ADOT Specific Requirements for Tensar ARES Wall System

ADOT Vendor: Tensar International Corporation
2500 Northwinds Pkwy., Suite 500
Alpharetta, GA 30009

General Information:
ADOT Product ID No. 10035
Approval Date: 05/2011
Approval Renewed Date: 5/2016
Re-evaluation due: 05/2021

Design Standards:
More Stringent of the following:
1. 2008 ADOT Standard Specifications for Road and Bridge Construction
2. Latest ADOT MSE Wall LRFD Based Special Provisions [Contact ADOT for latest version at the time of the application of the system to a given project.]
4. AASHTO (2012 or latest Specification or Interims) LRFD Bridge Design Specifications

HITEC Evaluation:

Facing Evaluated:
- 5 ft. wide x 5 ft. tall and 9 ft. wide x 5 ft. tall wet pre-cast steel reinforced panels with a minimum thickness of 6 inches. See Sheet SD-04 of attached drawings for details.

Facing Connector:
- Spliced (Bodkin) connection between UX1700MSE geogrid tab embedded in precast concrete panels with various UX series geogrids (Table 1) used for soil reinforcements.

Soil Reinforcement Evaluated:
- Tensar “UX” series: UX1400MSE, UX1500MSE, UX1600MSE, UX1700MSE

Panel Geogrid Connection Strength:
See Table 1

Notes/Constrains:
In addition to the general design requirements provided in the Design Standards listed above, the following specific requirements apply:
- For any project, use of the system evaluated herein is subject to ADOT approval based on project and site specific evaluation.
- Only the system components evaluated as noted above are to be used. Details in the HITEC report are considered to be superseded by the figures, tables and typical details in this evaluation. Tolerances shall be the more stringent of those noted in Tensar’s attached drawings and the Design Standards listed above.
- Maximum wall height of 50 feet based on data provided in the vendor’s submittal.
ADOT Specific Requirements for Tensar ARES Wall System

- Provided that the maximum particle size in the reinforced soil backfill is 3/8 inch or smaller, then based on detailed installation damage test data developed and provided in the submittal, a value of 1.15 can be used for the reduction factor due to installation damage instead of the default value of 1.5 required by design standard 2 listed above, i.e., ADOT Special Provisions.

- For skewed panel connection, a splay angle more than 5 degrees is not allowed. Splay angle is defined as the deviation from the normal to the face of the wall in the horizontal plane at a reinforcing level. Reduction in tensile capacity perpendicular to the wall face due to splay shall be accounted for in the analysis.

- Acute angle corner detail is not approved on a standard basis but shall be reviewed on a project specific basis.

- The longitudinal and transverse ribs of the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib (bow) from being perpendicular to the longitudinal rib, i.e. skew, shall be manufactured to be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

- The geotextile across the joints at the backface of the facing panels shall meet the requirements of AASHTO M 288.

- The number of bearings pads between panels shall be in accordance with the requirements of the design standard 2 listed above, i.e. ADOT Special Provisions.

- The long-term nominal connection strength, $T_{alc}$, in Tables 1 shall be multiplied by the resistance factor for connection strength as specified in the latest AASHTO specification (design standard 4 listed above) to obtain the long-term factored connection strength.

- The bar in the Bodkin connection shall have a minimum width of 4.5 inches and a maximum thickness of 0.25 inches.

- Reinforcement pullout shall be calculated based on the default values for steel grid reinforcement provided in the latest AASHTO specification (design standard 4 listed above).

- A detail of how geogrid embedment depth embedment depth and alignment in the concrete panel and horizontal alignment will be maintained during casting shall be submitted with shop drawings for each project.

- All details for penetration of culvers or other objects through the wall face shall be evaluated on a project and site specific basis.

- All details for penetration of vertical and horizontal obstructions through the reinforced soil zone shall be evaluated on a project and site specific basis. Examples of these obstructions include foundation elements, catch basins, slotted drains, etc. In all cases, the vertical obstruction shall either be installed through precut holes in geogrid layers that must be penetrated or the geogrid the layers shall be cut in a manner that prevents ripping or tearing of the geogrid.
ADOT Specific Requirements for Tensar ARES Wall System

- Drainage details shall be modified as appropriate to meet project and site specific requirements.
- End-bent details shall be modified as appropriate to meet project and site specific requirements.
- Facing construction tolerances for precast facing panels in design standard 2 listed above shall be applicable to ARES wall systems.
- Full height panels are not approved on a standard basis but may be considered on a project specific basis with the approval of the State Geotechnical Engineer.

Assumptions

- Vendor will submit a copy of this Specific Requirements with its project and site specific design to ADOT and its representatives for review and approval consideration for a specific construction project.
- Vendor submittals shall be in accordance with the design standards and other requirements listed herein.
- ADOT and its design representatives will evaluate the project and site specific application of Tensar’s ARES wall system and review submittals for approval consideration in strict accordance with the design standards, limitations, and requirements listed herein. Typical details in this package may not be applicable to a given project and will be modified, based on the site specific considerations, as necessary by the designer in consultation with the vendor.
- During construction of the Tensar’s ARES wall system, ADOT and its representatives will enforce project and site specific acceptance requirements in accordance with the plans and specifications.

<table>
<thead>
<tr>
<th>Geogrid</th>
<th>Long-term Nominal Connection Strength, $T_{alc}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX1400MSE</td>
<td>1,600 lb/ft</td>
</tr>
<tr>
<td>UX1500MSE</td>
<td>2,600 lb/ft</td>
</tr>
<tr>
<td>UX1600MSE</td>
<td>3,300 lb/ft</td>
</tr>
<tr>
<td>UX1700MSE</td>
<td>3,500 lb/ft</td>
</tr>
</tbody>
</table>
TYPICAL DETAILS

(24 pages)

Typical details submitted to ADOT as part of the product approval process are attached. These represent generic details that must be evaluated by the designer based on project and site specific requirements. The designer shall also be responsible for ensuring conformance to the constraints and design standards noted in this evaluation.
ARES (5' X 5') RETAINING WALL SYSTEM

STANDARD DETAILS
CONNECTION DETAIL PLAN VIEW AT 15° GRID SKEW

VIEW A-A

CONNECTION BOX

ATTACHMENT PLATE

PANEL TO PANEL ATTACHMENT

TENSAR INTERNATIONAL CORPORATION

TYPICAL DETAILS

ARIZONA DEPARTMENT OF TRANSPORTATION
ARIZONA DEPARTMENT OF TRANSPORTATION

ARES (5' X 9') RETAINING WALL SYSTEM
STANDARD DETAILS
TYPICAL PANEL DETAILS - STANDARD A PANEL SHOWING REBAR REINFORCING

NOT TO SCALE

NOTES:

1. All panels shall have 30-day minimum compressive strength of 2,000 psi.
2. All bars must be per ASTM A1015 Grade B6 reinforcing steel and shall be straight and not bent.
   - Tying wires shall be provided at 12 in. (max.)
   - Horizontal bars @ 12 in. (max.)
   - Vertical bars @ 8 in. (max.)
   - No bars shall be installed where they would create obstacles or hazards.
3. Reinforcing steel shall have a minimum cover of 1-1/2 in. from all panel edges unless otherwise noted.

TYPICAL PANEL DETAILS - STANDARD A PANEL SHOWING MESH REINFORCING

NOT TO SCALE

NOTES:

1. All panels shall have 30-day minimum compressive strength of 2,000 psi.
2. All bars must be per ASTM A1015 Grade B6 reinforcing steel and shall be straight and not bent.
   - Tying wires shall be provided at 12 in. (max.)
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