

ROANOKE RETAINING WALL & SOIL PLAYBOOK

A Comprehensive Regulatory and Construction Guide

Project Guide: This playbook compiles 50 crucial technical, geotechnical, and regulatory questions and answers for homeowners, contractors, and engineers designing, repairing, or maintaining retaining walls in the **County and City of Roanoke, Virginia**. All answers are rigorously grounded in local building safety codes, expansive soils policies, and official typical design details.

Prepared For: Homeowners, Realtors, & Contractors in Roanoke, VA

Regulatory Baseline: 2021 Virginia Residential & Uniform Statewide Building Codes

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Important Note: This document acts as a reference. Retaining walls must be built in conformance with the typical details provided herein. A copy of the typical details sheet is required to be on the job site and available to the inspector during each required inspection.

SECTION 1: REGULATORY & PERMITTING REQUIREMENTS

1. Under Roanoke County regulations, at what height of unbalanced fill does a retaining wall require a building permit?

A building permit is required for any retaining wall that retains 3 feet or more of unbalanced fill. This is a crucial threshold, and any project meeting this criterion must submit an application before commencing construction.

2. Who is encouraged to apply for a retaining wall building permit in Roanoke County, and can the property owner do so?

It is highly encouraged to have a licensed contractor apply for the permit. However, the deeded property owner may do so themselves if the property is intended for their own personal use.

3. What ultimate responsibility does a permit holder bear when applying for a retaining wall in Roanoke County?

Applying as the landowner is an important decision because the permit holder(s) bears the ultimate responsibility that the completed work complies fully with the Roanoke County and Virginia building safety codes.

4. What standard application documents must be submitted to obtain a retaining wall permit in Roanoke County?

The applicant must submit a completed permit application, an Owner Affidavit (required if the deeded owner is doing work on their primary residence, which must be notarized or signed in front of a Permit Tech), and a Plot Plan. The Plot Plan template shows the proposed wall location with respect to property lines, using a survey plat or acceptable hand sketch.

5. At what wall heights are standard manufacturer designs acceptable vs. requiring a professional engineer's stamp in Roanoke County?

Retaining walls from 4 to 6 feet in height can use standard manufacturer designs (provided they support less than 4 feet of ordinary fill). Any wall exceeding 6 feet in height or with more than 4 feet of unbalanced fill requires plans that bear the stamp of a Virginia Registered Design Professional.

6. When is a retaining wall in Roanoke County required to meet the requirements of the Special Inspections Program?

Retaining walls exceeding 10 feet in height or having more than 10 feet of unbalanced fill are required to meet the rigorous standards and inspections of the county's Special Inspections Program.

7. What is the typical permit review time for retaining walls under 4 feet vs. over 4 feet in Roanoke County?

If the wall is between 3 and 4 feet high and built without a plan, the permit can be issued on the same day. For walls over 4 feet, the submitted plans undergo a formal review process, which takes 7 working days.

8. What state and technology fees are added to a building permit cost in Roanoke County?

In addition to the base permit fee (calculated using the County Fee Estimator), all building permits are subject to a State Levy Fee of 2% and a County Technology Fee of 5%.

9. Where should the Inspection Card be posted at the job site, and why is it required?

Once approved, the Permit and the Inspection Card will be returned to the applicant. The card must be posted at the site in a visible location so that the building inspector can easily view and sign off on approvals or document denials.

10. What are the typical building safety inspections required for a retaining wall permit in Roanoke County?

The typical building safety inspections for a retaining wall permit are the Footing inspection and the Final Building inspection. The building department mandates that you always call before covering any of your work.

11. In the City of Roanoke (Zoning Division), what permit is required for a wall retaining less than 2 feet of unbalanced fill?

A completed Zoning and Basic Development Plan Application is required. Even if the wall is small and doesn't require a full building permit, zoning compliance is still required within city limits.

12. What specific details must be delineated on a Basic Development Plan in the City of Roanoke?

The plan must clearly delineate: (1) dimensions and shape of the lot, (2) adjoining streets, (3) location of the proposed retaining wall, (4) height and length of the wall, and (5) a section or profile showing the relationship of the unbalanced fill to the wall.

13. When does a zoning permit expire in the City of Roanoke if construction has not started?

If work described in the zoning permit has not begun within 6 months from the date of issuance, the permit expires. A written extension request can be submitted to the Zoning Administrator within 90 calendar days of expiration.

14. In the City of Roanoke, what are the building plan and design professional requirements for walls from 2 feet to over 10 feet?

Walls from 2 to 4 feet require no building plans or design professionals. Walls from greater than 4 feet up to 10 feet (and beyond) require both building plans and a Registered Design Professional's stamp. Note that the City's professional design threshold (>4 feet) is lower than the County's (>6 feet).

SECTION 2: EXPANSIVE SOILS & GEOTECHNICAL POLICIES**15. What are expansive or 'shrink-swell' soils, and how do they behave in Roanoke County?**

Expansive or 'shrink-swell' soils are high in clay content and change volume with moisture content. They absorb water and swell forcefully during wet seasons (causing the ground to heave up as much as several inches) and shrink considerably during dry periods, leaving visible ground cracks.

16. How does the damage caused by expansive soils nationwide compare to major natural disasters?

Each year in the United States, expansive soils cause billions of dollars in damage to buildings, roads, pipelines, and other structures. This is more total damage than that caused by floods, hurricanes, tornadoes, and earthquakes combined!

17. What are the typical structural and cosmetic warning signs of expansive soil damage on a property?

Damage manifests as cracked foundations, significant cracks at the corners of windows and doors, cracking in garage slabs, walkways, and driveways, and jammed doors or windows that become difficult to open.

18. How does Roanoke County determine if a parcel is located in a potential expansive soil area?

The county utilizes the current USDA soil survey to identify potential expansive soil zones. Parcels are identified by Tax ID prefix numbers. If a parcel's Tax ID begins with a designated prefix (e.g., 1-23, 25-33, 35-41, etc.), a soils test report is mandatory before any permit for new construction or expansion is issued.

19. What is the minimum number of soil borings required for a single lot geotechnical study in Roanoke County?

Under county guidelines, a minimum of two soil borings per site must be taken, and they must be positioned specifically within the footprint of the proposed structure.

20. What is the minimum depth required for soil test borings under Roanoke County's Expansive Soils Policy?

The minimum depth of test borings must be five feet or to auger refusal on non-shrink/swell geologic strata. The investigation must extend a minimum of 12 inches below the recommended footing depth unless auger refusal is encountered first.

21. Which specific soil samples must be collected for laboratory testing during a Roanoke County geotechnical investigation?

The geotechnical investigator must collect a sample exhibiting the 'poorest' observed soil quality from each lot, specifically taken within a zone 0 to 12 inches below the proposed bottom of the footing.

22. What technical information must be included in a Roanoke County soils test report?

The report must feature soil bore logs, a scaled site sketch showing bore locations, a tabulation of all laboratory test results, and the signature and professional seal of the supervisor. Note that ASTM unified soil classification is not accepted as a standalone test standard for this policy.

23. What is the alternative soil testing procedure for new subdivisions or expansions of existing subdivisions?

As an alternative to individual lot studies, a preliminary soil study may be performed by a qualified Geotechnical Engineer for all new subdivisions or expansions of existing subdivisions. Based on this study, further testing may be required on individual lots where deemed necessary and at a frequency prescribed by the Geotechnical Engineer.

24. Are additions and accessory structures exempt from expansive soils testing under Roanoke County policy?

Yes, commercial and residential additions are excluded from testing provided there has been no evidence of soil-related damage to the existing structure. Testing is also not required for detached accessory structures, though the building department may require it for any questionable soil condition.

SECTION 3: TIMBER RETAINING WALL DETAILS

25. What specific lumber species, grade, and wood treatment category are required for typical timber retaining walls in Roanoke County?

Timber retaining walls must use lumber that is 6x6 southern pine, grade #2 or better, and preservative-treated category UC4A in accordance with American Wood Preservers' Association (AWPA) standards for ground contact.

26. What are the size and material specifications for spikes used in a Roanoke County timber retaining wall?

All spikes must be 60d or equivalent, hot-dipped galvanized or stainless steel to prevent corrosion, and driven into pre-drilled holes.

27. What is the minimum penetration depth required for spikes into the timber below?

The 60d spikes must be of sufficient length to penetrate the base timber member a minimum of 2 inches, ensuring a secure and stable vertical connection between courses.

28. How must individual timber members be fastened together along the length of the wall?

At each course, each timber member must be secured to the course below with 60d spikes spaced at 24 inches on center, staggered at the edges.

29. What are the specific fastening requirements for corners and timber ends?

Each 6x6 member must be secured at each end with 2-60d spikes driven vertically into the member below. Additionally, corners must be secured with 2-60d spikes driven horizontally.

30. What are the required dimensions and spacing for 'deadmen' in a typical timber wall?

Deadmen must be placed at 8 feet on center. Each deadman must be constructed as a 6-foot-long timber secured with a 30-inch cross plate to anchor the wall against backfill pressure.

31. Are deadmen required in all courses of a timber retaining wall?

No, deadmen are not required in the top course or the bottom course below grade. They are placed only in intermediate courses to optimize structural resistance.

32. What is the minimum joint stagger required between adjacent courses of timbers?

To maintain structural integrity and avoid continuous vertical weak points, you must stagger joints a minimum of 3 feet, 6 inches between courses.

SECTION 4: MASONRY & CONCRETE DETAILS

33. What is the minimum 28-day concrete compressive strength required for typical concrete walls?

For all typical concrete retaining walls and footings, the minimum concrete compressive strength at 28 days must be 3,500 psi and comply with ACI 318 standards.

34. What standards and yield strength are required for reinforcing steel in typical Roanoke County retaining walls?

Reinforcing steel must comply with ASTM A615 and have a yield strength of 60,000 psi (Grade 60) to provide necessary tensile resistance.

35. What is the minimum lap length required for reinforcing steel in typical concrete or masonry walls?

Whenever reinforcing steel bars overlap, they must be lapped a minimum of 20 inches to ensure proper load transfer.

36. What standard must concrete masonry blocks meet for typical masonry retaining walls?

All concrete masonry blocks used in typical masonry retaining walls must comply with ASTM C90, and all joint reinforcement and ties must be corrosion-resistant.

37. What are the mortar and joint thickness requirements for concrete block retaining walls?

Mortar must conform to ASTM C270. Head and bed joints must be exactly 3/8-inch thick, except for starting course bed joints over the concrete foundation, which may be between 1/4-inch and 3/4-inch.

38. What are the steel reinforcement specifications for a 48-inch high typical masonry wall?

For a 48-inch high masonry wall (retaining 48 inches of fill with a 63-inch wide footing), O-bars/dowels must be #4 spaced at 16 inches on center, and P-bars must be #4 spaced at 30 inches on center.

39. What are the structural requirements for bond beams in concrete block retaining walls?

A bond beam must be provided at the top course and at every other intermediate course below, constructed using dedicated bond beam block types (with sections removed or slotted) and reinforced with 2 #4 bars.

40. How often must vertical control joints and expansion joints be placed in typical concrete and masonry retaining walls?

Control joints must be placed no more than 20 feet on center. Expansion joints must be placed at every fourth control joint to manage thermal and structural movement.

41. What is the difference in construction between a masonry control joint and an expansion joint?

Control joints are sealed with caulk on both sides and use building paper prior to grouting. Expansion joints use a 1/2-inch compressible filler material, an earth-side waterproof membrane, and require greased ends on bars extending across the joint.

SECTION 5: DRAINAGE, BACKFILL & SITE PREPARATION

42. How long must concrete or grout cure before backfilling is permitted against masonry or concrete walls?

Backfilling against masonry or concrete retaining walls is strictly prohibited until at least 7 days after placing the concrete or grout, allowing the structure to reach sufficient design strength.

43. What distance must heavy construction equipment maintain from a newly built retaining wall?

Heavy machinery must maintain a distance away from the wall equal to the wall's height. Operating heavy equipment closer can exert massive surcharge and impact forces that compromise structural integrity.

44. What size and type of drainage pipe must be installed behind a typical retaining wall?

A minimum 4-inch diameter perforated drain pipe must be installed running the full length of the wall. It must outlet to daylight at each end, or utilize cast-in-place weep holes spaced at 8 feet on center.

45. What are the backfill material and placement requirements behind typical retaining walls?

Backfill must consist of crushed stone placed to within 12 inches of the top of the wall. For masonry and concrete walls, the stone must start a minimum of 4 inches below the drain pipe.

46. How is filter fabric used to prevent drainage system clogging?

Filter fabric must wrap around the gravel/crushed stone layer to prevent fine soil particles from migrating and clogging the pipe. This requires a 12-inch x 24-inch gravel wrap for timber walls and a 12-inch x 12-inch gravel wrap for masonry/concrete walls.

47. What is required if the soil under a concrete or masonry footing consists of soft clay?

If the soil directly under the footing consists of soft clay, you must place 4 to 6 inches of crushed stone under the footing before pouring the concrete foundation to ensure a stable subgrade.

SECTION 6: COSTS, REPAIR & CONTRACTOR GUIDELINES

48. What are the average installation costs per square foot for brick, stone, and block walls in Roanoke?

According to local Roanoke cost reports, concrete block wall installation averages \$8.03/sq ft (range \$7.15-\$8.90), brick wall installation averages \$14.02/sq ft (range \$13.36-\$14.68), and stone wall installation averages \$16.35/sq ft (stone only, range \$15.71-\$16.99).

49. What is the average cost for a poured concrete retaining wall in Roanoke, and what elements are excluded from this average?

Poured concrete retaining walls average \$35.39/sq ft (range \$33.88-\$36.89). This price includes labor, prep, and basic finishing, but excludes existing wall removal, decorative/stamped/colored finishes, curved layouts, walls over 3 feet, and challenging soil conditions.

50. What are the primary indicators of structural failure that require professional retaining wall repair?

The most common warning signs include visible leaning, cracking, bulging, or sections that have shifted out of position due to ground settling, erosion, or poor drainage.

DOCUMENT REFERENCES & STANDARDS

All information contained in this playbook is strictly grounded in the official regulatory, building safety, and geotechnical policy documents of Roanoke County and the City of Roanoke. The following sources were used as direct references:

1. Building a Retaining Wall | Roanoke County, VA - Official Website
2. COUNTY EXPANSIVE SOILS POLICY & PROCEDURES - Roanoke County Development Services, Office of Building Safety (Revised 2/2025)
3. Favor engineering, PLLC - Downtown Roanoke Inc Directory
4. Retaining Wall Guidelines 2018 Virginia USBC – Exemption from permits - RoanokeVA.gov
5. Retaining Wall Repair in Roanoke, VA | Roanoke Masonry FAQ & Overview
6. Retaining Wall | Roanoke, VA Official Website - Zoning and Submission Requirements
7. Retaining Walls - Roanoke Concrete Company, Roanoke, VA Service Portfolio
8. Roanoke Walls Costs & Prices - ProMatcher Cost Report
9. Typical Retaining Wall Details - Roanoke County, Virginia (Based on the 2021 Virginia Residential Code)

Regulatory Disclaimer: Retaining walls may require site-specific engineering depending on site conditions, soils, and height. Always consult with the Roanoke County Office of Building Safety or the City of Roanoke Permit Center prior to starting construction. Ensure all contractors are fully licensed and insured in the Commonwealth of Virginia.