Wall design Charts  
Preliminary design assistance

Techo-Bloc can help you in your preliminary design of retaining walls which fall outside the bounds of the Height Charts. However, preliminary design should only be used to assess the suitability of a wall system to a specific project or for estimating budget costs. For final construction designs, please contact a qualified engineer in your area.

1. TECHO-BLOC
Representative ___________________________________________ Date __________

2. GENERAL PROJECT INFORMATION
Enterprise ________________________________________________ Are you a Techo-Pro? ☐ Yes ☐ No
Address ______________________________________________ City __________________________
State / Province __________________________ Postal Code ________________ Contact _____________
Telephone __________________________ Fax __________________________
E-mail __________________________ Information date required _____________

Prepared by __________________________________ Project title __________________________
Address __________________________ City __________________________
State / Province __________________________ Postal Code ________________
Type (industrial, commercial, institutional, residential) __________________________ Units (metric or imperial) _____________

3. GENERAL INFORMATION ON WALLS
Block product __________________________ Techo-Bloc Distributor __________________________
Maximum wall height (above-ground) __________________________ Wall length __________________________
Tiered wall ☐ No ☐ Yes LOWER WALL Distance between UPPER WALL

Height __________________________ __________________________ __________________________

If a grading plan is available, include it with this request (drawings should indicate the location of the wall, grade lines and loads). Otherwise, clear and detailed sketches must be provided.

4. SLOPE INFORMATION
Indicate the angle or the ratio. For example, for a 1-unit vertical difference in level on a 3-unit horizontal plan, write 1V:3H.

Slope at BASE of wall? ☐ No ☐ Yes __________________________ (angle or ratio)
Slope ABOVE wall? ☐ No ☐ Yes __________________________ (angle or ratio)

5. SURCHARGE ABOVE WALL

TYPE OF SURCHARGE (LOAD) WALL DISTANCE
☐ Route __________________________
☐ Parking / alley for heavy vehicles __________________________
☐ Parking / alley for light vehicles __________________________
☐ Swimming pool __________________________
☐ Paved surface (patio) __________________________
☐ Lawn / grass __________________________
☐ Other __________________________

6. TYPE OF SOIL
Reinforced soil ___________ Retained soil ___________
☐ Clean sand and gravel ☐ Silty sand
☐ Silty gravel ☐ Clayey sand
☐ Clayey gravel ☐ Silt and clay
☐ Other __________________________

If a soil report is available, attach it to this request.

Return this request by one of the following methods: Fax 450 656-1983 | Email walls@techo-bloc.com  
Mail Techo-Bloc - 5255 Albert-Millichamp Street, Saint-Hubert, QC J3Y 8Z8
## SUMMARY OF CHARACTERISTICS | Wall without geogrid

<table>
<thead>
<tr>
<th>Type of wall</th>
<th>Number of rows</th>
<th>Meters</th>
<th>Ft.</th>
<th>Wall inclination degrees</th>
<th>Wall inclination mm</th>
<th>Inches</th>
<th>Meters</th>
<th>Ft.</th>
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<td>Escala</td>
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<td>7</td>
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<td></td>
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<td>9/16</td>
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<td>9/32</td>
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<td>9/16</td>
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<td>25/32</td>
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<td>(regular unit)</td>
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<td>11</td>
<td>76</td>
<td>3</td>
<td>5.2</td>
<td>17</td>
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</table>

1. The maximum wall height recommended in this table is based on the following conditions:
   - The retained soil type considered is gravel with an internal friction angle of at least 36°.
   - There is no surcharge load applied on top of the wall.
   - There is no slope on top of the wall.
   - An adequate drainage system is provided at the back of the wall.

2. These products can be used with geogrid reinforcement to build higher walls or walls subject to different conditions than those mentioned.
   
   Contact your Techo-Bloc representative for more details or fill out our Preliminary Design Assistance form (see page 195).

3. Minimum wall radius is measured at the front face of the wall. It corresponds to the lowest course in an internal curve and to the uppermost course in an external curve (see pages 126 and 127).
The information contained in the design charts is supplied for information purposes only and as such should only be used for preliminary designs. A qualified engineer should be consulted for the final design to be used for construction. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers cannot under any circumstances be held liable for the incorrect use of information contained in the design charts.

The design charts show the number, position and length of the geogrids for a Techo-Bloc inclined wall based on the height of the wall, soil type and the load conditions. Furthermore, geogrid may be required for walls with a height lower than the minimum stated. The geogrid layout has been optimized to satisfy the minimum design requirements of the “Design Manual for Segmental Retaining Walls, 3rd Edition” from the National Concrete Masonry Association.

The height (H) of the wall is the total height from the leveling pad to the top of the wall, including the coping stones of 75 mm (2.95 in) thick. The wall height varies approximately from 1.97 ft. (0.6 m) to 8.20 ft. (2.5 m), gradually increasing in height increments of 1.31-1.97 ft. (0.4-0.6 m). THE THREE TYPES OF SOIL ASSUMED IN THE REINFORCED SOIL ZONE ARE:

(i) Mixes of sand and gravel (minimum friction angle of 34°);
(ii) Sands (minimum friction angle of 30°);
(iii) Low plasticity silts and clays (minimum friction angle of 26°).

The description of the soil is provided for information purposes; it is the actual shear strength parameter that will govern the design. THE THREE LOAD CONDITIONS ASSUMED ARE:

(i) a horizontal surface above the wall with no surcharge;
(ii) a horizontal surface above the wall with a uniform surcharge of 250 psf (12 kPa) or 100 psf (4.8 kPa);
(iii) a 1:3H slope above the wall.

The symbol shows the position and length of the geogrid taken from the front of the block. The foundation soil must be able to support the wall-reinforced backfill system. A geotechnical study to ascertain the bearing capacity of the soil must be carried out. The leveling pad is made of 0-3/4 in (0-20 mm) crushed stone. A concrete pad can be used. Compaction must be carried out in successive layers of a maximum of 8" (200 mm) in thickness and in accordance with project specifications.

The minimum burial depth must be 6 in (150 mm) or 10% of the above ground wall height, whichever is greater.
Wall Design Charts USA

THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:

• Geogrid layout determined as per requirements of “NCMA Design Manual for Segmental Retaining Walls, 3rd Edition”.
• The geogrid to use must be Miragrid® 3XT by Tencate Mirafi.
• Soil parameters: reinforced soil (φ = see above, γ = 120 pcf); retained soil (φ = 26°, γ = 120 pcf); foundation soil (φ = 26°, γ = 120 pcf).
• The bearing capacity of the foundation soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
• The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
• 250 psf (12 kPa) surcharge equivalent to tractor trailer and heavy truck loadings.
• 100 psf (4.8 kPa) surcharge equivalent to car and light truck traffic.
• The design charts do not apply to tiered walls.

For further information, please contact our technical service department.
Email: WALLS@TECHO-BLOC.COM  Web site: WWW.TECHO-BLOC.COM
Wall Design Charts USA
Mini-Creta 6"

EQUIVALENT TO TWICE THE MINI-CRETA 3"
The information contained in this publication is provided for information purposes only. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers can not under any circumstances be held liable for the incorrect use of information contained in the design charts. This chart should be read in conjunction with the notes on pages 166 and 167.

REINFORCED SOIL TYPE: SAND / GRAVEL ($\phi = 34^\circ$, $\gamma = 120$ PCF)

**CASE 1**
Inclined wall (5°)
No surcharge

**CASE 2**
Inclined wall (5°)
250 psf surcharge (12 kPa)

**CASE 3**
Inclined wall (5°)
Slope 1V:3H

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Wall Design Charts USA
Mini-Creta 6"

EQUIVALENT TO TWICE THE MINI-CRETA 3"
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CASE 1
Inclined wall (5°)
No surcharge

REINFORCED SOIL TYPE: SAND (ϕ = 30°, γ = 120 PCF)

CASE 2
Inclined wall (5°)
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (5°)
Slope 1V:3H

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**Wall Design Charts USA**

**Mini-Creta 6”**

**EQUIVALENT TO TWICE THE MINI-CRETA 3”**
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**CASE 1**
Inclined wall (5°)
No surcharge

**CASE 2**
Inclined wall (5°)
250 psf surcharge (12 kPa)

**CASE 3**
Inclined wall (5°)
Slope 1V:3H

**REINFORCED SOIL TYPE: SILT / LEAN CLAY (ϕ = 26°, γ = 120 PCF)**

**H =**

- 2.21' (0.675 m)
- 3.69' (1.125 m)
- 5.17' (1.575 m)
- 6.64' (2.025 m)
- 8.12' (2.475 m)

---

Mini-Creta 6”
Wall Design Charts USA
Quarry Stone 200 mm

EQUIVALENT TO TWICE THE QUARRY STONE 100 mm

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REINFORCED SOIL TYPE: SAND / GRAVEL (φ = 34°, γ = 120 PCF)

CASE 1
Inclined wall (4°)
No surcharge

CASE 2
Inclined wall (4°)
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (4°)
Slope 1V:3H
EQUIVALENT TO TWICE THE QUARRY STONE 100 mm

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CASE 1
Inclined wall (4°)
No surcharge

CASE 2
Inclined wall (4°)
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (4°)
Slope 1V:3H
Wall Design Charts USA
Quarry Stone 200 mm

EQUIVALENT TO TWICE THE QUARRY STONE 100 mm
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CASE 1
Inclined wall (4°)
No surcharge

CASE 2
Inclined wall (4°)
100 psf surcharge (4.8 kPa)

CASE 3
Inclined wall (4°)
Slope 1V:3H

REINFORCED SOIL TYPE: SILT / LEAN CLAY (φ = 26°, γ = 120 PCF)
CASE 1
Inclined wall (7.6")
No surcharge

CASE 2
Inclined wall (7.6")
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (7.6")
Slope 1V:3H

Reinforced soil type: SAND / GRAVEL (\(\phi = 34^\circ\), \(\gamma = 120\) PCF)

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Wall Design Charts USA

Semma

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CASE 1
Inclined wall (7.6°)
No surcharge

CASE 2
Inclined wall (7.6°)
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (7.6°)
Slope 1V:3H

REINFORCED SOIL TYPE: SAND (φ = 30°, γ = 120 PCF)
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**CASE 1**
Inclined wall (7.6°)
No surcharge

**CASE 2**
Inclined wall (7.6°)
250 psf surcharge (12 kPa)

**CASE 3**
Inclined wall (7.6°)
Slope 1V:3H
Wall Design Charts USA
Suprema

The information contained in this publication is provided for information purposes only. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers can not under any circumstances be held liable for the incorrect use of information contained in the design charts. This chart should be read in conjunction with the notes on pages 166 and 167.

**REINFORCED SOIL TYPE: SAND/GRAVEL \( (\phi = 34^\circ, \gamma = 120\text{ PCF}) \)**

<table>
<thead>
<tr>
<th>Case</th>
<th>Description</th>
<th>Surcharge (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CASE 1</strong></td>
<td>Inclined wall ( (4.5^\circ) )</td>
<td>No surcharge</td>
</tr>
<tr>
<td><strong>CASE 2</strong></td>
<td>Inclined wall ( (4.5^\circ) )</td>
<td>250 psf (12 kPa)</td>
</tr>
<tr>
<td><strong>CASE 3</strong></td>
<td>Inclined wall ( (4.5^\circ) )</td>
<td>Slope 1V:3H</td>
</tr>
</tbody>
</table>

---

**Suprema**

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Wall Design Charts USA

Suprema

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CASE 1
Inclined wall (4.5°)
No surcharge

CASE 2
Inclined wall (4.5°)
250 psf surcharge (12 kPa)

CASE 3
Inclined wall (4.5°)
Slope 1V:3H
Wall Design Charts USA
Suprema

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**REINFORCED SOIL TYPE: SILT / LEAN CLAY (φ = 26°, γ = 120 PCF)**

**CASE 1**
Inclined wall (4.5°)
No surcharge

**CASE 2**
Inclined wall (4.5°)
250 psf surcharge (12 kPa)

**CASE 3**
Inclined wall (4.5°)
Slope 1V:3H
The information contained in the design charts is supplied for information purposes only and as such should only be used for preliminary designs. A qualified engineer should be consulted for the final design to be used for construction. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers can not under any circumstances be held liable for the incorrect use of information contained in design charts.

The design charts are graphically presented to show different configurations of Monumental gravity-wall (geogrid is not required) at the setback position (3" (76 mm) setback per block course) and near vertical position (3/8" (10 mm) setback per block course). Monumental walls can be made of uniform depth block units (either regular or base units). However, in some cases, for economics and speed of construction, regular and base block units are combined. The design charts on the following pages cover the scenarios of walls with uniform and combined depth block units. Each configuration was optimized to meet the minimum design requirements as prescribed in the NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.

The height (H) of the wall is the total height from the leveling pad to the top of the wall including the Monumental cap unit of 3.94" (100 mm) thick. The wall height ranges from 1.64' (0.5 m) to 10.83' (3.3 m), increasing in height incrementally by 1.31' (0.4 m).

THE THREE TYPES OF RETAINED SOIL ASSUMED ARE:

(i) sand and gravel mixes (friction angle of 36° min.);

(ii) sands (friction angle of 30° min.);

(iii) low plastic silts and clays (friction angle of 28° min.).

The soil descriptions are provided only as a general guide and it is the actual shear strength parameter that will govern the design. The assumed moist unit weight of soils is 125 pcf (19.6 kN/m³).
THE FOUR LOAD CONDITIONS ASSUMED ARE:

(i) a horizontal surface above the wall with no surcharge;

(ii) a horizontal surface above the wall with a uniform surcharge of 100 psf (4.8 kPa);

(iii) a horizontal surface above the wall with a uniform surcharge of 250 psf (12 kPa);

(iv) a 1V:3H slope above the wall.

The foundation soil must be able to support the wall. A geotechnical study to ascertain the bearing capacity of the soil must be carried out.

The leveling pad is made of crushed stone 0-3/4” (0-20 mm). A concrete leveling pad can also be used.

Compaction must be carried out in successive layers of a maximum of 8” (200 mm) in thickness and in accordance with project specifications.

The minimum burial depth must be 6” (150 mm) or 10% of the above ground wall height, whichever is greater.

For further information, please contact our technical service department.

E-mail  WALLS@TECHO-BLOC.COM
Web site  WWW.TECHO-BLOC.COM/MONUMENTAL
Wall Design Charts USA
Monumental

The information contained in the design charts is supplied for information purposes only. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers can not under any circumstances be held liable for the incorrect use of information contained in design charts. This chart should be read in conjunction with the notes on pages 180 and 181.

Retained soil: Sand and gravel mixes ($\phi = 36^\circ$, $\gamma = 125$ pcf [19.6 kN/m$^3$])

CASE N° 1
Inclined wall (10.8°)
Surcharge: None

CASE N° 2
Inclined wall (10.8°)
Surcharge: 100 psf (4.8 kPa)

CASE N° 3
Inclined wall (10.8°)
Surcharge: 250 psf (12 kPa)

CASE N° 4
Inclined wall (10.8°)
Slope: 1V:3H

THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:
- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil $\phi = $ see above, $\gamma = 125$ pcf [19.6 kN/m$^3$]; foundation soil ($\phi = $ see above, $\gamma = 120$ pcf [18.9 kN/m$^3$]). The friction angle ($\phi$) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

For further information, please contact our technical service department.
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### CASE N° 5
Inclined wall (10.8°)
Surcharge: None

### CASE N° 6
Inclined wall (10.8°)
Surcharge: 100 psf (4.8 kPa)

### CASE N° 7
Inclined wall (10.8°)
Surcharge: 250 psf (12 kPa)

### CASE N° 8
Inclined wall (10.8°)
Slope: 1V:3H

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**THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:**

- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil $\phi$ = see above, $\gamma = 125$ psf $[19.6 \text{ kN/m}^2]$; foundation soil ($\phi = $ see above, $\gamma = 120$ psf $[18.9 \text{ kN/m}^2]$). The friction angle ($\phi$) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

For further information, please contact our technical service department.
Wall Design Charts USA
Monumental

The information contained in the design charts is supplied for information purposes only. TECHO-BLOC and its predecessors, successors, beneficiaries, employees, associates, administrators and insurers can not under any circumstances be held liable for the incorrect use of information contained in design charts. This chart should be read in conjunction with the notes on pages 180 and 181.

- Retained soil: Low plastic silts and clays (φ = 28°, γ = 125 pcf [19.6 kN/m³])

**CASE N° 9**
Inclined wall (10.8°)
Surcharge: None

**CASE N° 10**
Inclined wall (10.8°)
Surcharge: 100 psf (4.8 kPa)

**CASE N° 11**
Inclined wall (10.8°)
Surcharge: 250 psf (12 kPa)

**CASE N° 12**
Inclined wall (10.8°)
Slope: 1V:3H

THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:

- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil φ = see above, γ = 125 pcf [19.6 kN/m³]; foundation soil (φ = see above, γ = 120 pcf [18.9 kN/m³]). The friction angle (φ) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

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Retained soil: Sand and gravel mixes (\(\phi = 36^\circ\), \(\gamma = 125 \text{pcf [19.6 kN/m}^3\])

**CASE NO 13**
Near vertical wall (1.4°)
Surcharge: None

**CASE NO 14**
Near vertical wall (1.4°)
Surcharge: 100 psf (4.8 kPa)

**CASE NO 15**
Near vertical wall (1.4°)
Surcharge: 250 psf (12 kPa)

**CASE NO 16**
Near vertical wall (1.4°)
Slope: 1V:3H

THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:

- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil \(\phi = \) see above, \(\gamma = 125 \text{pcf [19.6 kN/m}^3\]); foundation soil (\(\phi = \) see above, \(\gamma = 120 \text{pcf [18.9 kN/m}^3\])). The friction angle (\(\phi\)) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

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Retained soil: Sands ($\phi = 30^\circ$, $\gamma = 125$ pcf [19.6 kN/m$^3$])

**CASE NO 17**
Near vertical wall (1.4°)
Surcharge: None

**CASE NO 18**
Near vertical wall (1.4°)
Surcharge: 100 psf (4.8 kPa)

**CASE NO 19**
Near vertical wall (1.4°)
Surcharge: 250 psf (12 kPa)

**CASE NO 20**
Near vertical wall (1.4°)
Slope: 1V:3H

The design charts were developed based on the following conditions:

- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil $\phi =$ see above, $\gamma =$ 125 pcf [19.6 kN/m$^3$]; foundation soil ($\phi =$ see above, $\gamma =$ 120 pcf [18.9 kN/m$^3$]). The friction angle ($\phi$) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

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**CASE Nº 21**  
Near vertical wall (1.4°)  
Surcharge: None

**CASE Nº 22**  
Near vertical wall (1.4°)  
Surcharge: 100 psf (4.8 kPa)

**CASE Nº 23**  
Near vertical wall (1.4°)  
Surcharge: 250 psf (12 kPa)

**CASE Nº 24**  
Near vertical wall (1.4°)  
Slope: 1V:3H

THE DESIGN CHARTS WERE DEVELOPED BASED ON THE FOLLOWING CONDITIONS:

- Design as per requirements of NCMA Design Manual for Segmental Retaining Walls, 3rd Edition.
- Soil parameters: (retained soil $\phi = 28^\circ$, $\gamma = 125$ pcf [19.6 kN/m$^3$]; foundation soil ($\phi = $ see above, $\gamma = 120$ pcf [18.9 kN/m$^3$]). The friction angle ($\phi$) is assumed to be the same for both the retained and foundation soils.
- The bearing capacity of the soil, settlement, and global stability must be verified and validated by a qualified geotechnical engineer.
- The hydrostatic pressure is not considered. The wall must be provided with an adequate drainage system.
- Surcharge of 250 psf (12 kPa) (trucks).
- Surcharge of 100 psf (4.8 kPa) (cars).
- The design charts do not apply to tiered walls.

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