

DESIGN SPECIFICATIONS: AASHTO Standard Specifications for Highway Bridges, 1996 Edition with 1997 Interims.

CONSTRUCTION SPECIFICATIONS: Kansas Department of Transportation Standard Specifications for State Road and Bridge Construction 1990, and Special Provisions.

DESIGN LOADING:

Live Load ---Surcharge load of 600 mm of earth.  
 ---Barrier impact load as specified by AASHTO Section 2.7.  
 Dead Load ---Components of Wall Structure.  
 Other Loads ---As specified by AASHTO.

UNIT STRESSES:

Concrete  $f'c=30$  MPa  
 Reinforcing Steel (Grade 420)  $f_y=420$  MPa

DESIGN GUIDELINES: The allowable reinforcement material stress shall meet the requirements outlined in AASHTO Section 5.8.7.

The wall dimensions shall meet the requirements outlined in AASHTO 5.8.1. In addition, to meet the overall stability and safety factors, a minimum reinforcement width of 0.8 times the wall height should be used for walls less than 6 meters high and 1.0 times the wall height for walls greater than 6 meters high. Wall height is equal to the distance from the top of leveling pad to the top of coping.

The minimum safety factor for sliding shall be 1.5.  
 The minimum safety factor for overturning shall be 2.0.  
 The minimum safety factor for bearing capacity shall be 2.0.  
 The minimum design life of the structure shall be 75 years.  
 The reinforcing steel shall conform to the requirements of ASTM A615M, Grade 420.

Standard wall design shall be based on the following parameters:

1. Select Granular Backfill (Reinforced Fill)

- a.  $\phi = 34^\circ$
- b.  $\gamma = 1840$  kg/m<sup>3</sup>

2. Random Fill or In situ Soil behind wall (Retained Fill)

- a.  $\phi = 25^\circ$
- b.  $c = 5$  kPa
- c.  $\gamma = 2000$  kg/m<sup>3</sup>

3. Foundation Soils

- a. Foundation soils vary from Silty Sand to Lean Clay.
- b. Allowable average foundation bearing pressures shall not exceed the following:

Reinforced Mass Width	Allowable Average Foundation Pressure
2.5 to 3.5 m	140 kPa
3.5 to 5.0 m	155 kPa
5.0 to 6.0 m	175 kPa
6.0 to 7.5 m	195 kPa
>7.5 m	210 kPa

Maize Road Walls

- a.  $\phi = 18^\circ$
- b.  $c = 20$  kPa
- c.  $\gamma = 1900$  kg/m<sup>3</sup>

Tyler Road Walls

- a.  $\phi = 22^\circ$
- b.  $c = 10$  kPa
- c.  $\gamma = 2000$  kg/m<sup>3</sup>

4. Engineered fill

- a.  $\phi = 25^\circ$
- b.  $c = 14.5$  kPa
- c.  $\gamma = 2000$  kg/m<sup>3</sup>

5. Maximum total and differential settlement shall be limited such that wall aesthetics and serviceability are not adversely affected.

6. Minimum leveling pad embedment shall be 0.9 meters.

7. Foundation soils found to be unsuitable, as determined by the Engineer, shall be removed and replaced with suitable material.

GENERAL NOTES:

Stability of temporary construction slopes shall be the responsibility of the Contractor. The minimum safety factor for temporary slope stability shall be 1.2.

Concrete coping at top of retaining wall shall be Cast-In-Place. (Grade 30 Concrete).

If computer programs are used to prepare the design, the output and an example hand calculation of one of the submitted wall design sections shall be furnished.

Wall panels shall have a minimum dimension of 1525 mm x 3050 mm. Wall panels will have an architectural finish which will be chosen by the City of Wichita following award of the contract, should the MSE Alternate be selected. The architectural finish will be selected from form liner textures available from Scott Systems, Inc., 1788 Helena Street, Aurora, CO. 80011, Tel. 303-341-1400.

Possible textures will include Stone Textures, Fractured Textures, Smooth Flute Textures, Flat Textures or Brick and Block Textures provided by Scott Systems or an approved equal.

Groundwater was located 4.1 to 6.9 meters below existing grade at the times borings were drilled. Fluctuations of the groundwater table may occur during construction or at other times during the life of the structure. The Contractor shall consider the possibility of groundwater fluctuation when developing project design and plans.

The bid price per square meter for "M.S.E. Retaining Wall" shall include all costs for wall panels, including selected architectural finish, soil reinforcing elements, leveling pad, coping, wall terminal reinforcing steel (Grade 420), joint protection, excavation, dewatering, backfilling, and all incidentals necessary to construct the wall.

Payment will be based on the wall area listed in the table, "SUMMARY OF QUANTITIES - M.S.E. RETAINING WALLS."

Estimated retaining wall area is based on height from the top of the leveling pad (0.9 m embedment) to the top of coping.

Surface Coating Finish shall be applied to exterior concrete surfaces of the wall panels and barriers within the limits shown on the plans. The color of the surface coating shall match Federal Standard 595B color No. 20372 (Buckskin) unless an equal is approved by Engineer. A non-petroleum base form release agent shall be used on formed surfaces to be coated. All labor, materials and incidentals required to perform this work shall be paid for as "Surface Coating Finish" in accordance with the Special Provisions.

The Geotechnical Report for the M.S.E. Retaining Walls is on file and available for inspection by interested and qualified bidders at the Professional Engineering Consultants office at 303 S. Topeka, Wichita, Ks.


LOCATION	UNIT	WALL AREA	TOTAL
Maize Northwest Wall	Sq. M.	1220.6	
Maize Southwest Wall	Sq. M.	1686.1	
Maize Northeast Wall	Sq. M.	1554.5	
Maize Southeast Wall	Sq. M.	1750.2	
Subtotal	Sq. M.		6211.4
Tyler Northwest Wall	Sq. M.	1926.4	
Tyler Southwest Wall	Sq. M.	2142.1	
Tyler Northeast Wall	Sq. M.	1760.8	
Tyler Southeast Wall	Sq. M.	1517.0	
Subtotal	Sq. M.		7346.3
		TOTAL WALL AREA	13557.7 Sq. M.
			13,583.4

Legend

- $\phi$  = Angle of internal friction
- $c$  = Cohesion
- $\gamma$  = Soil unit weight

FHWA REGION NO.	STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
7	KANSAS	54-87 K-6657-01	2002	375	1122

DSNR: WDH OPER: JGP SCALE: 1:1  
 I:/1997/97362/001/RETWALL/GENNOTE MSE WALL.DGN 3-25-2002 15:10:10 LAST REV: BY:

1			
No.	Revisions	By	Date
CITY OF WICHITA <b>MECHANICALLY STABILIZED EARTH RETAINING WALLS</b> SUMMARY OF QUANTITIES & GENERAL NOTES SEDGWICK COUNTY			
 <b>Professional Engineering Consultants, P.A.</b> 303 S. TOPEKA - WICHITA, KANSAS 67202 316-262-2691 • FAX 316-262-3003			
Designed by	WDH	Checked by	RAS
Drawn by	JSB	Date	April, 2002 Job No. 97362