464 Golf Club Road

‘Gay Farmhouse’

Inspection Report

Prepared for:

City of Fredericton Planning & Development

Prepared By:

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Fredericton N.B.

Rev No.	Date	Description	Prepared By	Approved By
0	17-Feb-2024	Issued for Review	J. Matthews	S. McLaggan

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1 INTRODUCTION AND BACKGROUND

Ace Engineering Inc was on site at 464 Golf Club Road in Fredericton N.B. on January 30th, 2024 to perform a visual inspection of the existing single family dwelling structure, later referred to as the “Farmhouse”. The inspection began at approximately 10:00 am, the weather was -15° C (excluding wind chill) and sunny, the inspection concluded at 11:30 am. The purpose of the inspection was to identify and assess structural and life safety deficiencies associated with the Farmhouse.

The Farmhouse is located within City of Fredericton limits on a rectangular shaped parcel of land (PID 01500461) that spans north-south between Golf Club Road and Prospect Street. The Farmhouse is positioned along the east property line approximately 275 meters south of Golf Club Road and overlooks the Saint John River to the north. Low density tree cover spans the north and east sides of the Farmhouse with several other structures (approximately 4) located within a 60 meter radius to the south and west sides.

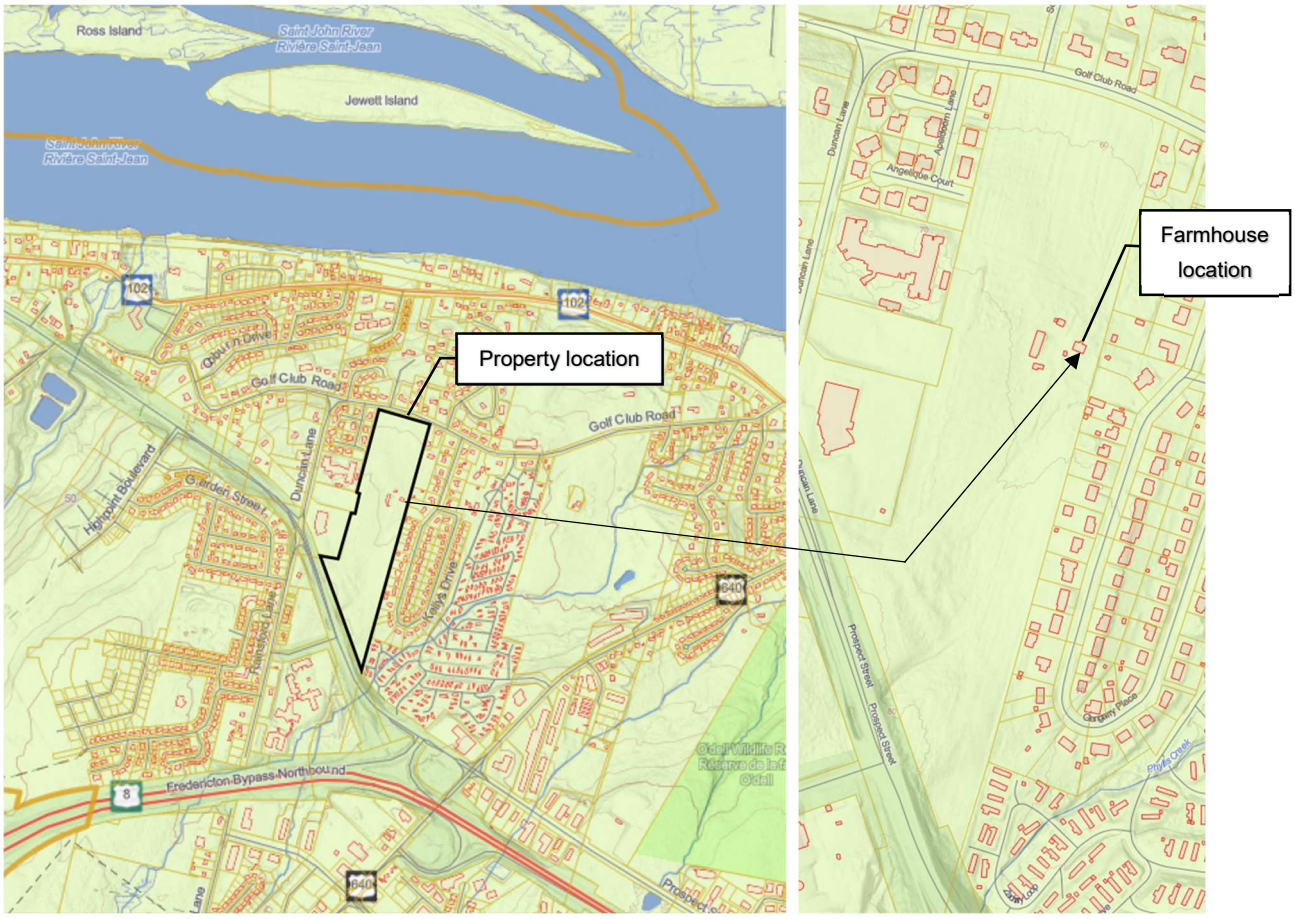

Figure 1-1: Property & Farmhouse Location

The Farmhouse has been vacant for many years with little to no maintenance. The exact amount of time that the property has been unoccupied is unknown. It was requested that Ace Engineering Inc complete a report to summarize inspection findings, communicate identified deficiencies and structural issues, and estimate provisions required to repair the structure in place or transport the Farmhouse to a different location.

The following is a summary of the inspection observations, identified defects and deficiencies, conditions, severity, option discussion, decision analysis, and recommendations.

2 INSPECTION NOTES AND OBSERVATIONS

Figure 2-1: Farmhouse Exterior (Looking Southeast)

The existing Farmhouse structure is 2 storeys high with a finished attic space and unfinished basement. The roof is a gable style with asphalt shingles. The footprint is approximately square with a front covered porch. There is an enclosed west side porch supported on a masonry block foundation that appears to be constructed as an addition to the original Farmhouse. The porch roof framing is hip styled and supported by the exterior wall of the original Farmhouse. It appears that the original (or near original) siding was cedar shingles based on the exposed area below the porch roof framing. The remainder of the exterior cladding is vinyl siding.

The original wood framed Farmhouse structure is supported by a red brick masonry wall constructed over a natural rock foundation with a dirt floor basement. The above grade exterior sides of the foundation wall have been treated with an unidentified type of spray foam insulation. There is an interior wooden staircase that allows access to the basement from the main level.

Figure 2-2: General Foundation

Rough cut mass timber beams span east-west from exterior foundation walls with in-fill beams supporting rough cut wood floorboards. The floor beams bear on a wood sill plate and the rim cavity is in-filled with masonry brick between beams. A consistent white fuzzy growth, noted as mildew, covers approximately 50% to 75% of the framing member's surface area.

Figure 2-3: Floor Beams

There is a masonry chimney, furnace, hot water tank, and other utilities located throughout the basement. The brick chimney is centrally located and continues from the basement through each level and extends above the roof. Electrical cables, pipes, and patches of lath and plaster cover the underside of the floor framing. There is a door that separates the main basement from the west side porch basement. This door could not be forced open during the inspection. Therefore, the interior basement of the porch was not inspected, and only observed from the exterior.

The main level consists of a bathroom, kitchen, living space, hallway, and staircase. The walls are finished with lath and plaster throughout. Several walls are covered with wallpaper. Sagging/ uneven floors, cracking wall and ceiling finishes, signs of water damage, mold, mildew, and a musty damp smell are observed throughout. Various signs of exterior elements can be observed within the house including signs of debris, snow, ice, water, rodents, and insects.

Figure 2-4: General Interior Condition

The upper level consists of bedrooms, closets, a hallway, and a staircase. Significant amounts of water damage are observed. Wall and ceiling finishes have collapsed or are hanging off the

framing members. Broken windowpanes in multiple bedrooms has left the interior exposed to the exterior elements (see Figure 2-5).

Figure 2-5: Broken Windowpane

The attic space displays similar signs of deterioration (see Figure 2-6). The ceiling plaster in some areas has completely fallen away from the lath due to water infiltration. Exposed roof framing shows that the roof system is rough cut mass timber rafters with perpendicular roof boards and no insulation. The ridge connection is formed by a mortise and tenon joint with a single peg (see Figure 2-7).

Figure 2-6: General Attic Condition (south east roof slope)

Figure 2-7: Roof Ridge Connection

The underside of the upper-level floor framing has been built down with dimensional lumber and filled with batt insulation (see Figure 2-4 and Figure 2-8). Strapping and vapour barrier have also been installed. It appears the purpose of this modification was to limit heat loss. However, there is no insulation material in the roof framing cavity above the attic living space. The installed strapping and vapour barrier below the floor framing has acted as a membrane and contained water within the floor system. Wall cavity insulation details were not captured during this inspection due to access. However, it is assumed that there is little to no insulation within the wall assembly.

Figure 2-8: Trapped water within ceiling/ floor

3 DEFECTS AND DEFICIENCIES

The following is a summary of defects and deficiencies observed during the inspection.

Defect = something or a lack of something that results in incompleteness, inadequacy, or imperfection

Deficiency = the quality or state of being inadequate or of lacking some necessary quality or element

3.1 FLOOR FRAMING MEMBER ROT

The main load carrying beams, infill beams, and underside of floorboards have visible layers of mildew growing on 50% to 75% of their surface area. From the significant amounts of visible mildew growth, it is assumed that a considerable amount of member rot has occurred, and the members should be considered compromised. As a result, these members would not be suitable for use in an occupied space or for transportation. This assumption can be verified by extracting member core samples and performing material testing to verify the amount of member rot and subsequent member capacity. It is noted that collection of core samples may result in further deterioration of these members.

Figure 3-1: Floor Framing

3.2 FLOOR & WALL DEFORMATION

The main level floor and center wall orientated in the north-south direction are showing signs of vertical deformation. There are several flexure and shear cracks observed in the wall plaster (see Figure 3-2). Floor settlement is concentrated towards the northern half of the Farmhouse. The supporting floor beams, noted in the previous section, span the entire width of the structure. It appears that the lack of intermediate foundation support below these beams has resulted in the vertical settlement. In addition, these deteriorating conditions have been compounded by the multiple years of neglect due to unoccupancy.

Figure 3-2: Wall Deflection Cracking

In the same fashion, the upper-level floor framing and partition walls are experiencing vertical deformation. In essence, this is a result of the main level floor beam deflection as noted above.

3.3 WATER DAMAGE

The southeast corner of the Farmhouse has significant water damage observed from the roof down to the main level floor system. The water damage attributes indicate water infiltration has occurred over several years with considerable water staining, mildew, mold, and rotting of structural members. Large sections of the interior plaster and wallpaper finishes have collapsed or are damaged. In addition to Figure 3-3 below, see Figure 2-4: General Interior Condition.

Figure 3-3: Ceiling Water Damage (south west roof slope)

A subsequent renovation estimated to have been undertaken in the 1970's (based on manufacturer's date stamp on vapour barrier) included the installation of batt insulation, vapour barrier, and strapping along the underside of the original second storey and attic floor framing (see Figure 2-4, Figure 2-8, and Figure 3-4). This system resulted in the trapping and pooling of infiltrated water around and against the existing framing. This pooling and trapping effect increases the magnitude of mold, mildew, and rot within the structural members.

Figure 3-4: Water damage in floor & ceiling assembly

Within the kitchen area, the water infiltration has resulted in significant rotting of the floor beams, floorboards, sill plate, and exterior framing (see Figure 3-5). As a result, a portion of the kitchen floor has collapsed and is currently covered with a piece of plywood (note, the plywood was temporarily removed and replaced for inspection).

Figure 3-5: Kitchen floor failure

3.4 WALL AND CEILING CRACKING

Hairline to large cracking of ceiling and wall plaster is noted throughout the Farmhouse. Given the size, pattern, and location of cracks, it appears the cracks are the direct result of inadequate structural support, structural settlement, water damage to framing members, and fluctuations in member geometry due to temperature changes. As previously noted these deteriorating conditions have been compounded by the multiple years of neglect due to unoccupancy.

Figure 3-6: Ceiling Cracks

3.5 STAIRS AND HANDRAILS

The existing stairs do not satisfy National Building Code of Canada requirements. Including rise, run, clear height above nosing, minimum handrail height, guards, and minimum strength. Portions of the stair framing is damaged; handrails are damaged or missing.

Figure 3-7: Typical Stair & Handrail Condition

3.6 ELECTRICAL AND PLUMBING

In addition to failed or damaged infrastructure, the electrical and plumbing utilities do not satisfy National Building Code of Canada requirements. Including but not limited to exposed wires, improper use of junction boxes, undersized drainpipes, insufficient or inaccessible cleanouts, incorrect venting, poor drainpipe slope, etc.

Since the interior has been exposed to the elements with no heat throughout the winter months it is assumed that water pipes may have been compromised due to expanding ice pressures.

Figure 3-8: Typical Electrical & Plumbing Condition

3.7 WINDOWS

There are several upper-level windows that have damaged or missing glass panes. This has left the interior exposed to the elements and increased the amount of water infiltration. In addition, all windowsills are rotted and deteriorating.

In addition, bedroom windows do not appear to satisfy egress requirements as per National Building Code of Canada.

3.8 SMOKE ALARMS

Functioning smoke alarms are not present. As per NBC 2015, at a minimum, smoke detectors (and carbon monoxide if solid fuel burning is present) shall be centrally located on each storey and in each bedroom.

3.9 ROOF SHINGLE FAILURE

Existing asphalt roof shingles show signs of deterioration: section loss, curling, cracking, and blistering. The singles are clearly past their service life span. Note, entirety of shingled roof could not be visibly inspected due to snow cover.

3.10 FLASHING FAILURE

Existing eave and gable end flashing around the roof perimeter has failed and become detached from the Farmhouse. This failure exposes the framing and interior components of the structure to the elements. This includes unwanted water, rodent, and pest infiltration.

Figure 3-9: Flashing Failure

3.11 FRONT PORCH DEFORMATION

The front porch located on the north side of the Farmhouse has a gable pitched roof and is tied to the exterior wall. There are two posts supporting the north end of the porch framing that are supported by foundations that are not frost protected. As a result, the porch framing has shifted and undergone visible deformation. The shifting of the porch away from the main structure is also a potential source of water ingress.

3.12 SIDE PORCH FOUNDATION FAILURE

On the west side of the Farmhouse there is an enclosed porch with a hip styled roof, 5 windows, 1 door, and exterior vinyl siding. The interior is unfinished with wood joists, subfloor, and rafters. The foundation is masonry block wall with an open basement below the floor joists. The porch structure appears to be constructed after the original Farmhouse structure was built. The north foundation wall of the porch has partially failed and is collapsing inwards.

Figure 3-10: Porch Foundation Wall Failure

4 CONDITION AND SEVERITY SUMMARY

For the deficiencies listed above, the following summary table outlines the estimated condition and severity of the deficiency.

Report Section	Deficiency	Condition	Severity
3.1	Floor Framing Member Rot	Poor	High
3.2	Floor & Wall Deformation	Poor	Medium
3.3	Water Damage	Poor	High
3.4	Wall and Ceiling Cracking	Fair	Low
3.5	Stairs and Handrails	Poor	High
3.6	Electrical and Plumbing	Poor	High
3.7	Windows	Poor	High
3.8	Smoke Alarms	Poor	Medium
3.9	Roof Shingle Failure	Poor	Medium
3.10	Flashing Failure	Poor	Medium
3.11	Front Porch Deformation	Fair to Poor	Low
3.12	Side Porch Foundation Failure	Poor	High
Condition Levels: Poor, Fair, Good, Excellent Severity Levels: N/A, Low, Medium, High			

5 STRUCTURE RELOCATION DISCUSSION

Given that the overall dimensions of the Farmhouse are approximately 28 ft wide by 32 long and 25 ft high, the Farmhouse is physically too large to relocate without significant deconstruction and coordination. To relocate the Farmhouse, the front porch, side porch, and roof structure would have to be removed. In addition, if relocation off site is required, it may be necessary to divide the structure into 2 pieces to allow transportation via the existing road infrastructure. Coordination with NB Power would be required to ensure conflicts with overhead utilities and trees are avoided. Traffic control and various other safety measure would be required to facilitate relocation.

Regardless of distance traveled during relocation, the existing Farmhouse structure itself would require significant temporary bracing and replacement or reinforcing of members to support the existing framing and resist forces from inertia, acceleration, deacceleration, and wind while in transit. This would include diagonal temporary braces along all walls, within interior and exterior doorways, and windows. Steel running beams would be required below the main level floor

beams to allow jacking, lifting, and loading activities. Based on deterioration deficiencies noted previously, the rotted main level floor beams may experience crushing or bending failures when subject to concentrated loads from the temporary steel running beams. In addition, the masonry foundation would have to be braced and/or underpinned to resist concentrated jacking forces.

Any type of relocation movement will have a negative effect on the existing plaster wall finish. The Farmhouse interior plaster finish is brittle and the shifting movement during transportation would most definitely result in a large quantity of cracking, spalling, and collapsing plaster. Nearly every interior surface will require new finishing (i.e. drywall and crack fill).

Although not captured during the inspection due to lack of access, it is assumed the existing Farmhouse framing members are connected using mortise and tenon, wedge, bearing, or similar type joints. These types of joints do not typically resist lateral, racking, or uplift forces adequately. To mitigate connection failure during relocation, strapping of framing member across joints may be required in addition to the overall bracing and member reinforcement requirements noted previously.

Finally, relocation of the structure would require construction of a new foundation and all necessary construction activities for positioning and assembly of the relocated Farmhouse. Followed by repairs and construction of new finishes.

6 DECISION ANALYSIS

The table below displays a decision matrix that was undertaken to evaluate and prioritize the list of alternative actions and objectively identify which alternative is best given the set of predefined considerations. Given the considerations listed, demolishing the existing structure is the best engineering decision.

Consideration / Alternative	Cost (Weight = 4)	Safety (Weight = 3)	Complexity (Weight = 2)	Time (Weight = 1)	**Weighted Score**
Remain as is	Not considered an option, action must be taken.				**0**
Demolish	4	5	3	5	**42**
Renovate in place	2	2	2	2	**20**
Relocate	1	1	1	1	**10**

Weight Definitions: 1 to 4 where 1 = Least Important, 4 = Most Important
Score Definitions: 1 to 5 ranking where 1 = Lowest score, 5 = Best Score
Weighted Score Definition = Σ(Weight)x(Score), where highest Weighted Score value determines best alternative

7 SUMMARY AND RECOMMENDATIONS

Based on the visual inspection completed by Ace Engineering Inc., several structural and non-structural deficiencies have been noted. The deficiencies range in condition from Poor to Fair with Low to High severities. Currently the Farmhouse is not fit for human occupancy. A significant amount of remedial work would have to be undertaken to restore the structure to a safe condition. Similarly, relocation of the structure offsite is not feasible given the current condition of structural framing. A decision matrix exercise was completed that determined demolition of the Farmhouse is the best alternative when considering cost, safety, time, and complexity. Relocation of the structure to another location within the property limits may be possible with significant temporary work. However, this alternative is not recommended.

Please do not hesitate to contact the undersigned with any questions or comments.

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