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Understanding Residential Foundations in Vermont & New Hampshire

A Guide for Homeowners

Why Foundations Behave Differently Here

Homes in Vermont and New Hampshire are built in a unique environment. Cold winters, freeze-thaw cycles, variable soils, and a wide range of building ages all influence how foundations perform over time.

Because of this, foundation conditions that look concerning at first glance are **not always signs of a serious structural problem** — but they do warrant understanding in the right context.

The Foundation Challenge:

Understanding Homes in Vermont & New Hampshire

Environmental Factors

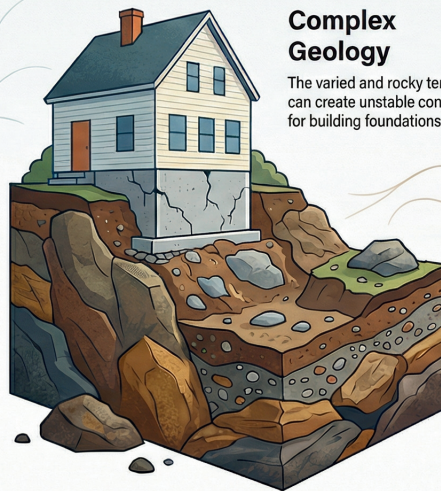
Cold Climate

Harsh winters with freezing and thawing cycles impact the ground around foundations.



Complex Geology

The varied and rocky terrain can create unstable conditions for building foundations.



Historical Factors

Older Housing Stock

Many homes were built before modern foundation standards and materials were common.



What Makes This Region Unique

Foundation performance here is commonly influenced by:

- **Freeze-thaw cycles** that expand and contract soil
- **Moisture and drainage conditions** that increase soil pressure
- **Soil type**, which affects drainage and frost susceptibility
- **Construction era**, since many homes predate modern standards
- **Alterations and additions** to a building over time

Many foundation issues develop **gradually**, not suddenly.

What This Guide Is — and Is Not

This guide is intended to:

- Explain common foundation types found in VT & NH
- Help interpret common cracking and movement patterns
- Provide context for why foundation issues occur in this region
- Clarify when professional evaluation may be appropriate

This guide is not intended to:

- Diagnose any specific building
- Replace a site-specific structural assessment
- Provide repair designs or cost estimates

Every foundation is unique. Meaningful conclusions require an in-person evaluation.

A Calm, Measured Approach

Foundation concerns can be stressful — especially during real estate transactions or renovation planning. Our approach is grounded in observation, measurement, and experience with Northern New England construction and soils.

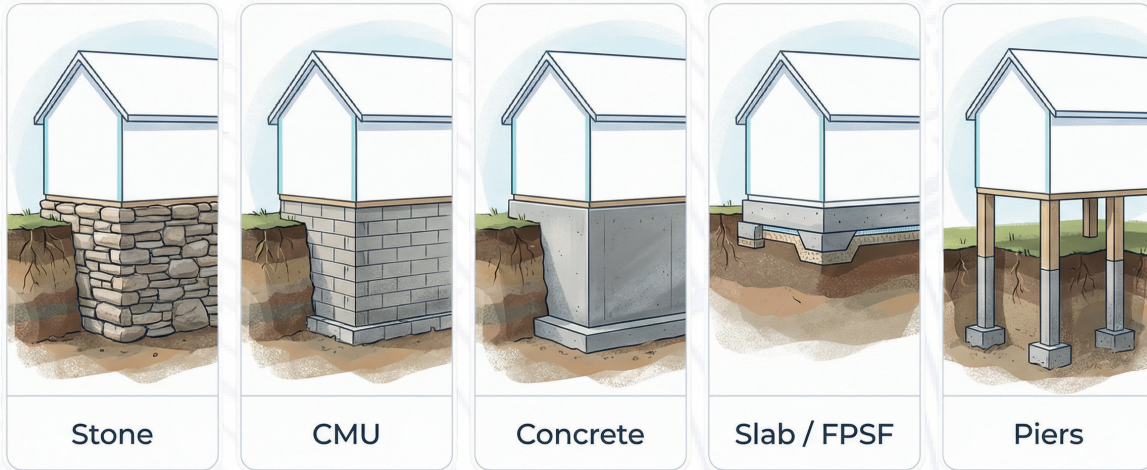
Our goal is simple: replace uncertainty with clarity.



Common Foundation Types in Vermont & New Hampshire

Homes in Vermont and New Hampshire span many construction eras and site conditions. As a result, there is **no single “standard” foundation type** in this region.

Understanding the **type of foundation** a home has provides important context for how it behaves and how concerns are evaluated.



Stone Foundations

Common in: Homes built in the 1800s and early 1900s

Stone foundations are typically constructed from fieldstone or rubble stone set in mortar and often lack modern concrete footings.

Typical characteristics

- Thick, irregular stone walls (18"-24")
- Lime-based or early cement mortar
- Basements not intended to be watertight

Common behaviors

- Mortar deterioration over time
- Localized bulging or inward movement
- Moisture intrusion

Key takeaway:

Stone foundations are common and often serviceable, but they behave differently than modern concrete walls and require careful evaluation.



Concrete Block (CMU) Foundations

Common in: Homes built from the mid-1900s through the 1980s

CMU foundations are constructed from stacked concrete blocks. Older CMU walls often contain little or no reinforcing steel.

Typical characteristics

- Hollow or minimally reinforced concrete blocks with mortar joints
- Reliance on floor framing at the top of the wall for stability

Common behaviors

- Horizontal or stair-step cracking
- Inward bowing under soil pressure
- Sensitivity to drainage and moisture conditions

Key takeaway:

CMU foundations can perform well, but they are particularly sensitive to drainage, and usually require reinforcement and top-of-wall bracing.



Cast-in-Place Concrete Foundations

Common in: Homes built from the 1960s to present

These foundations are formed and poured as continuous concrete walls and are generally stronger and stiffer than block walls.

Typical characteristics

- Solid concrete walls
- Reinforcing steel varies by age and construction

Common behaviors

- Vertical shrinkage cracking
- Occasional horizontal cracking from soil pressure
- Moisture entry through cracks or joints

Key takeaway:

Concrete foundations are robust, but cracking is common and must be interpreted based on pattern and context.



Thickened Slab / Frost-Protected Shallow Foundations

Common in: Newer homes or outbuildings such as garages

These foundations rely on slab edge thickness and insulation rather than deep footings to protect against frost.

Typical characteristics

- Slab-on-grade construction
- Insulation at perimeter used to control frost
- No full-height basement

Common behaviors

- Performance depends heavily on insulation and detailing
- Issues often relate to moisture or edge settlement

Key takeaway:

When properly designed and constructed, these foundations perform well; issues usually relate to construction or drainage details.

Pier Foundations

Common in: Camps, seasonal structures, additions, and older rural homes

Pier foundations support a structure on individual piers rather than continuous foundation walls.

Typical characteristics

- Shallow or irregular pier depths
- Open or partially enclosed crawlspaces

Common behaviors

- Differential settlement
- Frost heave
- Moisture exposure to framing

Key takeaway:

Pier foundations can be serviceable, but they are highly sensitive to frost, soil conditions, and moisture.



Why Foundation Type Matters

Each foundation type:

- Responds differently to soil and moisture
- Exhibits different cracking patterns
- Requires different evaluation approaches

Understanding the foundation type helps determine whether observed conditions are typical or warrant closer review.

Foundation Cracks: What to Pay Attention To

Seeing a crack in a foundation wall can be unsettling — but **not all cracks indicate a structural problem**. In practice, the **orientation, pattern, and context** of a crack are often more informative than width alone.

The following pages summarize the most common foundation crack types seen in Vermont and New Hampshire and what they typically indicate.

Vertical Cracks

Typical appearance

- Mostly vertical
- Narrow and relatively uniform
- Often extend partway up the wall

Typical cause

Concrete shrinkage during curing.

Structural concern

Usually low when crack edges remain flush and uniform and crack width is consistent.

Key takeaway:

Vertical cracks are very common and often, though not always, non-structural.



Diagonal or Stair-Step Cracks

Typical appearance

- Slanted cracks, or
- Stair-step patterns in block walls

Typical cause

Differential movement (settlement or frost-related).

Important exception

Short diagonal cracks at window or door corners are often shrinkage-related and not structurally concerning.

Key takeaway:

Diagonal cracking often reflects movement — location and pattern matter.



Horizontal Cracks

Typical appearance

- Horizontal cracks along the wall
- Often near mid-height

Typical cause

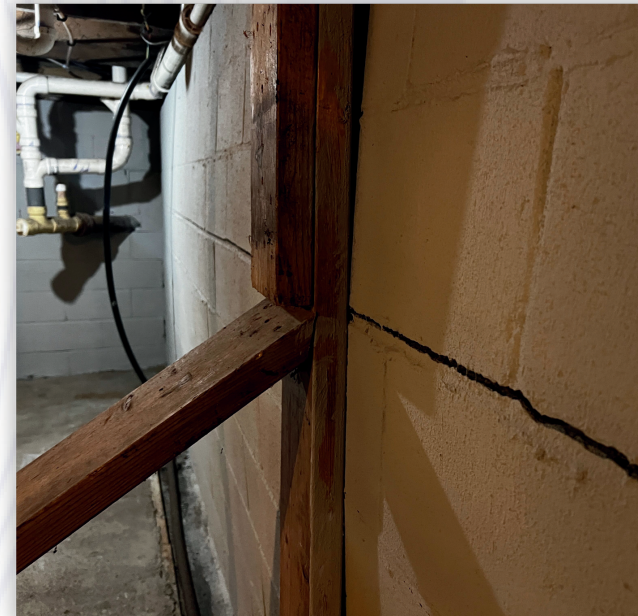
Inward wall deflection from lateral soil pressure, often increased by moisture or frost.

Structural concern

Generally considered the most significant structural crack type.

Key takeaway:

Horizontal cracks should be evaluated to understand whether inward wall movement is occurring.



Crack Pattern vs. Crack Width

A common misconception is that **crack width alone determines severity**. In reality, greater emphasis should be placed on:

- Crack orientation and shape
- Whether the crack varies in width
- Location on the wall
- Signs of change over time

Key takeaway:

Patterns and behavior over time matter more than a single measurement.

Foundation Cracks: Signs of Structural Movement

While not all foundation cracks are cause for alarm, some are accompanied by other signs that point to significant structural movement.



Bowing or Bulging Walls

This indicates significant external pressure is being applied to the foundation wall.

Uneven Crack Width

A crack wider at one end suggests rotational movement or uneven settlement.

Sloping Floors

Floors that slant near a foundation crack point to significant settlement.

Sticking Doors or Windows

Foundation shifts can distort frames, causing doors and windows to misalign.

Why Cracks and Movement Happen Here

Frost, Drainage, Soil, and Wall Behavior in Northern New England

Foundation issues in Vermont and New Hampshire rarely result from a single cause. More often, they develop gradually due to the **combined effects of climate, soil, water, and structural design** over time.

Understanding these factors helps explain why cracking or movement occurs — and why similar-looking homes can behave very differently.

Frost and Freeze–Thaw Effects

Cold winters cause moisture in soil to freeze and expand. In frost-susceptible soils, this creates upward and lateral pressures on foundations. When soils thaw, they do not always return to their original position.

Common effects:

- Gradual settlement
- Differential movement at corners or transitions
- Repeated seasonal stress on walls and footings

Key takeaway:

Frost-related movement is typically slow and seasonal, not sudden.

Water and Drainage

Water significantly increases the pressure soil exerts on foundation walls. Saturated soils are heavier and more susceptible to frost effects.

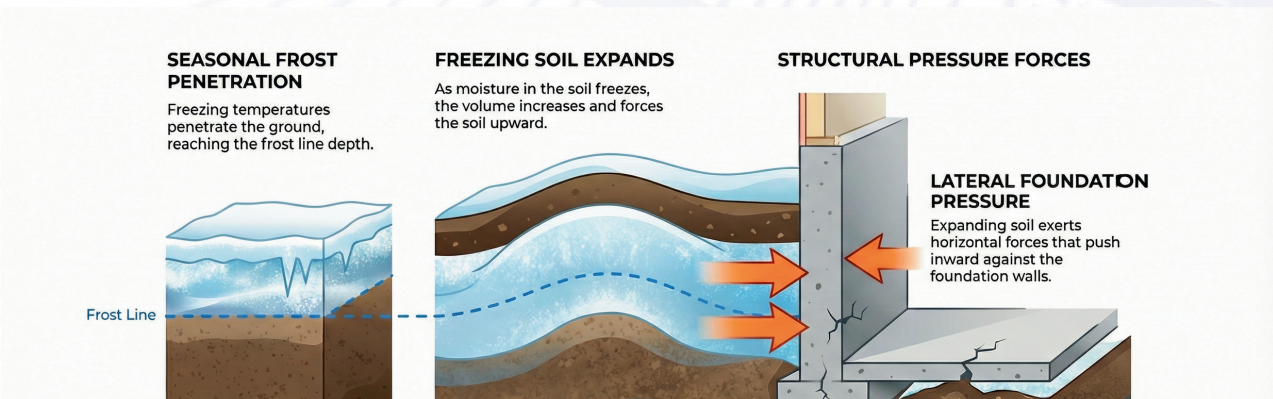
Common contributors:

- Roof runoff discharging near the foundation
- Missing or ineffective gutters
- Poor surface grading
- Moisture-retaining soils
- Lack of perimeter drainage

Interior signs such as floor dampness or efflorescence on walls often reflect exterior drainage conditions.

Key takeaway:

Managing water around a home is often as important as maintaining the foundation itself.



Soil Type Matters

Different soils behave very differently around foundations.

- **Granular soils (sand, gravel):** drain well and exert lower lateral pressure
- **Fine-grained soils (clay, silt):** retain moisture, expand when wet or frozen, and exert higher pressure

Many sites contain layered or mixed soils, which can lead to uneven movement.

Key takeaway:

Foundation movement is often driven by soil–water interaction, not just the foundation material.

Basement Walls vs. Retaining Walls

Most residential basement walls are **not designed to act as standalone retaining walls**.

They are typically intended to be:

- Retaining soil on the exterior, and
- Braced at the top by the first-floor framing

If floor framing is altered or soil and drainage loads increase, a basement wall may be forced to behave like a retaining wall, increasing the likelihood of inward movement and cracking.

Key takeaway:

How a wall is supported matters as much as what it is made of.

Why Issues Often Develop Slowly

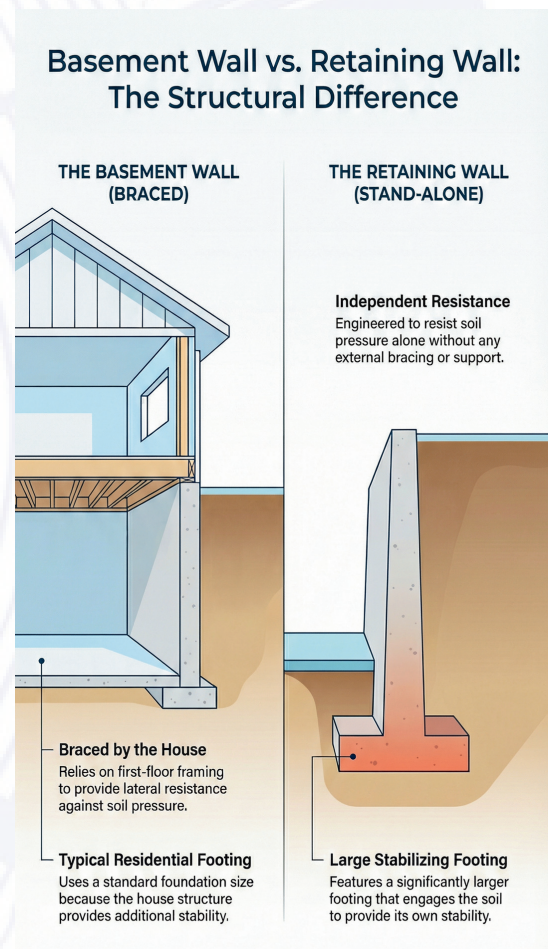
Foundation conditions often evolve over decades due to:

- Seasonal freeze–thaw cycles
- Long-term moisture and drainage patterns
- Gradual soil behavior
- Changes to the building over time

Because of this, many foundations show signs of movement long before they show signs of distress.

Key takeaway:

Understanding why movement occurs helps determine what, if anything, should be done.



When to Seek a Structural Foundation Assessment

Replacing Uncertainty with Clarity

Many foundation conditions are common in Vermont and New Hampshire and do not require immediate repair. Others warrant a closer look to understand **what is happening, why it is happening, and what options are reasonable**.

A structural foundation assessment is intended to provide that clarity.

Situations That Often Warrant Further Evaluation

You may wish to seek a structural assessment if you observe one or more of the following:

- **Horizontal cracking** in foundation walls
- **Inward bowing or bulging** of basement walls
- **Diagonal or stair-step cracking** that appears to be increasing
- **Foundation cracks wider at one end** than the other
- **Sloping floors** or uneven transitions near foundation walls
- **Doors or windows that stick** or go out of alignment
- **Ongoing moisture intrusion** or significant efflorescence
- **Planned renovations** affecting load-bearing walls or foundations
- **Real estate transactions** where foundation concerns have been raised

Important note:

A crack or imperfection alone does not automatically indicate a structural problem. Context, pattern, and behavior over time matter.

What a Structural Foundation Assessment Provides

A structural foundation assessment focuses on **performance**, not just appearance. It typically provides:

- A professional evaluation of existing conditions
- Measured observations (not just visual impressions)
- Insight into likely contributing factors (soil, drainage, structure)
- A distinction between **historic conditions** and **active movement**
- Clear guidance on appropriate next steps

In some cases, the outcome may be reassurance and monitoring.

In others, it may involve recommendations for further investigation or repair.

What an Assessment Is — and Is Not

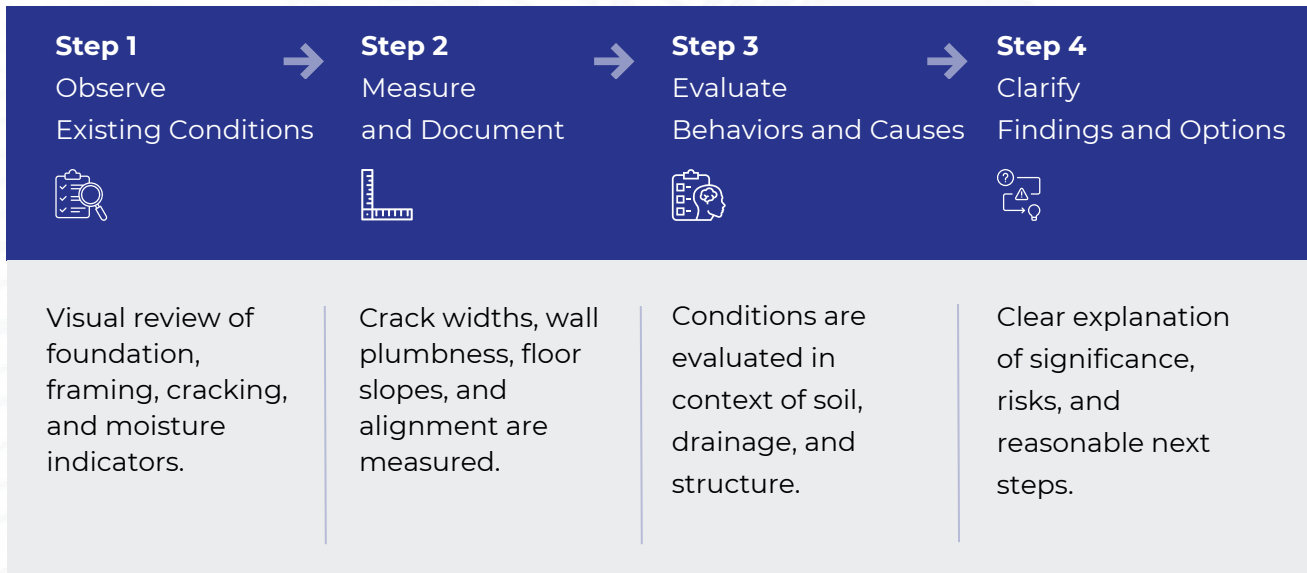
A structural assessment is

- An engineering-based evaluation
- Focused on understanding causes and behavior
- Intended to support informed decision-making

A structural assessment is not

- A contractor bid or scope of work
- A guarantee against future movement

What Happens During a Structural Foundation Assessment



Why Timing Matters

Foundation issues don't typically require emergency action, but **early understanding** can often:

- Prevent unnecessary repairs
- Reduce uncertainty
- Help prioritize maintenance or improvements
- Support long-term planning

Key takeaway:

Our goal is to respond thoughtfully, with clarity-guided solutions.

Our Approach

At Mass Timber Advisors, our work is grounded in careful observation, measurement, and experience with Northern New England construction and soils.

Our role is to help homeowners, buyers, and real estate professionals understand:

- What is happening
- Why it is happening
- What options make sense moving forward

Next Steps


If you have questions or concerns about a foundation — or would like professional clarity before making a decision — a structural foundation assessment can provide that perspective.

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