

1 **(February 6, 2023)**

2 **Precast Concrete Panel Faced Structural Earth Wall Materials**

3 **General Materials**

4 **Concrete Leveling Pad**

5 Leveling pad concrete shall be commercial concrete in accordance with  
6 Section 6-02.3(2)B.

7  
8 **Proprietary Materials**

9 **ARES Modular Panel Wall System**

10 **Tensar Geogrid Materials**

11 Geogrid reinforcement shall conform to Section 9-33.1 and shall be a  
12 product listed in Appendix D of the current WSDOT Qualified Products List  
13 (QPL). The values of  $T_{al}$  and  $T_{ult}$  as listed in the QPL for the products used  
14 shall meet or exceed the values required for the wall manufacturer's  
15 reinforcement design as specified in the structural earth wall design  
16 calculation and working drawing submittal.

17  
18 The minimum ultimate tensile strength of the geogrid shall be a minimum  
19 average roll value (the average test results for any sampled roll in a lot  
20 shall meet or exceed the values shown in Appendix D of the current  
21 WSDOT QPL). The strength shall be determined in accordance with  
22 ASTM D6637 for multi-rib specimens.

23  
24 The ultraviolet (UV) radiation stability, in accordance with ASTM D4355,  
25 shall be a minimum of 70 percent strength retained after 500 hours in the  
26 weatherometer.

27  
28 The longitudinal (i.e., in the direction of loading) and transverse (i.e.,  
29 parallel to the wall or slope face) ribs that make up the geogrid shall be  
30 perpendicular to one another. The maximum deviation of the cross-rib  
31 from being perpendicular to the longitudinal rib (skew) shall be no more  
32 than 1 inch in 5 feet of geogrid width. The maximum deviation of the  
33 cross-rib at any point from a line perpendicular to the longitudinal ribs  
34 located at the cross-rib (bow) shall be 0.5 inches.

35  
36 The Engineer will take random samples of the geogrid materials at the job  
37 site. Approval of the geogrid materials will be based on testing of samples  
38 from each lot. A "lot" shall be defined as all geogrid rolls sent to the project  
39 site produced by the same manufacturer during a continuous period of  
40 production at the same manufacturing plant having the same product  
41 name. The Contracting Agency will require 14 calendar days maximum for  
42 testing the samples after their arrival at the WSDOT Materials Laboratory  
43 in Tumwater, WA.

44  
45 The geogrid samples will be tested for conformance to the specified  
46 material properties. If the test results indicate that the geogrid lot does not  
47 meet the specified properties, the roll or rolls which were samples will be  
48 rejected. Two additional rolls for each roll tested which failed from the lot  
49 previously tested will then be selected at random by the Engineer for  
50 sampling and retesting. If the retesting shows that any of the additional  
51 rolls tested do not meet the specified properties, the entire lot will be

1 rejected. If the test results from all the rolls retested meet the specified  
2 properties, the entire lot minus the roll(s) which failed will be accepted.

3  
4 All geogrid materials which have defects, deterioration, or damage, as  
5 determined by the Engineer, will be rejected. All rejected geogrid materials  
6 shall be replaced at no expense to the Contracting Agency.

7  
8 Except as otherwise noted, geogrid identification, storage and handling  
9 shall conform to the requirements specified in Section 2-12.2. The geogrid  
10 materials shall not be exposed to temperatures less than -20F and  
11 greater than 122F.

12  
13 Rubber bearing pads shall be a type and grade as recommended by Tensar  
14 Earth Technologies, Inc.

15  
16 Geosynthetic joint cover for all horizontal and vertical joints shall be a non-  
17 woven geosynthetic as recommended by Tensar Earth Technologies, Inc.  
18 Adhesive used to attach the geosynthetic to the rear of the precast concrete  
19 facing panel shall be as recommended by Tensar Earth Technologies, Inc.

#### 20 21 **Reinforced Earth Wall**

22 Reinforcing strips shall be shop fabricated from hot rolled steel conforming to  
23 ASTM A572 Grade 65 or approved equal and shall be galvanized after  
24 fabrication in accordance with AASHTO M 111. Damage to the galvanizing  
25 shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

26  
27 Bolts and nuts shall conform to Section 9-06.5(3) and shall be galvanized in  
28 accordance with ASTM F2329.

29  
30 Rubber bearing pads shall be a type and grade as recommended by the  
31 Reinforced Earth Company.

32  
33 Vertical joint filler between panels, when specified in the structural earth wall  
34 working drawings, shall be two-inch square, flexible open cell polyether foam  
35 strips, Grade UU-34, as recommended by the Reinforced Earth Company.

36  
37 Filter fabric joint cover for all horizontal and vertical joints, when specified in  
38 the structural earth wall working drawings, shall be a pervious woven  
39 polypropylene filter fabric as recommended by the Reinforced Earth Company.  
40 Adhesive used to attach the fabric material to the rear of the precast concrete  
41 facing panel shall be as recommended by the Reinforced Earth Company.

#### 42 43 **MSE Plus Wall**

44 Pins connecting the soil reinforcing mesh to the precast concrete panels shall  
45 conform to AASHTO M 336, plain wire, and shall be galvanized after  
46 fabrication in accordance with AASHTO M 111. Damage to the galvanizing  
47 shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

48  
49 Bearing pads shall be serrated high-density polyethylene (HDPE) copolymer  
50 pads as recommended by SSL, LLC.  
51

1 Filter fabric joint cover for all horizontal and vertical joints shall be non-woven  
2 geosynthetic conforming to AASHTO M 288. Adhesive used to bond the  
3 geosynthetic to the rear of the precast concrete facing panel shall be as  
4 recommended by SSL, LLC.  
5