LARGE BATTER WALLS
**IMPORTANT NOTICE**

The design specifications for Redi-Rock® blocks suggest maximum installation heights under certain assumed conditions. These wall heights were calculated using the assumed material properties and loading conditions in the Design Resource Manual and will vary from location to location depending on the soil properties and terrain. Since soil conditions and topography vary greatly from site to site, an engineering analysis must be performed for each wall installation.

Because Redi-Rock International does not build the blocks or install the wall system, Redi-Rock International does not assume any responsibility regarding structural stability of any particular block or particular wall system. In addition, Redi-Rock International assumes no responsibility in connection with any injury, death, or property damage claim whatsoever whether asserted against a Leasor, Purchaser or others, arising out of or attributable to the operation of or products produced with Redi-Rock International equipment.

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**9” (230 mm) SETBACK WALLS**

34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL ....................108
30° | FINE TO MEDIUM SAND or SILTY SAND ..................................116
28° | SILTY SAND or CLAYEY SAND ..................................................121

---

**Preliminary Height Guide**

This preliminary height guide has been prepared showing Redi-Rock walls in a variety of assumed conditions. It is intended to give the specifier an idea of what block types are required and what heights are achievable with Redi-Rock in different applications. A combination of Redi-Rock 28° (716 mm), 31° (930 mm), and 34° (991 mm) wide blocks with limits in the 9” (230 mm) setback position are used to provide the most efficient cross-section available in the different conditions.

Several assumptions have been made in preparation of the guide. They are listed in the notes below. If these assumptions do not match the wall section under consideration, block selections and achievable heights may vary from the sections shown in this guide. All wall sections for construction must be designed by a registered Professional Engineer using the actual conditions of the site.

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**Notes:**

This preliminary guide has been prepared for three different soil types and three different load conditions to give an indication of the performance of Redi-Rock wall. Redi-Rock walls are not limited to these conditions. Specific wall sections can be designed for different soil and loading conditions.

Unit weight of soil is assumed to be 120 lb/ft³ (19.66 kN/m³) or 150 lb/ft³ (24.4 kN/m³) as noted for each section of this preliminary guide. Minimum factors of safety are 1.5 for stability, 1.2 for bearing capacity, and 1.3 for global stability. Other factors of safety will result in changes from the wall heights and block selections shown in this guide.

No seismic or hydrostatic loads were included in this preliminary guide.

Ledgestone blocks were used to prepare this preliminary guide. Achievable wall heights and block selections for other textures may vary.

Independent barrier design at the top of the wall must be performed for allowable conditions. barrier requirements may result in changes to available wall heights and block selections from those shown in this guide.

Wall stability needs to be verified in the final design for site specific conditions.

The wall design shall address both internal and external drainage and shall be evaluated by the Professional Engineer who is responsible for the final wall design.

Backfill materials to be compacted to 95% modified proctor density (ASTM D1557).

All Redi-Rock International Wall System Specifications and installation recommendations should be followed.

Construction oversight should be provided on all walls to ensure proper construction according to your detailed design drawings.

For tall enough? Greater wall heights are achievable with added backfill or mechanically stabilized earth Redi-Rock walls.

Redi-Rock products are manufactured by independently owned, licensed manufacturers. Product offerings will vary between manufacturers. Contact your local manufacturer to determine what products are available for your job.
### Preliminary Height Guide

#### 9" (230 mm) SETBACK WALLS

#### ALLOWABLE STRESS DESIGN

<table>
<thead>
<tr>
<th>LOAD CONDITION A</th>
<th>NO LIVE LOAD SURFACE, NO BACK SLOPE, NO TOE SLOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO LIVE LOAD SURFACE, NO BACK SLOPE, NO TOE SLOPE</td>
<td>109</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOAD CONDITION B</th>
<th>250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE</td>
<td>112</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOAD CONDITION C</th>
<th>1 : 2.5 BACK SLOPE, NO TOE SLOPE, NO LIVE LOAD SURCHARGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 2.5 BACK SLOPE, NO TOE SLOPE, NO LIVE LOAD SURCHARGE</td>
<td>114</td>
</tr>
</tbody>
</table>

---

#### φ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

**SECTION 1 OF 3**

- **Large batter gravity walls**
- **Assumed retained and foundation soils for this Section**
- **SW, GW**
- **Internal angle of friction** φ = 34°
- **Unit weight** γ = 130 lb/ft³ (20.4 kN/m³)
- **Cohesion** c = 0 lb/ft² (0 kPa)

---

#### 9" (230 mm) SETBACK WALLS

#### ALLOWABLE STRESS DESIGN

**φ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL**

**LOAD CONDITION A | NO LIVE LOAD SURFACE, NO BACK SLOPE, NO TOE SLOPE**

<table>
<thead>
<tr>
<th>2 BLOCK HIGH SECTION</th>
<th>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</td>
</tr>
</tbody>
</table>

**LOAD CONDITION B | 250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE**

<table>
<thead>
<tr>
<th>4 BLOCK HIGH SECTION</th>
<th>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</td>
</tr>
</tbody>
</table>

**LOAD CONDITION C | 1 : 2.5 BACK SLOPE, NO TOE SLOPE, NO LIVE LOAD SURCHARGE**

<table>
<thead>
<tr>
<th>6 BLOCK HIGH SECTION</th>
<th>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (2) 41&quot; (1040 mm) Block</td>
</tr>
</tbody>
</table>

**Legend:**

- 28" (710 mm) BLOCK
- 41" (1040 mm) BLOCK
- 34° (1040 mm) BLOCK

---

**SEE NOTES AND RECOMMENDED DETAILS AT START OF PRELIMINARY HEIGHT GUIDE.**
Preliminary Height Guide

LOAD CONDITION A

<table>
<thead>
<tr>
<th>BLOCK HIGH SECTION</th>
<th>NO LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (9) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>11 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (10) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>12 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (11) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>13 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (12) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>14 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (13) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>15 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (14) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>16 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (15) 41&quot; (1030 mm) Blocks</td>
</tr>
<tr>
<td>17 BLOCK HIGH SECTION</td>
<td>(1) 28&quot; (710 mm) Top Block (16) 41&quot; (1030 mm) Blocks</td>
</tr>
</tbody>
</table>

Legend:

- 28" (710 mm) BLOCK
- 41" (1030 mm) BLOCK
- 49" (1250 mm) BLOCK

SEE NOTES AND RECOMMENDED DETAILS AT START OF PRELIMINARY HEIGHT GUIDE.
9" (230 mm) SETBACK WALLS

Preliminary Height Guide

**LOAD CONDITION B** |
250 b/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

**ALLOWABLE STRESS DESIGN**

| φ = 34° | DENSE WELL-GRATED SAND or SAND AND GRAVEL |

### 2 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(1) 41" (1030 mm) Block

### 3 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(2) 41" (1030 mm) Blocks

### 4 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(3) 41" (1030 mm) Blocks

### 5 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(4) 41" (1030 mm) Blocks

### 6 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(5) 41" (1030 mm) Blocks

### 7 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(6) 41" (1030 mm) Blocks

### 8 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(7) 41" (1030 mm) Blocks

### 9 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(8) 41" (1030 mm) Blocks

### 10 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(9) 41" (1030 mm) Blocks

### 11 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(10) 41" (1030 mm) Blocks

### 12 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(11) 41" (1030 mm) Blocks

**Legend:**

- ± 28" (710 mm) BLOCK
- ± 41" (1030 mm) BLOCK
- ± 60" (1520 mm) BLOCK

**SEE NOTES AND RECOMMENDED DETAILS AT START OF PRELIMINARY HEIGHT GUIDE.**

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**Retaining Walls Large Batter Walls**

9" (230 mm) Setback Walls

**Preliminary Height Guide**

**Load Condition C**

1:2.5 Back Slope, No Toe Slope, No Live Load Surcharge

### Allowable Stress Design

**θ = 34°**

**Dense Well-Graded Sand or Sand and Gravel**

#### 2 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks

#### 3 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks

#### 4 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks
4. 40’ (1016 mm) Blocks

#### 6 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks
4. 40’ (1016 mm) Blocks
5. 40’ (1016 mm) Blocks
6. 40’ (1016 mm) Blocks

#### 7 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks
4. 40’ (1016 mm) Blocks
5. 40’ (1016 mm) Blocks
6. 40’ (1016 mm) Blocks
7. 40’ (1016 mm) Blocks

#### 8 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks
4. 40’ (1016 mm) Blocks
5. 40’ (1016 mm) Blocks
6. 40’ (1016 mm) Blocks
7. 40’ (1016 mm) Blocks
8. 40’ (1016 mm) Blocks

#### 9 Block High Section
1. 28’ (815 mm) Top Block
2. 41’ (1050 mm) Blocks
3. 40’ (1016 mm) Blocks
4. 40’ (1016 mm) Blocks
5. 40’ (1016 mm) Blocks
6. 40’ (1016 mm) Blocks
7. 40’ (1016 mm) Blocks
8. 40’ (1016 mm) Blocks
9. 40’ (1016 mm) Blocks

**Legend:**

- 28’ (815 mm) Block
- 41’ (1050 mm) Block
- 40’ (1016 mm) Block

**See Notes and Recommended Details at Start of Preliminary Height Guide.**

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**Redi-Rock Design Resource Manual V19**

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### Preliminary Height Guide

#### Load Condition A
- **Load Condition A**: No live load surface, no back slope, no toe slope.

#### Load Condition B
- **Load Condition B**: 250 lb/ft² (12 kPa) live load surcharge, no back slope, no toe slope.

#### Load Condition C
- **Load Condition C**: 1:2.5 back slope, no toe slope, no live load surcharge.

### Allowable Stress Design

#### Retaining Walls - Large Batter Walls

**ϕ = 30°**
- Fine to medium sand or silty sand

<table>
<thead>
<tr>
<th>Load Condition</th>
<th>Description</th>
<th>Height (ft)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (1) 41&quot; (1050 mm) Block</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>4 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (3) 41&quot; (1050 mm) Blocks</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>6 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (5) 41&quot; (1050 mm) Blocks</td>
<td>120</td>
</tr>
<tr>
<td>B</td>
<td>2 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (2) 41&quot; (1050 mm) Blocks</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>5 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (4) 41&quot; (1050 mm) Blocks</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>7 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (6) 41&quot; (1050 mm) Blocks</td>
<td>120</td>
</tr>
<tr>
<td>C</td>
<td>2 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (7) 41&quot; (1050 mm) Blocks</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>9 Block High Section</td>
<td>(1) 28&quot; (710 mm) Top Block, (8) 41&quot; (1050 mm) Blocks</td>
<td>120</td>
</tr>
</tbody>
</table>

#### Legend
- 28" (710 mm) BLOCK
- 41" (1050 mm) BLOCK
- 60" (1520 mm) BLOCK

**See notes and recommended details at start of preliminary height guide.**
Preliminary Height Guide

**Load Condition A**
No live load surcharge, no back slope, no toe slope

- **10 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 19" (483 mm) Blocks
  - (2) 6" (152 mm) Block

- **11 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 41" (1030 mm) Blocks
  - (2) 6" (152 mm) Block

- **12 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (2) 41" (1030 mm) Blocks
  - (2) 6" (152 mm) Block

**Load Condition B**
250 kPa (12 kPa) live load surcharge, no back slope, no toe slope

- **2 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (2) 41" (1030 mm) Blocks

- **3 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (2) 41" (1030 mm) Blocks

- **4 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 41" (1030 mm) Blocks

- **5 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 41" (1030 mm) Blocks

- **6 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 41" (1030 mm) Blocks

- **7 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (3) 41" (1030 mm) Blocks

- **8 Block High Section**
  - (1) 28" (710 mm) Top Block
  - (2) 41" (1030 mm) Blocks

**Legend:**
- ![](image)
- ![](image)
- ![](image)

See notes and recommended details at start of preliminary height guide.

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**LOAD CONDITION C** | 1:2.5 BACK SLOPE, NO TOE SLOPE, NO LIVE LOAD SURCHARGE

2 BLOCK HIGH SECTION
(1) 29" (740 mm) Top Block
(2) 41" (1040 mm) Blocks

4 BLOCK HIGH SECTION
(1) 29" (740 mm) Top Block
(2) 41" (1040 mm) Blocks

6 BLOCK HIGH SECTION
(1) 29" (740 mm) Top Block
(2) 41" (1040 mm) Blocks
(3) 48" (1220 mm) Blocks

**LOAD CONDITION B** | 250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

3 BLOCK HIGH SECTION
(1) 29" (740 mm) Top Block
(2) 41" (1040 mm) Blocks

5 BLOCK HIGH SECTION
(1) 29" (740 mm) Top Block
(2) 41" (1040 mm) Blocks
(3) 48" (1220 mm) Blocks

**LOAD CONDITION A** | NO LIVE LOAD SURFACE, NO BACK SLOPE, NO TOE SLOPE

**Legend:**
- **29" (740 mm) BLOCK**
- **41" (1040 mm) BLOCK**
- **48" (1220 mm) BLOCK**

**Notes and Recommended Details:**
See notes and recommended details at start of preliminary height guide.
9" (230 mm) SETBACK WALLS

PRELIMINARY HEIGHT GUIDE

LOAD CONDITION A
NO LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

\[ \phi = 28^\circ \]
SILTY SAND OR CLAYEY SAND

2 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(1) 41" (1030 mm) Block

3 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(2) 41" (1030 mm) Blocks

4 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(3) 41" (1030 mm) Blocks

5 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(4) 41" (1030 mm) Blocks

6 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(5) 41" (1030 mm) Blocks

7 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(6) 41" (1030 mm) Blocks

8 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(7) 41" (1030 mm) Blocks

9 BLOCK HIGH SECTION
(1) 28" (710 mm) Top Block
(8) 41" (1030 mm) Blocks

Legend:
\[ \pm 28" \] (710 mm) BLOCK
\[ \pm 41" \] (1030 mm) BLOCK

SEE NOTES AND RECOMMENDED DETAILS AT START OF PRELIMINARY HEIGHT GUIDE.
**PRELIMINARY HEIGHT GUIDE**

**LOAD CONDITION C**

### ALLOWABLE STRESS DESIGN

**9" (230 mm) SETBACK WALLS**

**SILTY SAND or CLAYEY SAND**

#### 1:2.5 BACK SLOPE, NO TOE SLOPE, NO LIVE LOAD SURCHARGE

**2 BLOCK HIGH SECTION**
- (1) 28" (710 mm) Top Block
- (1) 41" (1030 mm) Block

**3 BLOCK HIGH SECTION**
- (1) 28" (710 mm) Top Block
- (1) 41" (1030 mm) Block
- (1) 60° (1520 mm) Block

**4 BLOCK HIGH SECTION**
- (1) 28" (710 mm) Top Block
- (3) 60° (1520 mm) Blocks

---

**Legend:**
- 28" (710 mm) BLOCK
- 41" (1030 mm) BLOCK
- 60° (1820 mm) BLOCK

---

**SEE NOTES AND RECOMMENDED DETAILS AT START OF PRELIMINARY HEIGHT GUIDE.**

---

**Project:** Residential Erosion Protection  
**Block Manufacturer:** MDC Contracting, LLC  
**Engineer:** Benchmark Engineering  
**Installer:** Harbor Springs Excavating  
**Location:** Harbor Springs, Michigan  
**Completed:** 2008