STEEL CORE ENGINEERING

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November 11, 2024

To: NYC Department of Buildings
Forensic Engineering Unit
280 Broadway, 4th Floor
New York, NY 10007

Attn: Mr. Philip Ng

Subject:
109 East 9th St. New York, NY 10003
Block: 555**, Lot:** 40
Construction Classification: Class 3 Non-Fireproof (1938 Building Code classification)
Re: Additional Probing of Upper Floors structure

Dear Mr. Ng,

We would like to inform you that our office has visited **109 East 9th St. New York** to conduct a reinspection of the installed temporary shoring and to conduct further probes and investigations where we had access in vacant tenant spaces during our site visit. The temporary shoring was visually inspected to be in compliance and remained in place. Additional probes were created and visually inspected to give us a better understanding of the existing building framing conditions in other locations throughout the upper floors of the building where we currently had access. Our findings show that there are multiple structurally hazardous conditions at the upper floors which require reinforcement and repair work done as soon as possible.

Summary of Findings:

1. **Deterioration of Exterior Bearing Masonry Walls:** The exterior bearing masonry walls have significant deterioration from water damage and the deterioration worsens as you go up the building to the point where large gaps exist between bricks and bricks can be moved by hand. Such a condition makes the structural bearing wall unsuitable when resisting wind loading as there is no tensile capacity in the upper floors when resisting out of plane bending moments.
2. **Compromised Mortar Joints:** The dried-up, severely deteriorated and crumbling mortar joints throughout the building's bearing masonry walls also decreases the compression strength of the walls as the load has to be transferred through the structurally compromised mortar joints.
3. **Critical Joist and Beam Pocket Conditions:** Joist and beam pocket conditions throughout the upper floors have also been observed to be in critical condition. As shown in multiple photos, there are many joists, which have excessive deterioration at the beam pockets due to water damage.
4. **Insufficient Bearing of Floor Joists:** There are also floor joists, especially on the upper floors, which do not have sufficient bearing in the beam pockets or are lack bearing and

are just supported by the subfloor to which they are fastened and hang off of it. Such a condition is not safe and hazardous because the shear of the beam is not adequately transferred to the bearing masonry wall and will either fail by shear and or bearing (note that a shear failure is a sudden failure). For the conditions where no bearing exists on the wall, the load on these unsupported joists is being transferred to the next adjacent joist which does have sufficient bearing and these joists are overloaded.

5. **Water Damage to Roof Rafters and Floor Framing:** Throughout the building, the roof rafters and floor framing have substantial water damage and deterioration at the beam pockets and along their spans.
6. **Cracked Headers, Trimmers, and Floor Joists:** There are a handful of headers, trimmers and floor joists throughout the building that have large cracks and checks as shown in the photos. These members have essentially already failed and are only supported by everything else that is around them, such as the subflooring and/or floor joists which were not intended to provide such support. Existing cracks in beams are very dangerous because such beams have already experienced failure and can have a sudden collapse if further loaded. This condition will only deteriorate further over time until a sudden failure in the floor occurs.
7. **Sloping Floor Framing:** The sloping of the floor framing is experienced on all of the upper floors. The floor framing slopes towards the center of the building where there is a stair shaft and bearing walls around the stairs which bring the floor load down to the second floor (transfer floor).

Scope and Details of Conducted Investigation:

5TH FLOOR

Starting from the roof level, we had access to units 4A and 4C. In these units the roof rafters and some floor joists (5th floor framing) were exposed for visual inspection.

- **Photo #1 & #2** show roof rafters and chimney trimmer beam having extensive water deterioration. All of the roof rafters in unit 4A have water stains and have decay due to water exposure.
- **Photo #3** shows how the chimney trimmer beam is deteriorated at the beam pocket due to water exposure and this is an unsafe condition as the beam is weakened where it has to resist the maximum shear and bearing stresses.
- **Photo #4** shows the brick and mortar condition where the roof framing ties into the wall. The brick has extensive water marks throughout and the mortar between the bricks is just sand. There is no adhesive properties in the mortar as it is dry and crumbles when touched. Such a mortar condition does not provide the wall with any tensile strength from out of plane bending and impacts the way the wall transfers the load down the building.
- **Photo #5** also shows dried mortar conditions at the 5th floor and extensive water deterioration in the floor joists where the 5th floor joists pocket into the wall and where the shear and bearing stresses are the highest in the floor joists.

- **Photo #6** show that in unit 4C, the roof rafters were exposed and the chimney header along with the trimmer beams have water stains throughout and excessive decay at the beam pockets.
- **Photo #7** shows multiple mortise holes made into the trimmer beam which take away bending moment capacity in the trimmer where it has the largest bending moment due to the point load acting on it from the chimney header beam.
- **Photo #8** shows a large horizontal crack running across the length of the chimney header beam which supports multiple roof joists. Such a crack drastically decreases the sectional properties of the header where it must resist the maximum bending moment. Such a beam will fail if fully loaded for the roof load that it was designed for.
- **Photo #9 & #10** show a roof rafter which is oriented to 90 degrees with water damage. Such a rafter is supporting the roof load along its weak axis and does not have the capacity to support the roof loading imposed onto it.
- **Photo #11 & #12** show the condition of the masonry wall where the 5th floor framing ties into it. The masonry wall in this location has experienced so much deterioration that the mortar has been completely washed out, leaving large gaps between the bricks. The bricks can be moved by hand and are not bonded to each other and work independently, not like a wall. Such a masonry condition is incredibly dangerous, and this wall has no structural integrity and is in risk of collapse due to there being no bonding between the bricks and large gaps that allow for movement.
- **Photo #13** shows how the floor joist had rotten away at the beam pocket and has absolutely no bearing in the wall, this floor joist is hanging off the subflooring and is relying on the stiffness of the subflooring to support it.

4th FLOOR

On the 4th floor, we had access to units 3A and 3B to inspect some 5th floor joists in the ceilings and some 4th floor joists under the floor.

- **Photo #14 & #15** show that in unit 3B, all of the ceiling joists were exposed, and we can see warping in the ceiling joists and excessive water damage throughout the joist span.
- **Photo #16 & #17** show the extensive water damage in the floor joists, especially at the beam pockets where water contact is present due to porous and poor masonry wall conditions which allow rainwater infiltration.
- In unit 3A, the 5th floor joists (ceiling joists) were exposed and observed cracks in the joists, moisture damage throughout, deteriorated mortar in the bearing wall and sloping of the floor joists more than 2 degrees.
- **Photo #18** shows cracking of the chimney header beam which supports multiple floor joists.
- **Photo #19 & #20** shows horizontal cracks for the visible span of the floor beam. Such large cracks compromise the beams' structural integrity and deem it unsafe. Such beams rely on the adjacent beams to support the floor weight as they themselves do not have the structural integrity to do so, such a condition is hazardous and unsafe.
- **Photo #21, #22 & #23** show the conditions of the 5th floor joists at the masonry wall and the water damage that these joists have at the beam pockets which weakens their integrity at the beam pockets. The mortar condition is also compromised and can be easily scraped with a nail or chisel.

3RD FLOOR

On the 3rd floor, we had access to units 2A and 2B to inspect some 4th floor joists in the ceiling and some 3rd floor joists under the floor.

- **Photo #24, #25 & #26** provide multiple views of the 4th floor joist conditions and their deterioration. In unit 2B, all of the exposed 4th floor joists (ceiling joists) have water stains and deterioration from water damage. The 4th floor joists are sloping down towards the center of the building at a minimum of 2 degrees and lack bridging in some bays. deterioration.
- **Photo #27 & #28** show the water damage of the 4th floor joists at the beam pockets and the dried-up mortar joints in the bearing masonry wall.
- **Photo #29** shows lack of bridging in a bay between two floor joists.
- In unit 2A, some of the 3rd floor joists were exposed and large cracks, water damage and joist sloping were observed.
- **Photo #30 & #31** show the chimney header beam having a very large horizontal check/crack which represents beam failure. This beam supports multiple floor joists and the joists are sloping towards the middle of the building which also pull on this cracked chimney header in its weak axis. Such a framing condition is not safe and hazardous.
- **Photo #32** shows a crack in the 3rd floor trimmer beam. This crack is horizontal and spans for a large span of the beam, making this beam unsafe.
- **Photo #33** shows the dry mortar condition which exists where the 4th floor joists pocket into the wall. This condition has been seen throughout the building and not just this floor.
- **Photo #34 & #35** show the 3rd floor joist and chimney trimmer beam (in the floor of unit 2C) and show the water damage where the joist and trimmer pocket into the wall. The joist is bearing into the masonry wall for about one inch only. Standard bearing requirements for a floor joist would be about 4 inches. The mortar in the brick wall are also dry and structurally unstable.
- **Photo #36. #37 & #38** show the 3rd floor joist with a large horizontal check/crack which extends for the majority of its span. This crack is an indication that the floor member is beyond its point of failure and is not structurally sound to support the floor loading.
- **Photo #39** shows the condition of the beam pockets where the 3rd floor frames into the masonry walls under unit 2D. The beam pockets have voids and such a condition does not provide proper bracing of the exterior wall. The mortar in the brick wall, between the floor joists, has also dried up and crumbles to the touch.

Note: This investigation was limited only to some units on the upper floors where we had access. It is imperative that we inspect the remainder of the building in the occupied tenant spaces. Given the consistent and typical structurally deficient and dangerous conditions that were observed, we strongly feel that these conditions are consistent throughout the upper floors of the building, including even the occupied portions that we did not have access to inspect.

Please reference the key plans associated with each photograph for an understanding of the locations where mentioned photos were taken.

Conclusion:

The upper floors of this building require significant reinforcement and/or replacement work to ensure structural integrity and tenant safety. However, the full scope of the necessary repairs cannot be determined without further investigation of the upper floors. Based on our initial findings, addressing only the currently accessible areas will not adequately resolve the underlying structural issues. Therefore, we recommend conducting additional probing in the currently occupied spaces to assess their condition, which will provide a more comprehensive understanding of the repairs needed to restore the building's overall stability.

Immediate Recommendations:

Some of the immediate structural remediation work that should be completed includes but is not limited to:

- **Masonry Walls**: At the bearing masonry walls, removal and replacement of the deteriorated brick as well as deep repointing. Masonry stitching at the interior corners of the building, as required.
- **Floor Joists at Beam Pockets:** At the deteriorated and unsupported floor joists at the beam pockets, the remediation work would be to sister the floor joists and pocket the sister member into the wall and/or replace the floor joists with a new wood joist or LVL member which would bear at least four inches into the wall.
- **Water-Damaged Framing:** Throughout the building where the roof rafters and floor framing have substantial water damage and deterioration at the beam pockets and along their spans, the framing should be either sistered with new reinforcement, which is plumb, dry and stiff enough to span the length of the existing beam at minimum. However, the proper solution would be to replace the deteriorated framing with a new dry framing structure which will not be in contact with existing wet and deteriorated joists.
- **Cracked Structural Members:** At the existing headers, trimmers and floor joists throughout the building that have large cracks, and are at imminent risk of failure, such members must be replaced.
- **Sloping Floors:** At the severely sloping floors, the framing can be leveled by sistering/reinforcing the floor joists and/or replacing the floor joist with new framing.

In conclusion, we conducted further investigations at the upper floors, where access was allowed, to conduct local visual observations to evaluate the structural conditions of the upper floors of the building. Our findings are both concerning and alarming, as we discovered that the structural framework of the building is unsafe for occupants on the upper floors.

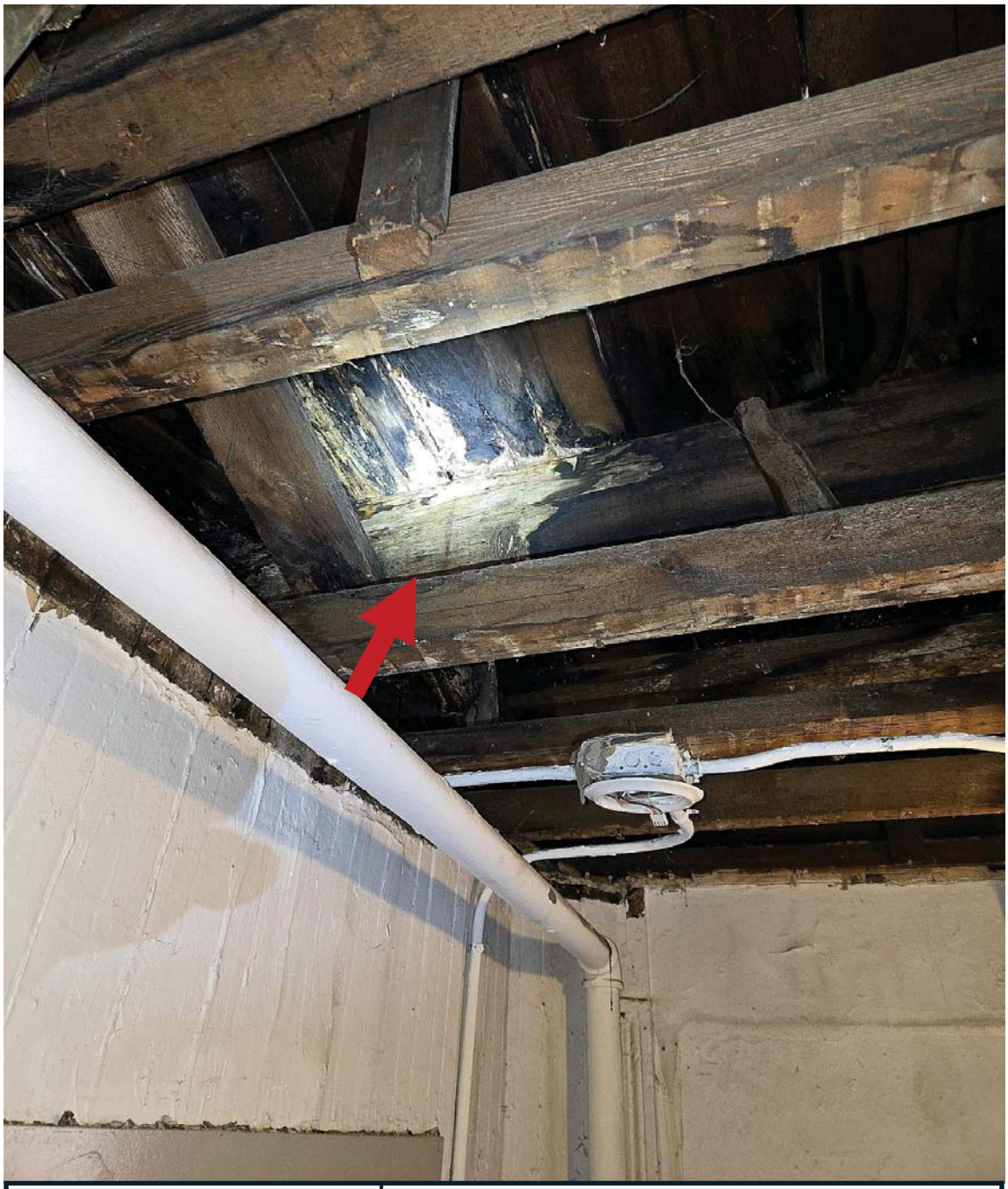
If you have any questions, please feel free to contact me.

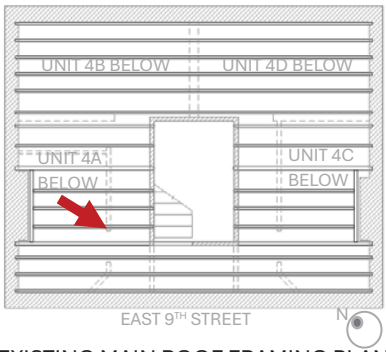
Sincerely,

Steel Core Engineering PLLC

Sebastian Sztukowski, PE

Principal

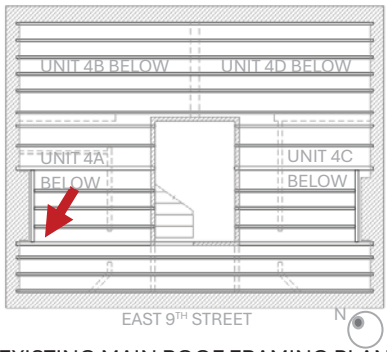




EXISTING MAIN ROOF FRAMING PLAN

PHOTO #1

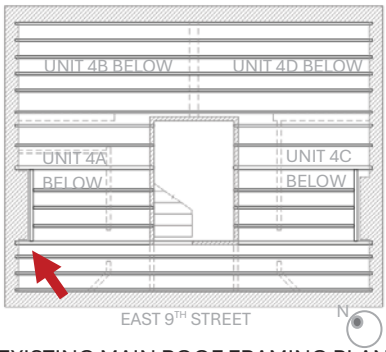
Roof rafter and chimney trimmer beams show extreme water deterioration



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #2

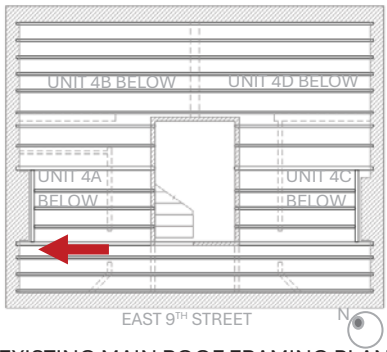
Roof rafter and chimney trimmer beams show extreme water deterioration



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #3

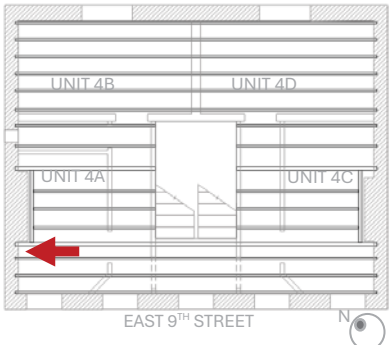
Chimney trimmer beam is deteriorated at the beam pocket due to water exposure and this is an unsafe condition as the beam is weakened where it has to resist the maximum shear and bearing stresses



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #4

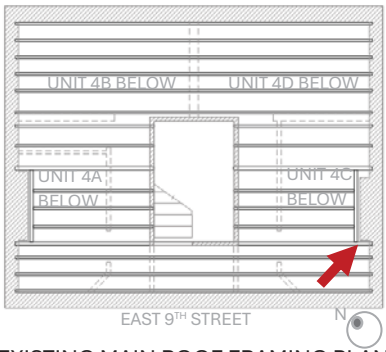
The brick has extensive water marks throughout and the mortar between the bricks is just sand. There is no adhesive properties in the mortar as it is dry and crumbles when touched. Such a mortar condition does not provide the wall with any tensile strength from out of plane bending and impacts the way the wall transfers the load down the building



EXISTING FIFTH FLOOR PLAN

PHOTO #5

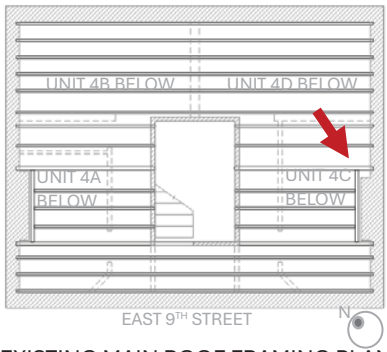
Dried mortar conditions at the 5th floor and extensive water deterioration in the floor joists where the 5th floor joists pocket into the wall and where the shear and bearing stresses are the highest in the floor joists.



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #6

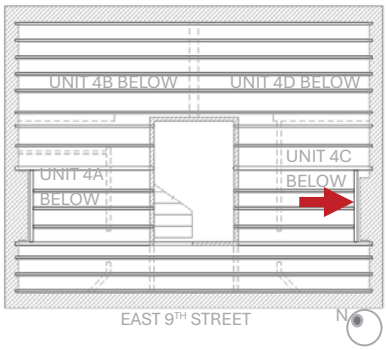
The roof rafters where exposed and the chimney header and trimmer beams have water stains throughout and excessive decay at the beam pockets



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #7

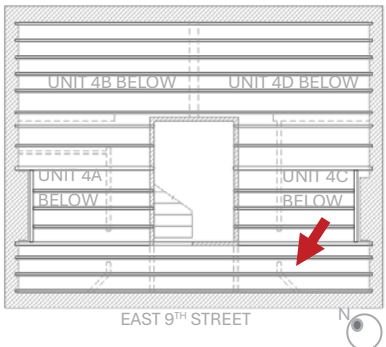
Multiple mortise holes made into the trimmer beam which take away bending moment capacity in the trimmer where it has the largest bending moment due to the point load acting on it from the chimney header beam.



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #8

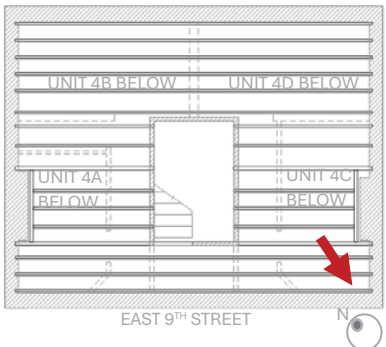
A large horizontal crack running across the length of the chimney header beam which supports multiple roof joists. Such a crack drastically decreases the sectional properties of the header where it has to resist the maximum bending moment. Such a beam will fail if fully imposed upon by roof loads for which it was designed to carry.



EXISTING MAIN ROOF FRAMING PLAN

PHOTO #9

Roof rafter which is oriented to 90 degrees with water damage. Such a rafter is supporting the roof load along its weak axis and does not have the capacity to support the roof loading imposed onto it.



EXISTING MAIN ROOF FRAMING PLAN

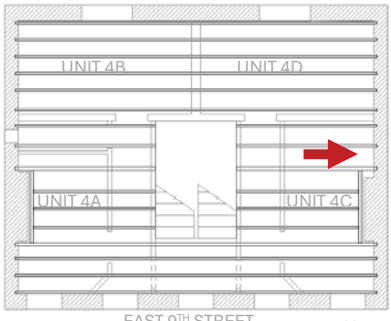
PHOTO #10

Roof rafter which is oriented to 90 degrees with water damage. Such a rafter is supporting the roof load along its weak axis and does not have the capacity to support the roof loading imposed onto it.

EXISTING FIFTH FLOOR PLAN

PHOTO #11

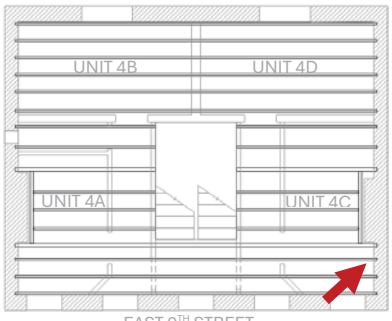
Condition of the masonry wall where the 5th floor framing ties into it. Mortar of the masonry wall is deteriorated to the extent that bricks are no longer bonded together and do not function like an incumbent system. There is no structural integrity to this wall



EXISTING FIFTH FLOOR PLAN

PHOTO #12

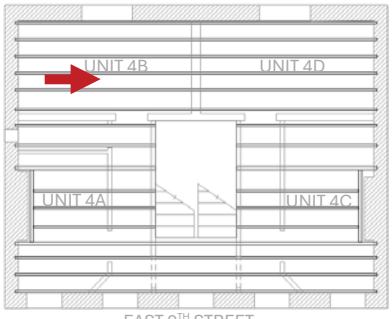
Condition of the masonry wall where the 5th floor framing ties into it. Mortar of the masonry wall is deteriorated to the extent that bricks are no longer bonded together and do not function like an incumbent system. There is no structural integrity to this wall



EXISTING FIFTH FLOOR PLAN

PHOTO #13

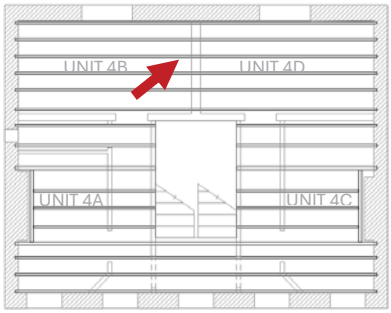
The floor joist has rotted away at the beam pocket and has absolutely no bearing in the wall, this floor joist is hanging off the subflooring and is relying on the stiffness of the subflooring to support it.



EXISTING FIFTH FLOOR PLAN

PHOTO #14

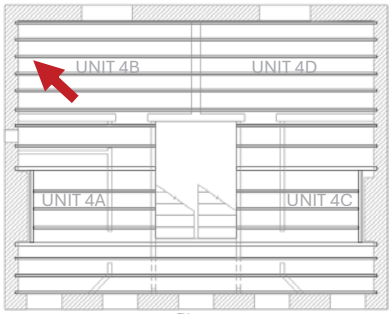
In unit 3B, all of the ceiling joists were exposed, and we can see warping in the ceiling joists and excessive water damage throughout the joist span



EXISTING FIFTH FLOOR PLAN

PHOTO #15

In unit 3B, all of the ceiling joists were exposed, and we can see warping in the ceiling joists and excessive water damage throughout the joist span



EXISTING FIFTH FLOOR PLAN

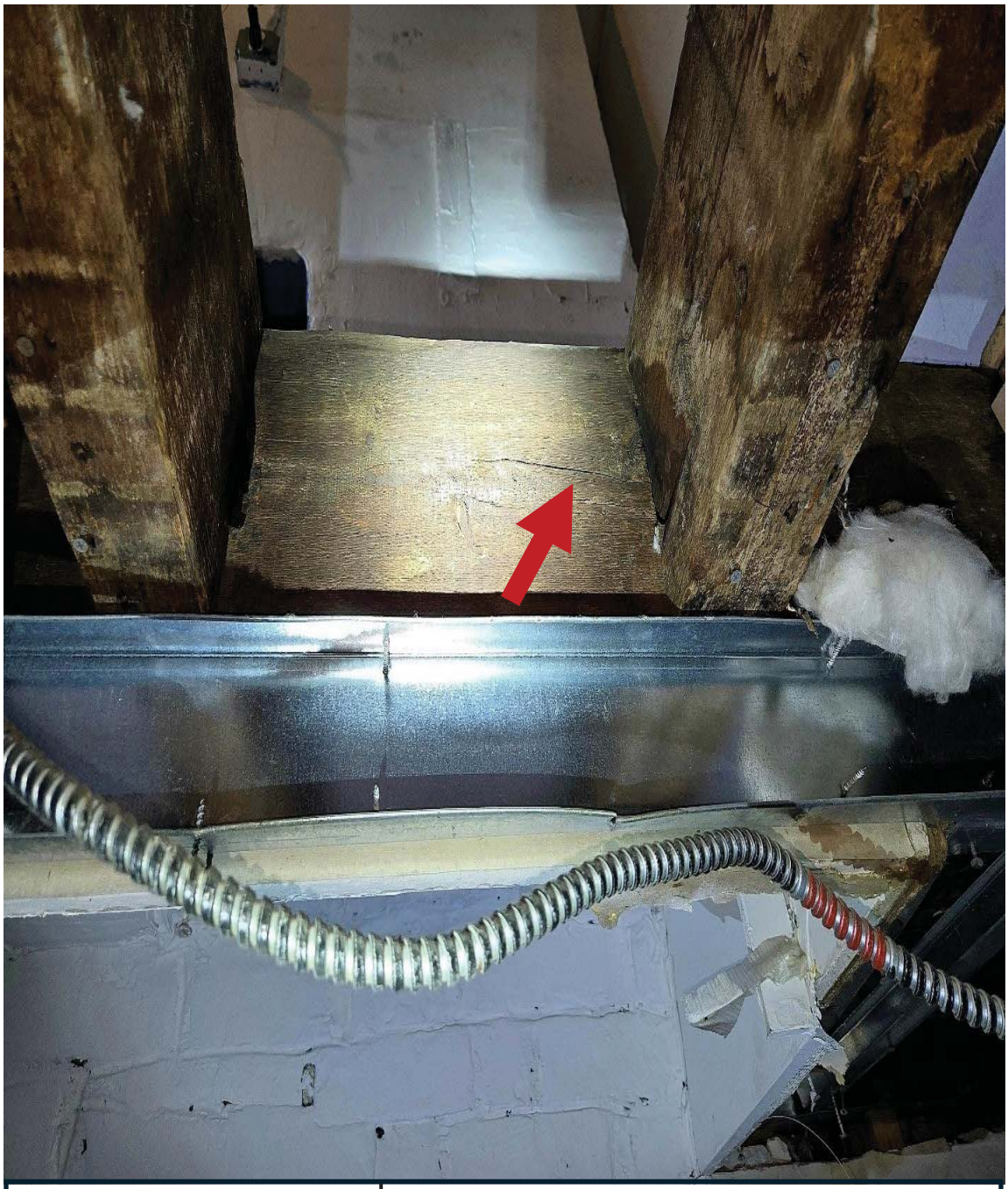
PHOTO #16

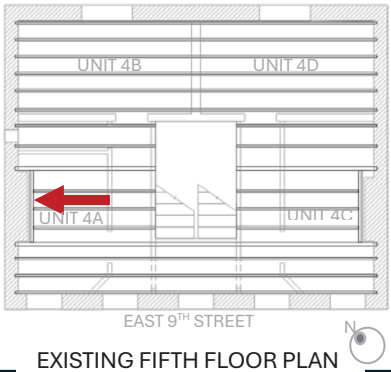
Extensive water damage in the floor joists, especially at the beam pockets where water contact is present due to porous and poor masonry wall conditions which allow rainwater infiltration

EXISTING FIFTH FLOOR PLAN

PHOTO #17

Extensive water damage in the floor joists, especially at the beam pockets where water contact is present due to porous and poor masonry wall conditions which allow rainwater infiltration.

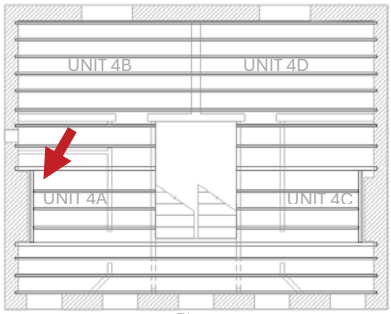




EXISTING FIFTH FLOOR PLAN

PHOTO #18

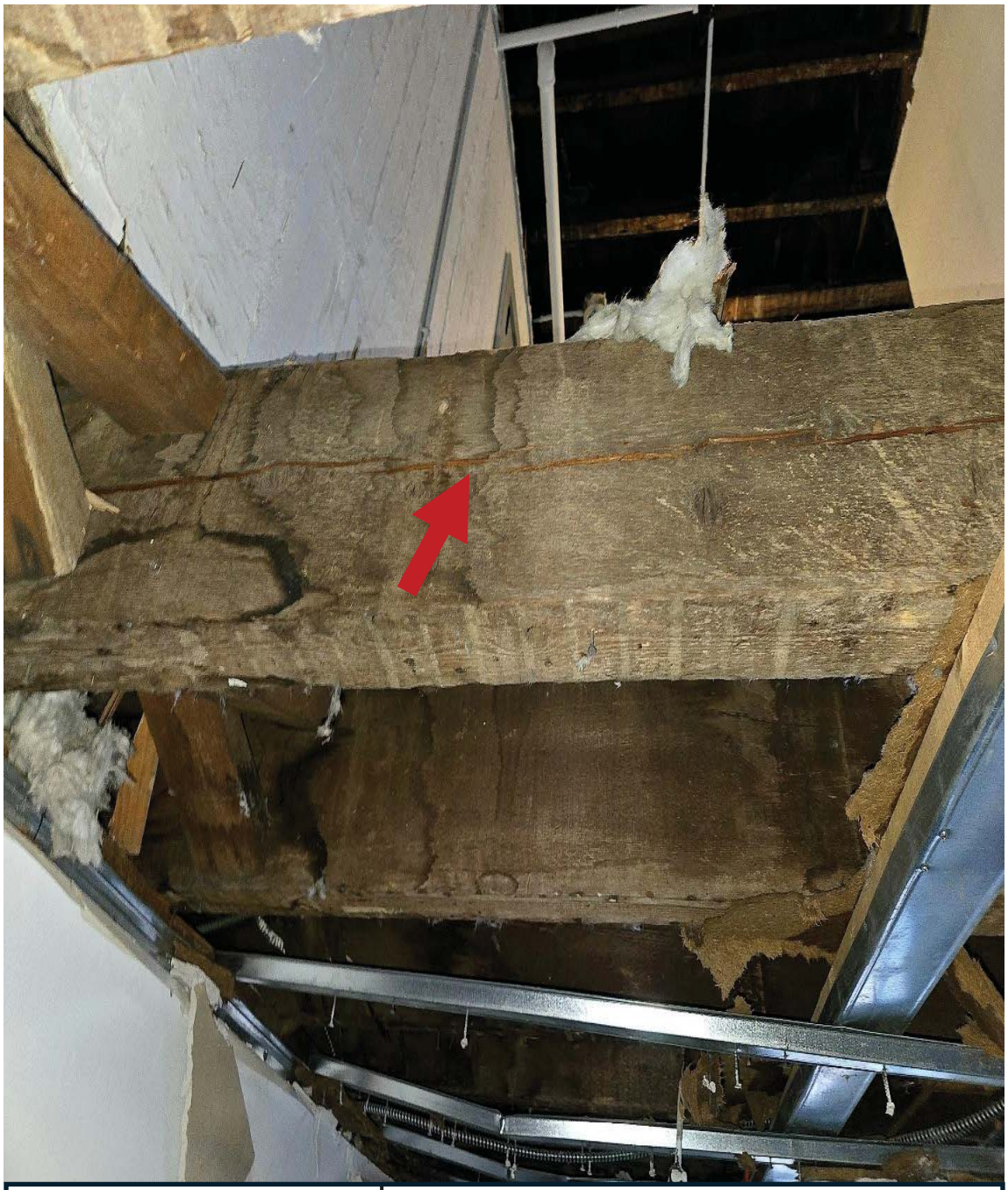
Cracking of the chimney header beam which supports multiple floor joists.



EXISTING FIFTH FLOOR PLAN

PHOTO #19

Horizontal cracks for the visible span of the floor beam. Such large cracks compromise the beams' structural integrity and deem it unsafe. Such beams rely on the adjacent beams to support the floor weight as they themselves do not have the structural integrity to do so, such a condition is hazardous and unsafe.



EXISTING FIFTH FLOOR PLAN

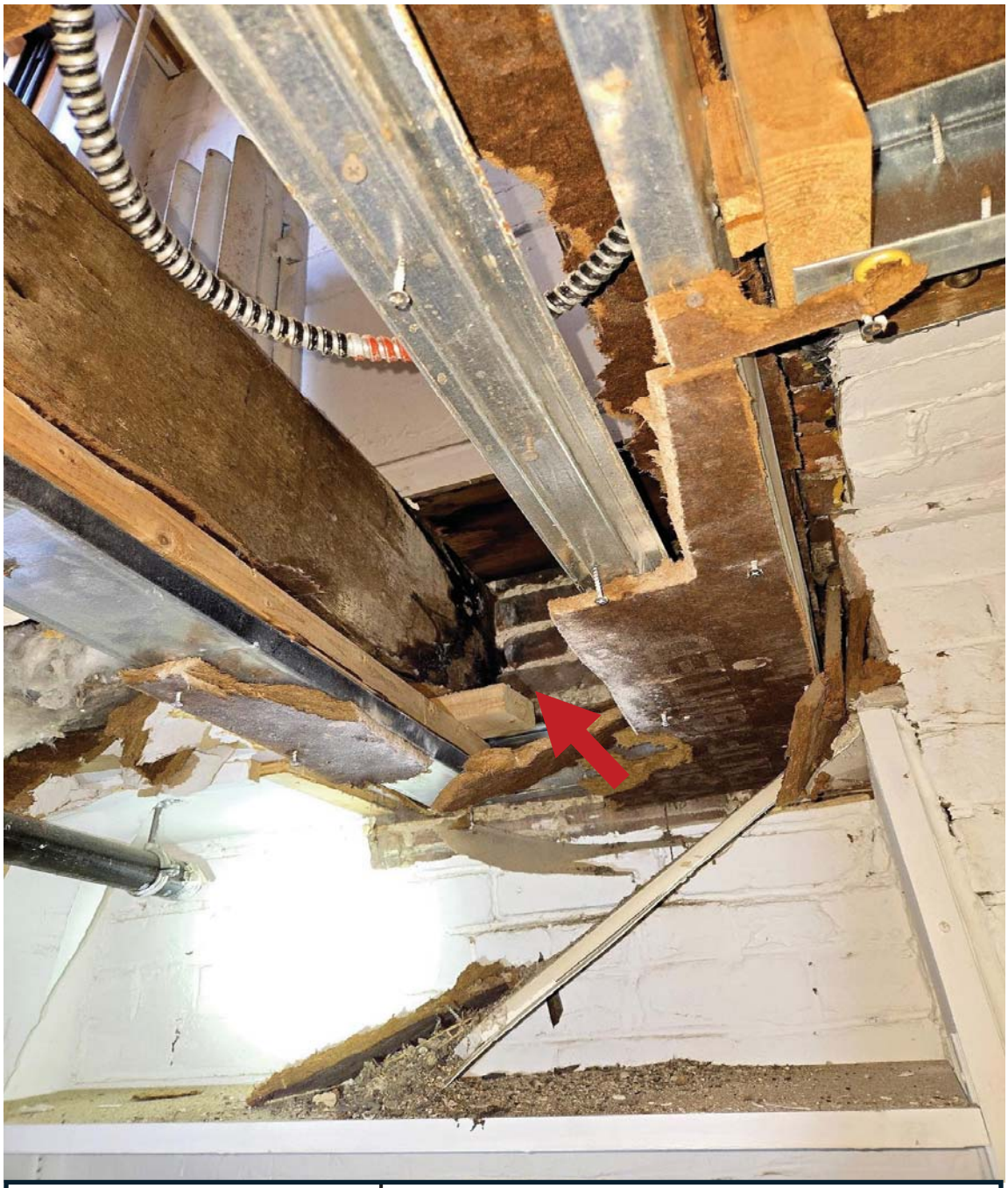
PHOTO #20

Horizontal cracks for the visible span of the floor beam. Such large cracks compromise the beams' structural integrity and deem it unsafe. Such beams rely on the adjacent beams to support the floor weight as they themselves do not have the structural integrity to do so, such a condition is hazardous and unsafe.

EXISTING FIFTH FLOOR PLAN

PHOTO #21

The conditions of the 5th floor joists at the masonry wall and the water damage that these joists have at the beam pockets which weakens their integrity at the beam pockets. The mortar condition is also compromised and can be easily scraped with a nail or chisel.



EXISTING FIFTH FLOOR PLAN

PHOTO #22

The conditions of the 5th floor joists at the masonry wall and the water damage that these joists have at the beam pockets which weakens their integrity at the beam pockets. The mortar condition is also compromised and can be easily scraped with a nail or chisel.

EXISTING FIFTH FLOOR PLAN

PHOTO #23

The conditions of the 5th floor joists at the masonry wall and the water damage that these joists have at the beam pockets which weakens their integrity at the beam pockets. The mortar condition is also compromised and can be easily scraped with a nail or chisel.

EXISTING FOURTH FLOOR PLAN

PHOTO #24

In unit 2B, all of the exposed 4th floor joists (ceiling joists) have water stains and deterioration from water damage. The 4th floor joists are sloping down towards the center of the building at a minimum of 2 degrees and lack bridging in some bays. Photos #24, #25 and #26 provide multiple views of the 4th floor joist conditions and their deterioration.

EXISTING FOURTH FLOOR PLAN

PHOTO #25

In unit 2B, all of the exposed 4th floor joists (ceiling joists) have water stains and deterioration from water damage. The 4th floor joists are sloping down towards the center of the building at a minimum of 2 degrees and lack bridging in some bays. Photos #24, #25 and #26 provide multiple views of the 4th floor joist conditions and their deterioration.

EXISTING FOURTH FLOOR PLAN

PHOTO #26

In unit 2B, all of the exposed 4th floor joists (ceiling joists) have water stains and deterioration from water damage. The 4th floor joists are sloping down towards the center of the building at a minimum of 2 degrees and lack bridging in some bays. Photos #24, 25 ad #26 provide multiple views of the 4th floor joist conditions and their deterioration.

EXISTING FOURTH FLOOR PLAN

PHOTO #27

Water damage of the 4th floor joists at the beam pockets and the dried-up mortar joints in the bearing masonry wall.

EXISTING FOURTH FLOOR PLAN

PHOTO #28

Water damage of the 4th floor joists at the beam pockets and the dried-up mortar joints in the bearing masonry wall.

EXISTING FOURTH FLOOR PLAN

PHOTO #29

Lack of bridging in a bay between two floor joists.

EXISTING THIRD FLOOR PLAN

PHOTO #30

Chimney header beam having a very large horizontal check/crack which represents beam failure. This beam supports multiple floor joists and the joists are sloping towards the middle of the building which also pull on this cracked chimney header in its weak axis. Such a framing condition is not safe and hazardous.

EXISTING THIRD FLOOR PLAN

PHOTO #31

Chimney header beam having a very large horizontal check/crack which represents beam failure. This beam supports multiple floor joists and the joists are sloping towards the middle of the building which also pull on this cracked chimney header in its weak axis. Such a framing condition is not safe and hazardous.

EXISTING THIRD FLOOR PLAN

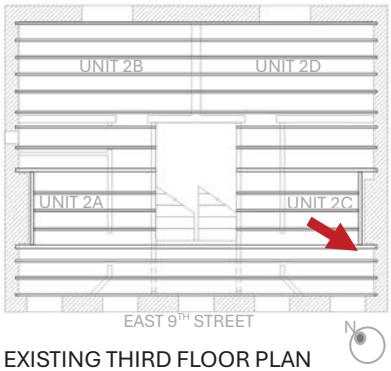
PHOTO #32

A crack in the 3rd floor trimmer beam. This crack is horizontal and spans for a large span of the beam, making this beam unsafe.

EXISTING FOURTH FLOOR

PHOTO #33

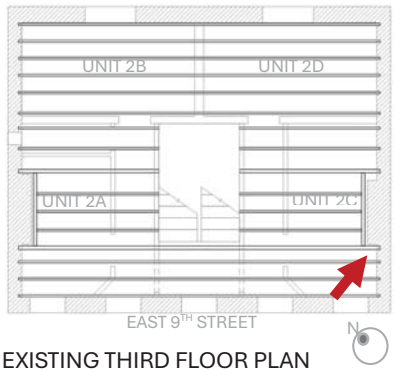
The dry mortar condition which exists where the 4th floor joists pocket into the wall. This condition has been seen throughout the building and not just this floor.



EXISTING THIRD FLOOR PLAN

PHOTO #34

The 3rd floor joist and chimney trimmer beam (in the floor of unit 2C) show the water damage where the joist and trimmer pocket into the wall. The joist is bearing into the masonry wall for about one inch only. Standard bearing requirements for a floor joist would be about 4 inches. The mortar in the brick wall are also dry and structurally unstable.



EXISTING THIRD FLOOR PLAN

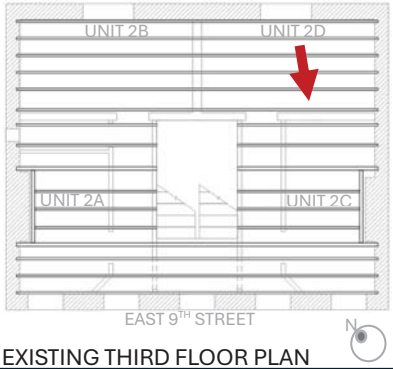
PHOTO #35

The 3rd floor joist and chimney trimmer beam (in the floor of unit 2C) show the water damage where the joist and trimmer pocket into the wall. The joist is bearing into the masonry wall for about one inch only. Standard bearing requirements for a floor joist would be about 4 inches. The mortar in the brick wall are also dry and structurally unstable.

EXISTING THIRD FLOOR PLAN

PHOTO #36

The 3rd floor joist with a large horizontal check/crack which extends for the majority of its span. This crack is an indication that the floor member is beyond its point of failure and is not structurally sound to support the floor loading.



EXISTING THIRD FLOOR PLAN

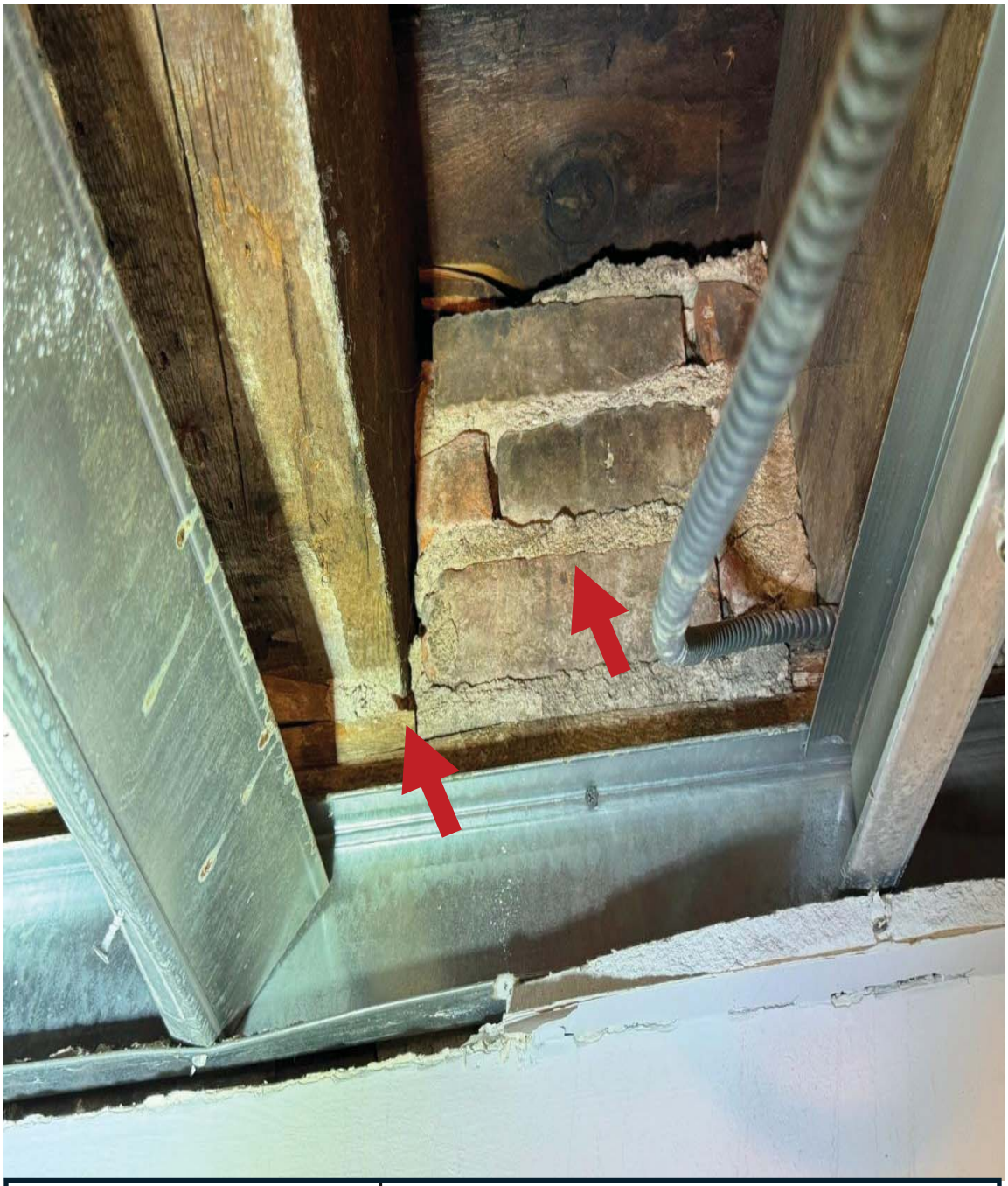
PHOTO #37

The 3rd floor joist with a large horizontal check/crack which extends for the majority of its span. This crack is an indication that the floor member is beyond its point of failure and is not structurally sound to support the floor loading.

EXISTING THIRD FLOOR PLAN

PHOTO #38

The 3rd floor joist with a large horizontal check/crack which extends for the majority of its span. This crack is an indication that the floor member is beyond its point of failure and is not structurally sound to support the floor loading.



EXISTING THIRD FLOOR PLAN

PHOTO #39

Photo #39 shows the condition of the beam pockets where the 3rd floor frames into the masonry walls under unit 2D. The beam pockets have voids and such a condition does not provide proper bracing of the exterior wall. The mortar in the brick wall, between the floor joists, has also dried up and crumbles to the touch.