifications for Highway Bridges, current edition, by either the Load Factor Design (LFD) or Load and Resistance Factor Design (LRFD) method. The design live load shall be as follows: MS-22.5 (HS-25) for LFD method, *modified HL-93 Strength I for LRFD method. *(modify HL-93 by increasing all wheel loads by a factor of 1.25)

The Contractor shall submit design calculations and shop drawings for the precast structure to the Department for approval. A Registered Professional Engineer, licensed in accordance with State of Maine laws, shall sign and seal all design calculations and drawings. The Contractor shall submit a bridge rating on the Department's Standard Bridge Rating Summary Sheet with the design calculations. Drawings shall conform with Section 105.7 - Working Drawings.

The Contractor shall submit the following items for review by the Resident at least ten working days prior to production:

- A) The name and location of the manufacturer.
- B) Method of manufacture and material certificates.
- C) Description of method of handling, storing, transporting, and erecting the members.
- D) Shop Drawings with the following minimum details:
 - 1) Fully dimensioned views showing the geometry of the members, including all projections, recesses, notches, openings, block outs, and keyways.
 - 2) Details and bending schedules of reinforcing steel including the size, spacing, and location. Reinforcing provided under lifting devices shall be shown in detail.
 - 3) Details and locations of all items to be embedded.
 - 4) Total mass (weight) of each member.

534.40 Construction Requirements The applicable provisions of Subsection 535.10 - Forms and Casting Beds and Subsection 535.20 – Finishing Concrete and Repairing Defects shall be met.

Manufacture of Precast Units The internal dimensions shall not vary by more than 1 percent from the design dimensions or 38 mm [1 ½ in], whichever is less. The haunch dimensions shall not vary by more than 19 mm [¾ in] from the design dimension. The dimension of the legs shall not vary by more than 6 mm [¼ in] from the dimension shown on the approved shop drawings.

The slab and wall thickness shall not be less than the design thickness by more than 6 mm [¼ in]. A thickness greater than the design thickness shall not be cause for rejection.

Variations in laying lengths of two opposite surfaces shall not be more than 15 mm [⅝ in] in any section, except where beveled ends for laying of curves are specified.

The under-run in length of any section shall not be more than 12 mm [½ in].

The cover of concrete over the outside circumferential reinforcement shall be 50 mm [2 in] minimum. The concrete cover over the inside reinforcement shall be 38 mm [1 ½ in] minimum. The clear distance of the end of circumferential wires shall not be less than 25 mm [1 in] or more than 50 mm [2 in] from the end of the sections. Reinforcement shall be single or multiple layers of welded wire fabric or a single layer of deformed billet steel bars.

Welded wire fabric shall meet the space requirements and contain sufficient longitudinal wires extending through the section to maintain the shape and position of the reinforcement. Longitudinal distribution reinforcement may be welded wire fabric or deformed billet steel bars which meet the spacing requirements. The ends of the longitudinal distribution reinforcement shall be not more than 75 mm [3 in] from the ends of the sections.

The inside circumferential reinforcing steel for the haunch radii or fillet shall be bent to match the radii or fillets of the forms.

Tension splices in the reinforcement will not be permitted. For splices other than tension splices, the overlap shall be a minimum of 300 mm [12 in] for welded wire fabric or billet steel bars. The spacing center to center of the circumferential wires in a wire fabric sheet shall be not less than 50 mm [2 in] or more than 100 mm [4 in]. For the wire fabric, the spacing center to center of the longitudinal wires shall not be more than 200 mm [8 in]. The spacing center to center of the longitudinal distribution steel for either line of reinforcing in the top slab shall be not more than 375 mm [15 in].

The members shall be free of fractures. The ends of the members shall be normal to the walls and centerline of the section, within the limits of variation provided, except where beveled ends are specified. The surfaces of the members shall be a smooth steel form or troweled

surface finish, unless a form liner is specified. The ends and interior of the assembled structure shall make a continuous line of members with a smooth interior surface.

Defects which may cause rejection of precast units include the following:

- 1) Any discontinuity (crack or rock pocket etc.) of the concrete which could allow moisture to reach the reinforcing steel.
- 2) Rock pockets or honeycomb over 4000 mm² [6 in²] in area or over 25 mm [1 in] deep.
- 3) Edge or corner breakage exceeding 300 mm [12 in] in length or 25 mm [1 in] in depth.
- 4) Extensive fine hair cracks or checks.
- 5) Any other defect that clearly and substantially impacts the quality, durability, or maintainability of the structure as measured by accepted industry standards.

The Contractor shall store and transport members in a manner to prevent cracking or damage. The Contractor shall not place precast members in an upright position until a compressive strength of at least 30 MPa [4350 psi] is attained.

Installation of Precast Units The Contractor shall not ship precast members until sufficient strength has been attained to withstand shipping, handling and erection stresses without cracking, deformation, or spalling (but in no case less than 30 MPa [4350 psi]).

The Contractor shall set precast members on 12 mm [$\frac{1}{2}$ in] neoprene pads during shipment to prevent damage to the section legs. The Contractor shall repair any damage to precast members resulting from shipping or handling by saw cutting a minimum of 12 mm [$\frac{1}{2}$ in] deep around the perimeter of the damaged area and placing a polymer-modified cementitious patching material.

When footings are required, the Contractor shall install the precast members on concrete footings that have reached a compressive strength of at least 20 MPa [2900 psi]. The Contractor shall construct the completed footing surface to the lines and grades shown on the plans. When checked with a 3 m [10 ft] straightedge, the surface shall not vary more than 6 mm [$\frac{1}{4}$ in] in 3 meters [10 ft]. The footing keyway shall be filled with a non-shrink flowable cementitious grout with a design compressive strength of at least 35 MPa [5075 psi].

The Contractor shall fill holes that were cast in the units for handling, with either Portland cement mortar, or with precast plugs secured with Portland cement mortar or other approved adhesive. The Contractor shall completely fill the exterior face of joints between precast members with an approved material and cover with a minimum 300 mm [12 in] wide joint wrap. The surface shall be free of dirt and deleterious materials before applying the filler material and joint wrap. The Contractor shall install the external wrap in one continuous piece over each member joint, taking care to keep the joint wrap in place during backfilling. The Contractor shall seal the joints between the end unit and attached elements with a non-woven geotextile. The Contractor shall install and tighten the bolts fastening the connection plate(s) between the elements that are designed to be fastened together as designated by the manufacturer.

Final assembly shall be approved by the manufacturer's representative prior to backfilling. The Contractor shall backfill the structure in accordance with the manufacturer's instructions and the Contract documents. The Contractor shall uniformly distribute backfill material in layers of not more than 200 mm [8 in] depth, loose measure, and thoroughly compact each layer using approved compactors before successive layers are placed. The Contractor shall compact gravel borrow backfill in accordance with Section 203.12 - Construction of Earth Embankment with Moisture and Density Control, except that the minimum required compaction shall be 95 percent of maximum density as determined by AASHTO T99, Method C or D. The Contractor shall place and compact backfill without disturbance or displacement of the wall units, keeping the fill at approximately the same elevation on both sides of the structure. Whenever a compaction test fails, the Contractor shall not place additional backfill over the area until the lift is re-compacted and a passing test achieved.

The Contractor shall use hand-operated compactors within 1.5 m [5 ft] of the precast structure as well as over the top until it is covered with at least 300 mm [12 in] of backfill. Equipment in excess of 11 Mg [12 ton] shall not use the structure until a minimum of 600 mm [24 in] of backfill cover is in place and compacted.

534.50 Method of Measurement The Department will measure Precast Structural Concrete Arch or Box Culvert for payment per Lump Sum each, complete in place and accepted.

534.60 Basis of Payment The Department will pay for the accepted quantity of Precast Structural Concrete Arch or Box Culvert at the Contract Lump Sum price, such payment being full compensation for all labor, equipment, materials, professional services, and incidentals for furnishing and installing the precast concrete elements and accessories. Falsework, reinforcing steel, jointing tape, grout, cast-in-place concrete fill or grout fill for anchorage of precast wings and/or other appurtenances is incidental to the Lump Sum pay item. Cast-in-place concrete, reinforcing steel in cast-in-place elements, excavation, backfill material, and membrane waterproofing will be measured and paid for separately under the provided Contract pay items. Pay adjustments for quality level will not be made for precast concrete.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
534.70 Precast Structural Concrete Arch	Lump Sum
534.71 Precast Concrete Box Culvert	Lump Sum