

RETAINING WALL REINFORCEMENT FIELD GUIDE

Roanoke County & City Safety Code Compliance Manual

Code Scope & Application: This document provides typical structural design schedules and a hand-held field inspection checklist for concrete masonry (block) and cast-in-place concrete retaining walls in Roanoke County and the City of Roanoke. All reinforcing steel must comply with ASTM A615 and have a minimum yield strength of 60,000 psi (Grade 60) [73]. All concrete footings must have a 28-day compressive strength of 3,500 psi complying with ACI 318 [73]. A copy of these typical details is required to be present on-site and available to the building inspector during each required inspection [70].

SECTION 1: CONCRETE MASONRY (BLOCK) WALL SCHEDULE (TABLE 1)

Masonry walls must be built in accordance with the dimensions and reinforcing steel specifications below. Vertical O-bars and corresponding footer dowels may be substituted with a single, full-height bar of equal size and spacing [77]. Mortar joint thickness must be exactly 3/8-inch [74], and mortar must comply with ASTM C270 [74]. Footing cross-bars of #3 rebar at 12" o.c. run perpendicular to the main footing P-bars [78].

Height (H)	Footing Width (W)	Vertical O-Bars & Dowels	Horizontal P-Bars	Footing Cross-Bars	Bond Beam Steel
24 inches	39 inches	#4 @ 56" o.c.	#4 @ 48" o.c.	#3 @ 12" o.c.	2 #4 bars in top course
36 inches	48 inches	#4 @ 32" o.c.	#4 @ 48" o.c.	#3 @ 12" o.c.	2 #4 bars at top & every other course
48 inches	63 inches	#4 @ 16" o.c.	#4 @ 30" o.c.	#3 @ 12" o.c.	2 #4 bars at top & every other course

SECTION 2: SOLID POURED CONCRETE WALL SCHEDULE (TABLE 2)

Solid concrete retaining walls must conform to the dimensions and reinforcing steel requirements below. Vertical O-bars and footing dowels may also be substituted with a single full-height bar of equal size and spacing [80]. Concrete walls must also contain horizontal temperature and shrinkage steel (#4 @ 18" o.c. vertically on each face) and footing shrinkage steel (#4 @ 12" o.c.) to satisfy CRSI standards [81].

Height (H)	Footing Width (W)	Vertical O-Bars & Dowels	Horizontal P-Bars	Footing Steel (Temp/Shrinkage)	Wall Steel (Temp/Shrinkage)
24 inches	39 inches	#4 @ 13" o.c.	#4 @ 8" o.c.	5 #4 bars in footing	#4 @ 18" o.c. both faces
36 inches	48 inches	#4 @ 13" o.c.	#4 @ 8" o.c.	5 #4 bars in footing	#4 @ 18" o.c. both faces
48 inches	60 inches	#4 @ 13" o.c.	#4 @ 8" o.c.	5 #4 bars in footing	#4 @ 18" o.c. both faces

CRITICAL STRUCTURAL NOTES & STANDARDS

- ☐ **Reinforcement Laps:** All overlapping steel reinforcement bars must lap by a minimum of 20 inches [74].
- ☐ **Footing Clearance:** All reinforcement steel must maintain a minimum 3-inch clearance from soil-facing concrete boundaries [78, 81].
- ☐ **Joint Spacing:** Vertical control joints must be spaced no more than 20 feet on center [81]. Expansion joints must be installed at every fourth control joint [81].
- ☐ **Grout Placement:** Masonry bond beams must be grouted solid, with vertical reinforcement secured using tie-holds (such as wire loops in bed joints) prior to pouring [79].

RETAINING WALL FIELD INSPECTION CHECKLIST

Complete this checklist on-site to verify code-compliant construction before pouring or backfilling.

Project Address: _____	Permit Number: _____
Contractor Name: _____	Inspection Date: _____

SECTION 3: PRE-POUR SUBGRADE & FOOTING CHECKLIST

- ☐ **Footing Geometry:** Verify the footing excavation width (W) matches the wall height (W=39" for 24" height, 48" for 36" height, 60" or 63" for 48" height) [77, 80].
- ☐ **Subgrade Stabilization:** If the footing subgrade is composed of soft clay, verify that a 4" to 6" compacted bed of crushed stone has been installed [84].
- ☐ **Keyway Placement:** For concrete/masonry walls, confirm that a 1"x4" keyway or heavily roughened joint is prepared to secure the starting course [78].

SECTION 4: STEEL REINFORCEMENT & LAP CHECKLIST

- ☐ **ASTM Standards & Grade:** Verify rebar is ASTM A615 Grade 60 steel (60,000 psi yield strength) [73].
- ☐ **Lap Splice Length:** Verify that all overlapped reinforcing steel bars lap by a minimum of 20 inches [74].
- ☐ **Steel Spacing (O-Bars/P-Bars):** Check that vertical O-bars and horizontal P-bars match the schedule spacing (e.g., #4@16" o.c. and #4@30" o.c. for 48" block walls) [77].
- ☐ **Concrete Cover/Clearance:** Verify a minimum of 3 inches of concrete cover exists from the soil-facing edge of the footing [78, 81].

SECTION 5: CMU BLOCK & BOND BEAM SPECIFICATIONS

- ☐ **CMU & Joint Standards:** Verify concrete masonry units (blocks) comply with ASTM C90 and head/bed mortar joints are exactly 3/8-inch thick [74].
- ☐ **Bond Beam Layout:** Verify continuous horizontal bond beams are installed at the top course and every other intermediate course, containing 2 #4 bars [77, 78].
- ☐ **Vertical Steel Placement:** Verify that vertical rebar is positioned using tie-holds (such as wire loops installed in bed joints before mortar sets) before grouting [79].

SECTION 6: CURING & BACKFILL VERIFICATION CHECKLIST

- ☐ **Concrete Curing Buffer:** Ensure no backfilling occurs against masonry or concrete walls for at least 7 days after placing concrete/grout [83].
- ☐ **Drain Pipe & Envelope:** Verify a 4-inch perforated drain pipe is installed full length, wrapped in filter fabric, and embedded in a gravel envelope (12"x12" for concrete/masonry, 12"x24" for timber) [84].
- ☐ **Compactor Buffer:** Ensure heavy compaction equipment maintains a setback distance from the wall equal to the wall's height to prevent structural distress [83].

Contractor Signature: _____

Inspector Name & Seal: _____

Signature: _____

Date: _____