SECTION 9.47
BUS PASSENGER SHELTER

9.47.01--Description: This item shall consist of the furnishing and installation of bus passenger shelters in the locations as shown on the plans or directed by the Engineer.

9.47.02--Materials:

1) The framework material shall conform to ASTM B221, alloy 6061-T6, or alloy 6063-T5 or T6 aluminum, and shall be anodized in accordance with the project plans or specifications.

2) The glazing shall be bronze tinted, coated polycarbonate with an abrasion resistance of 1.2 change in percent haze, or greater when tested in accordance with ASTM D-1044. It shall have a minimum flexural strength of 90 MPa when tested in accordance with ASTM D-790.

3) The roof shall not be transparent. It shall have sufficient strength for the purpose intended, and shall be fully weatherproof. Proper seals and drainage shall be provided to prevent water or ice from entering the shelter. All drains shall be directed away from the shelter and its entranceways.

4) The hardware shall either be aluminum conforming to ASTM B211, alloy 2024-T4, or stainless steel conforming to ASTM A167, alloy 304. Anchor bolts shall be either stainless steel conforming to ASTM A167, alloy 304, or steel conforming to ASTM A36. The A36 steel anchor bolts shall be galvanized in accordance with the requirements of ASTM A153.

5) Concrete shall be Class "C" in accordance with Article M.03.01.

6) There shall be a seat in the shelter with a width of 305 mm to 380 mm. The seat shall include a backrest with a minimum width of 200 mm. The seat and backrest shall be constructed of the same material and may be built as an integral unit. The material utilized is optional but shall be limited as follows:

Bare metal shall not be utilized. The rate of thermal conductance of the material shall be comparable to that of wood or molded fiberglass. Examples of acceptable materials are wood, fiberglass, high impact thermoplastic, and plastic coated (bonded) aluminum.

All wood surfaces shall be protected from warping, swelling, checking, and shrinking. The wood shall be finished with three coats of polyurethane finish.

The seat shall be vandal resistant and maintenance free; and it shall have no burrs, splinters, sharp edges or corners, nor any other shortcomings that will pose a hazard to personnel using the seat.

The seat shall afford reasonable comfort to the user and shall be of such design as to allow for drainage of liquids that may be spilled on it. The color and design of the seat shall be consistent with other portions of the shelter.

The seat and its supports shall be designed to accommodate a load of 1750 N/m without appreciable deflection. Appreciable deflection shall be considered to be any deflection over 3 mm in a meter in any direction. The supports shall be attached to the shelter frame at every vertical member, both posts and mullions, along the back wall panel. The support-to-frame attachments shall be made in such a manner that the fasteners will be subjected to shearing stress only.

The top of the backrest shall be at least 330 mm above the seat surface, and the seating surface shall be 432 mm above the floor. Lengths of both backrest and seat shall be such that the ends are 100 mm clear of one of the end walls and 1 m clear of the opposite wall to permit a seating area for wheelchair patrons.

7) Anchor bases shall be provided for all shelter posts. The material shall be the same as the framework, and the hardware shall be of the same material as specified above. Any exposed hardware shall not protrude into the entrance areas, and shall be vandal resistant.

8) A schedule holder shall be provided in the panel closest to the front of the shelter at the end farthest from an approaching bus. Glazing on the inside of the holder shall be clear rather than tinted and conform to the specifications for "glazing" stated herein. The minimum size of the schedule holder shall be 1 m long and the width of one window panel. It shall be 1 m above the shelter floor.

The holder shall include a locking or sealing assembly that is tamperproof and will not allow the insertion of foreign materials, but will provide easy access by employees for frequent changes in schedule information. No padlocks or keytype cabinet locks will be used. One edge of the holder shall be hinged. Fasteners used in the locking and sealing assembly shall have a maximum spacing of 300 mm on the side opposite the hinge.

9) All components of the shelter are to be designed with attention to a clean appearance and a tamper-proof assembly. No regular, phillips, hex, or square head screws or bolts will be used except where approved and concealed. The Contractor shall submit, for approval, the type(s) of security fasteners if other than aluminum flush-break rivets. All fasteners shall be of the same material as stated herein, and shall be of the same color as the surrounding material.

10) The shelter shall be designed to support safely a uniform live mass of 1900 Pa, plus a uniform mass of 1100 N/m applied along the edge of front fascia, or if there are intermediate supports along the front, point load of 1800 N each applied at the front fascia at midpoints between intermediate supports. The horizontal wind force shall be 720 Pa, and the uplift wind force shall be 860 Pa.

All structural components shall be designed so that, upon completion of construction, the shelter shall act as an integral unit and be free of any structurally detrimental movement.

11) The Contractor shall submit structural calculations and shop plans for approval in accordance with Article 1.05.02 a minimum of four weeks before performing any fabrication or on-site work for the shelter. The shop drawings shall show materials, alloys, dimensions, sizes, thicknesses, gauges, tempers, colors, finishes, joining details, attachments, minimum foundation requirements, and relationship of work to any adjoining construction that may be in progress.

The plans and shop drawings shall be stamped by a Professional Engineer registered in the State of Connecticut.

Certified Tests Reports and Materials Certificates, showing compliance with the provisions of these materials shall be submitted in accordance with Article 1.06.07.

9.47.03--Construction Methods:

The bus passenger shelter shall be installed at the location indicated on the plan or as directed by the Engineer. The shelter shall be plumb, level, true, neat, rigid, and in accordance with approved shop drawings, pertinent sections of the Connecticut Basic Building Code, and these specifications.

Field welding shall not be allowed without prior approval. Where shop welding is required, the shop drawings shall show all pertinent information and locations.

Shelters requiring special foundations because of shelter design, (i.e., those which cannot be attached directly to an existing sidewalk slab) shall have shop drawings delineating the necessary foundation work.

The dimensions of the completed bus shelter shall be a minimum of 1.5 m X 3.6 m, measured from center to center of the walls. The height shall be a minimum of 2.3 m from the floor to the lowest part of the roof or overhang.

The open area between the floor and the bottom of the panels shall not exceed 200 mm.

All bus shelters constructed under this item shall have a front "wind screen." The wind screen shall be of panel construction, including glazing and anchorages identical to that provided for the back wall. Two entrances shall be provided for each shelter. They each shall be a minimum of 915 mm to a maximum of 1016 mm wide. In areas where the distance from the sidewalk curb to the front shelter fascia is less than 1067 mm, the entrances shall be on the side walls. Where the distance from curb to fascia is 1067 mm or more, entrances may be placed in either the front wind screen or the side wall. In no case shall the clear opening between vertical supports be less than 1 m wide. In order to ensure accessibility for the handicapped, the shelter shall be located, unless otherwise directed by the Engineer, in an area where there are no poles, posts, sidewalk furniture, or impediments to the handicapped, within a 1.2 m radius of the vertical support that is closest to the curb. The wind screen, unless otherwise directed, shall be to the front of the shelter, which is defined as the longitudinal face closest to the designated bus stop.

All exposed surfaces and edges shall be smooth, free from burrs, slivers and other projections and neatly finished. All parts are to be manufactured so as to allow interchangeability of components.

All clamps used to fabricate or install the shelter shall be adequately padded to prevent scarring to the material surfaces. The shelter materials shall be adequately protected to prevent scarring or damaging of the various surfaces during shipment.

Prior to installation of glazing in its panel, the protective material (masking) shall be removed around the perimeter only. The amount of material to be removed shall be the engagement width plus a 6 mm. The protective material shall not be removed by cutting or scarring the glazing in any way. The remainder of the material shall be removed cleanly only after the panel is completely secured in its respective frame.

Plastic glazing shall be regarded as a finishing operation and shall be scheduled as one of the last steps in the completion of the shelter. When material is supplied masked, the masking paper should not be exposed to sunlight for longer than fifteen (15) minutes to avoid the deposition of adhesive residues.

Any residue left on the glazing material shall be completely removed, utilizing a process recommended by the glazing manufacturer. Any panels that are, in the opinion of the Engineer, excessively scratched or hazed shall be replaced by the Contractor at his own expense.

The framework shall be designed so that glazing material is securely engaged and able to withstand vandalism without disengaging, secured with tamper-proof fasteners such as aluminum flush-break rivets, and be able to resist the prying out of panels by vandals. The assembly design shall provide for each glazing replacement when the need arises. Each glazing frame shall provide for a minimum engagement width of 13 mm, but in no case shall it be less than the width recommended by the glazing manufacturer.

If the Contractor's work results in any damage, it will be his responsibility to restore or repair the damaged items or properties to the Engineer's satisfaction. Any costs involved will be borne solely by the Contractor.

The Contractor shall remove all excess materials and restore the work area to its original condition.

Immediately prior to acceptance, the Contractor shall clean the entire shelter in strict accordance with the various materials manufacturers' published directions.

9.47.04--Method of Measurement:

This work shall be measured for payment by the number of bus passenger shelters completely installed and accepted in place.

9.47.05--Basis of Payment:

This work will be paid for at the contract unit bid price each for "Bus Passenger Shelter," and this price shall include all materials, equipment, labor, tools, and work incidental thereto. In those locations where the Engineer determines that the existing sidewalk slab will not safely support the shelter, replacement of the sidewalk slab will be paid for under the appropriate items or as extra work in the absence thereof.

Special foundations required because of the design of the shelter will be paid for by the Contractor.

Pay Item	Pay Unit
Bus Passenger Shelter	EA.