

**Section 454**

1 **452-4 MEASUREMENT AND PAYMENT**

2 *Sheet Pile Retaining Walls* will be measured and paid in square feet. Sheet pile walls will be  
3 measured as the square feet of exposed wall face area with the wall height equal to the  
4 difference between the top and bottom of wall elevation. Define “top of wall” elevation as the  
5 top of coping or top of piles for sheet pile walls without coping. Define “bottom of wall”  
6 elevation as shown in the plans and no measurement will be made for portions of sheet pile  
7 walls below bottom of wall elevations.

8 The contract unit price for *Sheet Pile Retaining Walls* will be full compensation for providing  
9 submittals, labor, tools, equipment and sheet pile wall materials, installing sheet piles,  
10 excavating, backfilling, hauling and removing excavated materials and supplying sheet piles,  
11 backfill, coping and any incidentals necessary to construct sheet pile walls.

12 The contract unit price for *Sheet Pile Retaining Walls* does not include the cost for fences,  
13 handrails, ditches, guardrail and barriers associated with sheet pile walls as these items will be  
14 paid for elsewhere in the contract.

15 Where it is necessary to provide backfill material from sources other than excavated areas or  
16 borrow sources used in connection with other work in the contract, payment for furnishing  
17 and hauling such backfill material will be paid as extra work in accordance with  
18 Article 104-7. Placing and compacting such backfill material is not considered extra work but  
19 is incidental to the work being performed.

20 Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Sheet Pile Retaining Walls	Square Foot

21 **SECTION 454**  
22 **WATERPROOFING AND DAMPPROOFING**

23 **454-1 DESCRIPTION**

24 Waterproof or dampproof concrete surfaces in accordance with these specifications for the  
25 particular method of waterproofing or dampproofing called for in the plans. Furnish and  
26 apply all asphalt, tar, fabric, asphalt plank and any other materials.

27 **454-2 MATERIALS**

28 Refer to Division 10.

<b>Item</b>	<b>Section</b>
Asphalt Binder	1020-7(B)
Asphalt Primer	1020-7(A)
Tar	1020-7(C)
Woven Cotton Fabric	1020-7(D)

29 **454-3 METHOD A WATERPROOFING**

30 **(A) General**

31 Method A waterproofing consists of one coat of asphalt primer, and 3 mop coats of hot  
32 asphalt cement with 2 layers of cotton fabric alternating between the mop coats.

33 **(B) Preparation of Surface**

34 Ensure that concrete surfaces are dry, reasonably smooth and free from projections or  
35 holes which are capable of puncturing the membrane. Immediately before applying the  
36 waterproofing, thoroughly clean the surface of dust and loose materials.

37 Make sure that the concrete is at least 14 days old for Class A concrete, at least 10 days  
38 old for Class AA concrete, or at least 7 days old for high early strength concrete, before

1 beginning waterproofing. Do not waterproof in wet weather nor when the temperature is  
2 below 35°F, without permission.

3 **(C) Application**

4 Give waterproofed surfaces a thorough coat of asphalt primer, and allow it to set  
5 thoroughly before applying the first mop coat. Heat the asphalt cement for the mop coat  
6 to a temperature of at least 300°F and frequently stir to avoid local overheating. Equip  
7 the heating kettles with thermometers.

8 Begin the waterproofing at the low point of the surface.

9 Use a half width first strip of fabric; and a full width second strip. Lap the full width of  
10 the first strip. Make the third and each succeeding strip full width and lap so there are  
11 2 layers of fabric at all points with laps at least 2" wide. Make sure that the end laps are  
12 at least 12".

13 Beginning at the low point of the surface, mop a section about 20" wide and the full  
14 length of the surface with hot asphalt cement. Immediately roll the first strip of fabric  
15 into the asphalt cement and press into place to eliminate all air bubbles and to provide  
16 a firm bond to the surface. Mop this strip and an adjacent section of the surface of  
17 a width equal to slightly more than half the width of the fabric with hot asphalt binder  
18 and roll a full width of the fabric into this cement, completely covering the first strip, and  
19 press into place. Mop this second strip and an adjacent section of the concrete surface  
20 with hot asphalt cement and place the third strip of fabric to lap the first strip at least 2".  
21 Continue this process until the entire surface is covered, each strip of fabric lapping at  
22 least 2" over the second preceding strip. Give the entire surface a final mopping of hot  
23 asphalt cement.

24 Mop on concrete to completely cover the surface sufficiently heavy on cloth to  
25 completely conceal the weave. Use at least 12 gallons of asphalt on horizontal surfaces  
26 for each 100 sf of finished work and at least 15 gallons on vertical surfaces. Perform the  
27 work so, at the close of a day's work, all laid cloth receives the final mopping of asphalt.  
28 Thoroughly seal down all laps.

29 **(D) Special Requirements**

30 At the edges of the membrane and at any points punctured by such appurtenances as  
31 drains or pipes, make suitable provisions to prevent water from getting between the  
32 waterproofing and the waterproofed surface.

33 Place all membrane flashing at curbs and against girders, spandrel walls, etc., with  
34 separate sheets of membrane lapping the main membrane at least 12". Closely seal  
35 flashing with either a metal counter-flashing or by embedding the upper edges of the  
36 flashing in a groove poured full of joint filler.

37 Provide expansion joints, both horizontal and vertical, with water stops and premolded  
38 joint filler as called for in the plans. Seal expansion joints in the face adjacent to the  
39 membrane bituminous material. Carry the membrane continuously across all expansion  
40 joints.

41 At the ends of the structure carry the membrane well down on the abutments and make  
42 suitable provisions for all movement.

43 **(E) Repairs**

44 Repair any damage that occurs as directed. Repair by patching when permitted. Extend  
45 the first ply of the patch at least 12" beyond the outermost damaged portion of the  
46 membrane and extend the second ply at least 3" beyond the first.

**Section 460**

1 **(F) Backfilling**

2 Do not backfill without permission and until the final mop coat thoroughly hardens.  
3 Place backfill so the waterproofing is not damaged.

4 **454-4 METHOD B DAMPPROOFING**

5 **(A) General**

6 Method B dampproofing consists of 2 coats of tar, Grade RT 6.

7 **(B) Preparation of Surface**

8 Make sure the surfaces are dry. Immediately before applying the first dampproofing  
9 coat, thoroughly clean the surfaces of dust and loose materials. Permit the concrete to  
10 cure for at least 14 days for Class A concrete, at least 10 days for Class AA concrete or  
11 7 days for high early strength concrete before dampproofing.

12 **(C) Application**

13 Give the concrete surfaces 2 applications tar, Grade RT 6. Apply the tar with suitable  
14 brushes to secure uniform and thorough applications. Do not apply the second coat of tar  
15 until the first coat thoroughly sets. Do not apply dampproofing during any time that the  
16 surface is exposed to any moisture. Make sure that the temperature of the tar is such that  
17 uniform and thorough application is obtained. Do not backfill until the second coat  
18 thoroughly sets.

19 **454-5 MEASUREMENT AND PAYMENT**

20 *Method A Waterproofing* will be measured and paid as the actual number of square yards of  
21 surface that is waterproofed. In measuring this quantity, measurement is made along the  
22 actual surface that is to be waterproofed before the waterproofing is applied.

23 *Method B Dampproofing* will be measured and paid as the actual number of square yards of  
24 surface that is dampproofed. In measuring this quantity, measurement is made along the  
25 actual surface that is to be dampproofed before the dampproofing is applied.

26 These prices and payments will be full compensation for all items required to waterproof and  
27 dampproof including, but not limited to, those items contained in Article 454-1.

28 Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Method A Waterproofing	Square Yard
Method B Dampproofing	Square Yard

29 **SECTION 460**  
30 **BRIDGE RAILING**

31 **460-1 DESCRIPTION**

32 Furnish and place metal, pipe or concrete barrier bridge railing in accordance with these  
33 specifications and as shown in the plans. Furnish posts, rail bars, pipe fittings, hardware,  
34 paint, barrier delineators, concrete, reinforcing steel, admixtures, forms, falsework and all  
35 other materials; galvanize; paint; fabricate and erect rail; and place, finish and cure concrete.

36 **460-2 MATERIALS**

37 Refer to Division 10.

<b>Item</b>	<b>Section</b>
Aluminum Rail	1074-5
Barrier Delineators	1088-2
Epoxy Coated Reinforcing Steel	1070-7