

Building Defect Analysis Report

Root Cause Analysis

Report Generated: 1/28/2026, 9:27:23 AM
Property ID: P6
Historical Data Analyzed: 3 records

Identified Root Causes

1. Differential Foundation Settlement

Confidence: HIGH

Reasoning: The large, diagonal crack (3mm wide) running from the ceiling corner to the window frame in R1, coupled with the observation of 'signs of recent structural movement,' is a classic indicator of differential foundation settlement. This is a fundamental failure where parts of the foundation settle unevenly relative to others, placing undue stress on the superstructure. This stress manifests as diagonal cracks, often originating from corners of openings. In 'South' regions, expansive clay soils are common, which can cause significant movement due to moisture fluctuations (wetting and drying cycles), or it could be due to inadequate soil compaction/preparation during construction. This is not a symptom but the underlying cause of the structural crack and ongoing movement.

Affected Systems:

- Structural System
- Foundation System
- Building Envelope

2. Active Plumbing Leak

Confidence: HIGH

Reasoning: The significant water staining, discoloration, and paint peeling covering approximately 2 square meters on the ceiling in R2, located 'near the bathroom area,' strongly points to an active and persistent plumbing leak. This is further corroborated by the presence of black mold growth in the same room (R2), with a pattern suggesting 'moisture accumulation over an extended period.' The mold is a direct consequence of the water damage, and the water damage is a direct consequence of the leak. Therefore, the active plumbing leak (e.g., from a supply line, drain pipe, shower pan, or toilet seal in the bathroom directly above or adjacent) is the root cause of both the water damage and subsequent mold growth. This represents a failure within the plumbing system allowing uncontrolled water egress.

Affected Systems:

- Plumbing System
- Building Envelope
- Indoor Environmental Quality

Ø=Üj Immediate Action Recommendations

1. Immediately engage a qualified structural engineer to perform a comprehensive assessment of the foundation and structural integrity of the building (R1). This assessment should include investigation of soil conditions and drainage patterns around the foundation.

2. Implement any temporary shoring or stabilization measures recommended by the structural engineer to prevent further movement in R1 and ensure occupant safety.

3. Promptly locate and repair the source of the active plumbing leak in the bathroom area above or adjacent to R2. This will likely require opening up the ceiling or wall to access pipes, fixtures, or waterproofing membranes.

4. Isolate the affected area in R2 to prevent the spread of mold spores and engage a qualified mold remediation specialist to safely remove all mold growth and contaminated building materials (e.g., drywall, insulation).

5. Ensure thorough drying and dehumidification of the affected areas in R2 after the leak repair and mold remediation are complete, and inspect for any secondary damage to structural framing, electrical components, or HVAC systems due to prolonged moisture exposure.

