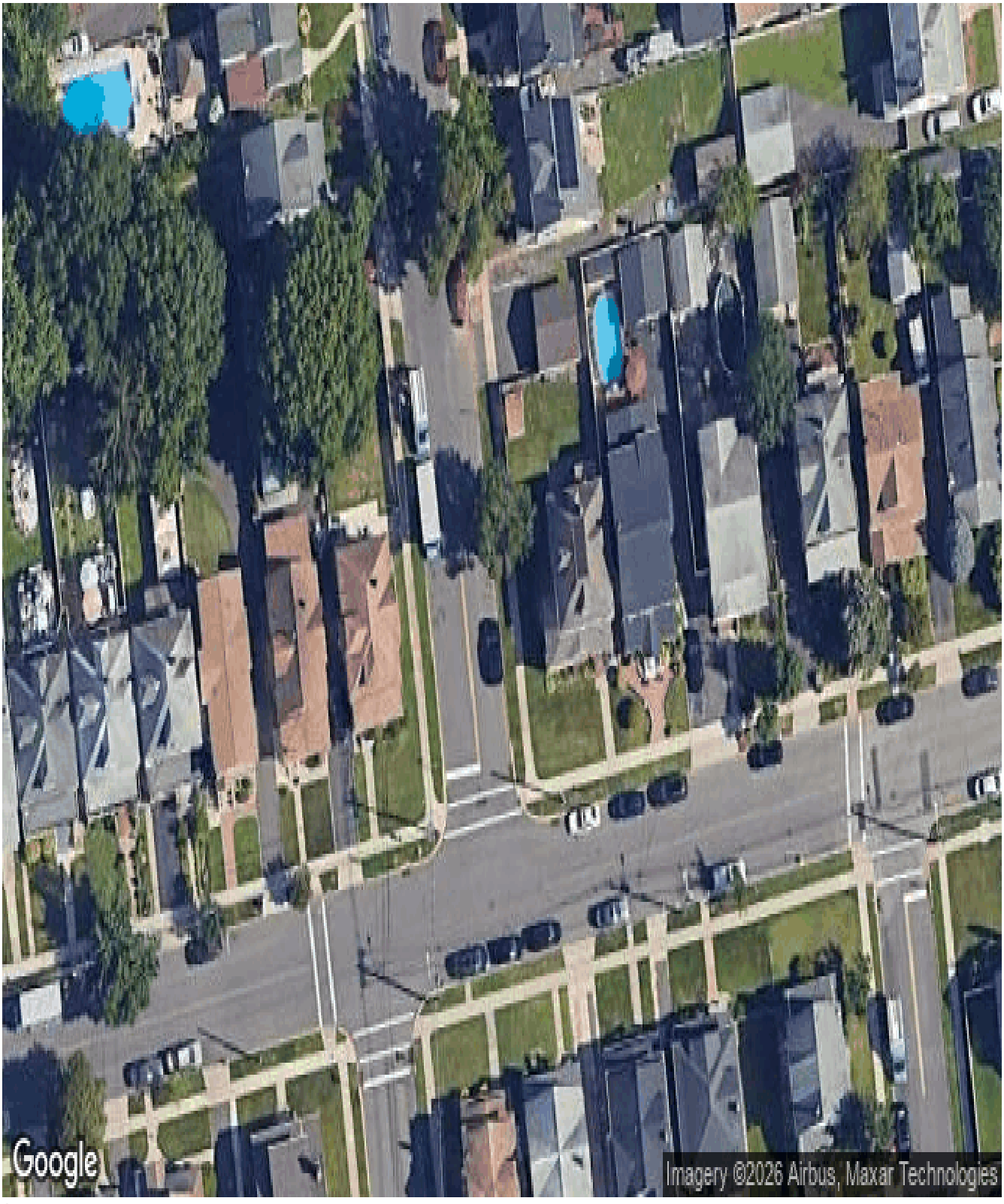
FORENSIC ROOF ANALYSIS

Mechanism-Based Evaluation of Observed Conditions

AERIAL / SATELLITE VIEW



STREET VIEW

PHOTO 1 OF 7: continuities_2026020613013921.jpg

Primary Damage Location: Roof field

Mechanism(s):
Predominant: Wind uplift
Secondary: Not observable

Evidence:
• Distributed out-of-plane shingle tab elevation
• Repetitive pattern of shingle lifting across the roof field
• Subtle shadow lines indicating shingle displacement

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on distributed out-of-plane shingle tab elevation, as reflected in a repetitive pattern across the roof field.

PHOTO 2 OF 7: pjnew2.jpg

Primary Damage Location: Roof-to-masonry interface

Mechanism(s):
Predominant: Wind uplift
Secondary: Structural movement

Evidence:
• Material loss and out-of-plane displacement of multiple shingle courses at the roof-to-masonry interface.
• Distorted and separated flashing at the interface with the masonry element.
• Step-pattern displacement and misalignment of shingle courses.

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on material loss and out-of-plane shingle displacement, as reflected in step-pattern displacement across the roof-to-masonry interface.

PHOTO 3 OF 7: PJFitzpatrick1.jpg

Primary Damage Location: Roof-to-wall interface below the window.

Mechanism(s):
Predominant: Wind uplift
Secondary: Wind-driven rain

Evidence:
• Distorted trim/flashing at the roof-to-wall interface.
• Out-of-plane elevation and bowing of the trim/flashing.
• Visible gap/separation between the trim/flashing and the wall.

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on distorted trim/flashing, out-of-plane elevation, and visible gap/separation, as reflected in localized deformation across the roof-to-wall interface.

PHOTO 4 OF 7: PJFitzpatrick5.jpg

Primary Damage Location: Roof-to-wall interface at the downspout termination

Mechanism(s):
Predominant: Wind uplift
Secondary: Wind-driven rain

Evidence:
• Visible separation and out-of-plane displacement of the vertical trim piece from the roof surface at the roof-to-wall interface.
• Observable gap between the bottom edge of the wall siding and the roof shingles.
• Localized granule loss on shingles directly below the downspout discharge point.

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on visible separation and out-of-plane displacement of the vertical trim piece from the roof surface, as reflected in localized deformation at the roof-to-wall interface.

PHOTO 5 OF 7: PXL_20251219_161036692.jpg

Primary Damage Location: Lower roof eave and upper roof rake

Mechanism(s):
Predominant: Wind uplift
Secondary: Wind-driven rain

Evidence:
• Exposed sheathing/underlayment due to missing shingles.
• Out-of-plane shingle elevation and displacement along roof edges.
• Step-pattern (zippering) of shingle courses along roof edges.

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on exposed sheathing, out-of-plane shingle elevation, and step-patterning, as reflected in distributed displacement across the lower roof eave and upper roof rake.

PHOTO 6 OF 7: DJI_20260214212027_0019_D.JPG

Primary Damage Location: Roof-to-wall interface

Mechanism(s):
Predominant: Wind uplift
Secondary: Wind-driven rain

Evidence:
• Exposed sheathing at the roof-to-wall interface.
• Displaced shingles with out-of-plane elevation at the roof-to-wall interface.
• Visible gap and separation between the roof system and the adjacent wall/trim.

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on exposed sheathing, displaced shingles with out-of-plane elevation, and a visible gap at the interface, as reflected in localized deformation across the roof-to-wall interface.

PHOTO 7 OF 7: IMG_20260207_110457.jpg

Primary Damage Location: Roof field

Mechanism(s):
Predominant: Wind uplift
Secondary: Bond failure

Evidence:
• Out-of-plane shingle elevation (tenting/lifting)
• Distributed shingle displacement
• Bond-line separation of shingle tabs

Conclusion: Observed conditions are most consistent with Wind uplift associated with loading, based on out-of-plane shingle elevation and bond-line separation, as reflected in distributed shingle displacement across the roof field.

SYSTEM-LEVEL CONSISTENCY ANALYSIS

Evaluates observed conditions across multiple photos for consistent response characteristics or related patterns throughout the image set.

SYSTEM-LEVEL CONSISTENCY ANALYSIS:

Observed Damage-Pattern-Mechanism Consistency:
• The widespread occurrence of out-of-plane shingle elevation and displacement across both roof fields (Photo 1, Photo 7) and perimeter zones (Photo 5) suggests a pervasive upward force.
• Consistent observations of distorted, separated, or elevated flashing/trim at various roof-to-wall and roof-to-masonry interfaces (Photo 2, Photo 3, Photo 4, Photo 6) indicate localized stress concentrations at these transitions.
• The presence of step-pattern displacement and "zippering" along roof edges (Photo 5) and at interfaces (Photo 2) is mechanically compatible with progressive shingle detachment under uplift forces.
• The progression from shingle elevation to material loss and exposed sheathing (Photo 2, Photo 5, Photo 6) across different roof zones indicates a consistent failure sequence under sustained or repeated loading.
• The directional consistency of out-of-plane displacement across all observed locations supports a common upward load vector.

Mechanically Compatible Mechanism(s):

Primary Compatible Mechanism: Wind uplift

Secondary Compatible Mechanism(s): Structural movement, Wind-driven rain, Bond failure

Contributing Conditions:
• Roof-to-wall and roof-to-masonry interface conditions
• Roof perimeter and edge conditions
• Shingle bond-line integrity

Condition-Response Load Mapping:
Roof-to-wall and roof-to-masonry interface conditions -> Wind uplift interaction -> Distorted/separated flashing/trim, material loss, visible gaps
Roof perimeter and edge conditions -> Wind uplift interaction -> Out-of-plane shingle elevation, step-pattern displacement, exposed sheathing
Shingle bond-line integrity -> Wind uplift interaction -> Out-of-plane shingle elevation, bond-line separation, distributed shingle displacement

Evidence:
• Distributed out-of-plane shingle tab elevation
• Material loss of shingle courses
• Distorted and separated flashing/trim
• Step-pattern displacement of shingle courses
• Visible gaps/separation at interfaces
• Exposed sheathing
• Bond-line separation of shingle tabs

Convergence Assessment:
Observed conditions are mechanically compatible with wind uplift, associated with upward aerodynamic forces, based on distributed out-of-plane shingle elevation, material loss, and interface separation, as reflected in consistent directional displacement and progressive detachment patterns across roof fields, edges, and various perimeter interfaces.

METHODOLOGY & STANDARDS REFERENCE

This analysis is informed by concepts reflected in recognized industry literature, technical guidance, and generally accepted forensic engineering practices, including publicly available materials from organizations such as FEMA, IBHS, WBDG, HUD, FM Global, NRCA, ASCE (including ASCE 7), and ASHRAE, as well as established building science literature and peer-reviewed research on asphalt shingle performance and aging. References to such materials are illustrative and do not imply direct application of any specific standard or verification of compliance. This analysis is limited to the information available at the time of review and may be revised if additional information becomes available. It provides a mechanism-based evaluation of observed conditions and does not constitute a licensed engineering opinion, certification, or code compliance determination.

The methodology applied evaluates observable evidence within a mechanism-based framework, considering factors such as load-path behavior, material response, environmental effects, and system interaction. The analysis seeks consistency between observed conditions and generally accepted physical principles. Conclusions are based on mechanical plausibility and evidentiary support and are not intended as determinations relative to specific design standards, thresholds, or regulatory criteria.