EXISTING CONDITIONS REPORT

RONDOUT LIGHTHOUSE

Kingston, New York

For
The Office of Planning
The City of Kingston

By
Kenneth Hewes Barricklo Architect, P.C.
173 Green Street
Kingston, New York

Kenneth Hewes Barricklo Architect, P.C.

October 19, 2005
Ms. Suzanne Cahill, City Planner
Office of Planning
City Hall
420 Broadway
Kingston, NY 12401

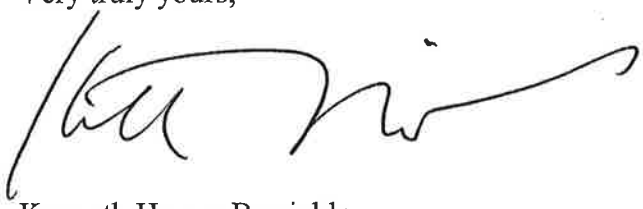
Re: **Conditions Report for Rondout Lighthouse**
Kingston, NY

Dear Ms. Cahill:

We are pleased to submit herewith our Conditions Report for the Lighthouse.

The report reviews past work on the building when The Hudson River Maritime Museum was operating and maintaining the structure and develops a scope of future work for restoration projects that can be funded under the ownership of the City of Kingston.

Very truly yours,



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RONDOUT LIGHTHOUSE KINGSTON, NEW YORK

History of the Lighthouse

The lighthouse was built by the United States Coast Guard and completed in 1913. This lighthouse is the second lighthouse here at the mouth of the Rondout Creek, the previous lighthouse was located just to the downstream side of the Hudson at the mouth of the Rondout. The stone pier remains as an historical marker.

The foundation structure is a concrete pier supported by timber piles. The house is constructed of load bearing brick walls, a system of recast floor beams and tiles. The roof is conventional wood framed rafters with slate roof.

Up until recently the lighthouse remained under the ownership of the US Coast Guard but was maintained by the Hudson River Maritime Museum. Recently the ownership of the house has been transferred to the City of Kingston.

Purpose of the Survey

The City of Kingston has commissioned Kenneth Hewes Barricklo Architect, P.C. (KHBA) to make a conditions survey and report that examines the condition of the structure and identifies future restoration work. The work will be prioritized and phased to enable the City to make the building accessible to the public while restoring the structural components that have not been able to be addressed over many years due to lack of funds.

The City has determined that they wish to make repairs to the building and make the building accessible to larger groups of people visiting for short periods, an hour or more, while possibly having an option for overnight accommodations.

Previous Restoration Projects

Prior to KHBA beginning work on the building in 1993 the lighthouse had been maintained by the Coast Guard with little real attention to longer range maintenance and restoration issues such as:

- the slate roof had been repaired many times and was leaking.
- the box gutters were failing.
- the brick chimney had been repointed many times.
- windows, doors and wood cornice work had been maintained and painted, but not repaired.
- the concrete porch piers had been rebuilt due to extreme exposure and water infiltration with a non-matching brick size.
- no roofing covered the concrete porch roof to protect the concrete.
- concrete exterior slabs and water course and foundation wall cracks had been periodically repointed.

- the brick walls with the hard fired core and with the Flemish bond pattern had settlement and hairline cracks that were found at the corner pilasters and in the field of the wall. These cracks and the general poor repointing allowed moisture into the structure that deteriorated the plaster finishes.
- the plaster on the north east facing dining room wall had been taken down and a sheetrock finish installed.
- the exposure of the building to the elements is severe, especially during the winter, and contributed to deteriorating interior finishes.
- during high tides/full moons and high water storms, water enters the basement and needs to be pumped out.
- there was minimal electric service to the building.
- the oil fuelled radiator heating system didn't function properly and has had to be jerry- rigged over the years to keep it operating during the winter.
- the original water collection system and cistern hasn't functioned and potable water is not available.

KHBA has completed two restoration projects each with matching grant assistance through the New York State Parks , Recreation, and Historic Preservation Office (SHPO).

The first project in 1993 was determined to be the replacement of the slate roof with new slate, rebuilding the box gutters, repointing the chimney, building in a cricket and flashings, the restoration and painting of the windows, doors and the wood cornices and installing temporary roofing on the concrete porch.

The second project of 1998, recently completed, was the repair and repointing of the exterior brick walls. Approximately 80% of the walls were repointed. The plan was to rebuild certain areas of brickwork where the cracking has been extreme, but we determined that due to the unavailability and high cost of a nonstandard brick size, and the density of the construction of the wall that it would be more advisable to only repoint the brick and move the rebuilding to a later phase. The 20% of the building that wasn't repointed was due to lack of funds, the wall being in still better condition than the remainder. The complete repointing was determined to be postponed to a future phase.

The concrete porch, due to its attached design to the tower was determined to be left, once again, to a future project. The repair of the caisson cap has remained a secondary problem and postponed for a future phase.

There are still exterior repairs that need to be made but, for the first time, we are now in a position to finally begin to work on the interior of the building.

CONDITIONS SURVEY AND RECOMMENDATIONS

This conditions survey addresses the major remaining restoration work as well as adding comments on conditions of the past work which require continued maintenance. The cost is for total cost per item. Refer to the Budget Estimate in the back of the report for the breakout of phased cost.

Concrete Porch

The concrete porch has been shored to prevent the accelerated cracking and spalling of the concrete structure. A temporary rubber roof was installed at the end of the previous construction campaign of roofing and window restoration. Water has infiltrated the cracks in the concrete slabs and is rusting the steel. The splitting brick piers show the signs of water infiltration behind the brick. Refer to the structural report (photos 7-16).

Recommendations: The structure needs immediate repair of the reinforced concrete structure while it is still in a condition that can be repaired. The brick piers need to be stripped of the brick that is not the size of the house brick; the concrete piers repaired and refaced with new brick. A new permanent roofing should be installed over the slab to protect the concrete surface. **Cost = $18,000**

Concrete Slab Walkway Around the House

The 8" thick concrete walkway around the house has cracked over the years due to apparent settlement or other movement of the concrete pier foundation. The cracks appear at the corners of the house and radiate to the outside edge. Other cracks occur at the window openings and other weak points in the concrete house foundation wall due to the movement or settlement. The concrete porch slabs have cracked as well.

The concrete surfaces of the slabs and foundation wall show that the exposed concrete surface is deteriorating due to the extreme exposure in the river , also probably due to a weak original concrete mix, unclean river water was used. Refer to the structural report (photos 17-22).

Recommendations: Phase I: The cracks in the house foundation wall and walkway slab need repair to prevent water infiltration and a breathable waterproofing coating applied in the short run. Phase II: For the long term repair, the slab should be replaced with a new slab; the cast iron railing will have to be removed and restored at the time the slab is repaired. Protection screens should be installed for safety. **Cost = $90,000**

Concrete House Pier Platform and Steel Caisson

The vertical exterior face of the concrete pier from the top of the steel caisson to the underside of the topping walkway slab has been repaired over the years by repairing settlement cracks and reparging the surfaces. The concrete has deteriorated behind the steel caisson. The steel interlocking caisson is generally in fair condition . There are a

few signs of rusting of the thickness of the sheet iron, this condition indicates there are other hidden weak areas. The caisson steel cap has rusting and has rotted and fallen off in several sides. Refer to the structural report (photos 23-30).

Recommendations: Concrete cracks and face surfaces need to be repointed and parged to make the surface as weather tight as possible and possibly coated with a waterproof protection coating. The steel caisson cap should be replaced and the holes in the caissons repaired. **Cost = $28,000**

Brick Walls

The brick walls have been repointed approximately 80% recently. All structural cracks in the wall surface and corner pilasters were cut out and pointed. Hairline cracks remain.

The wall is built with a flemish bond brick pattern with clay tile backup. In our last construction campaign the brick work was determined to be only repointed, and to postpone rebuilding of any more complicated conditions. But we are aware of failure of the brick due to building settlement and other movement and thermal action of the solid brick wall without any expansion capability. In addition to the structural cracks, hairline cracks are found in the wall and are concentrated at the corners. The hardness of the brick with tight mortar joints is contributing to the cracking as well. The exposed concrete lighthouse tower top appears in good condition. The exposed concrete surface has eroded due to freeze thaw cycles. Refer to the structural report (photos 31-38).

Recommendations: The movement of the structure is a given to the wood pile pier structure and evidence of settlement will require repairs periodically. At some future date the brick in the areas of greatest concentration of movement will require replacement. Due to the nonstandard size of the brick, it is recommended that a large quantity of the non-standard brick should be ordered and manufactured and purchased for longer term repairs as repair is needed. The original working drawings for the building do not give a precise detail of the construction of the walls. We recommend that a series of probes be made to confirm the construction and a study of crack pattern. An analysis of the brick should be made to determine its structural characteristics. The remaining 20% of the brick wall should be repointed as required to complete the repointing campaign. The exposed concrete top should be studied regarding possibly providing a breathable masonry waterproof coating to protect the surface. **Cost = $26,000**

Slate Roofing

The slate roofing was installed in the late 1990's and is in good condition. The lead coated copper built-in gutters and flashings appear to be in good condition. There are two (2) locations where a slate shingles has been lost (photos 39-40).

Recommendations: The slate shingles that have been lost should be replaced. **Cost = $500**

Windows, Doors , Cornice and Painting

The windows and doors were restored or repaired in the mid 1990's and painted. An upper floor northeast tower window required rebuilding or replacement and was postponed to a future phase. The frames and sashes of the basement windows under the concrete porch have rotted and need replication. The wood cornices were repainted at the time the windows and exterior doors were restored (photos 41-43).

Recommendations: The tower window, as well as the two basement windows, should be restored or replicated as needed to prevent future water infiltration and rotting. The painting of the wood cornices appear to be holding up, but the windows now require repainting; it may be advisable to repaint the cornices at the same time. **Cost = $37,000**

Cast Iron Lighthouse Top

The cast iron structure appears in good condition. The muntins of the glazed circular lighthouse window have been repaired over the years with machine screw and bolts , replacing the original flathead screws. The glazing putty is cracking and needs replacement or repair. The interior painted metal surfaces have all alligatored over the years due to condensation and thermal action of the metal. The metal railing and walkway appear in good condition (photos 45-48).

Recommendations: The glazing bars and glazing putty for the circular light needs repair. The exterior metal platform, housing , roof and railing will need painting. The interior alligatored paint requires study as to removal and repainting. **Cost =$10,000**

Floor Construction

The floor system is described in the conditions report. There are various areas where the steel beam edges have been exposed and are rusting and should be studied as to how best to repair (photos 49-50).

Recommendations: Scrape and expose all rusted steel members of the floor system and paint with a protective coating. **Cost =$5,000**

Floor Finishes

The basement floor is an exposed concrete slab and appears in good condition.. The first, second, and attic floors of the house are constructed of the beam and tile system with a concrete topping over the tile. The first and second floors are finished with a strip wood flooring installed over the concrete topping. The strip wood is in good condition. Linoleum is covering the original kitchen floor. The third floor concrete topping is left exposed. The floors of the tower are of a cast iron frame with a linoleum finish. The linoleum is old and brittle. The lighthouse tower stair is cast iron and painted (photos 51-56).

Recommendations: The basement floor is concrete and has only maintenance problems. The first and second floor strip wood flooring is in good condition and could be refinished at a future date. The third floor attic concrete floor can be left exposed. There are plans for possibly developing the use of the room for a meeting space. The tower and kitchen linoleum flooring can be replaced in the future. The cast iron stair and its railings should be painted. **Cost = $ 15,000**

Plaster Ceilings and Walls and Painting

The interior plaster ceilings and walls have not been able to be repaired and repainted for years due to the need for repointing the exterior brick work and providing the new slate roof . That work is now completed and the work of replacing the plaster can now proceed. The deteriorated plaster is most evident on the northwest and northeast walls due to the extreme exposure of the building in the winter months. The glazed brick tile in the tower has also spalled in various areas due to the moisture conditions. With the wall probes we will better understand the wall construction related to moisture migration. The unfinished roof rafters and walls of the third floor attic were sheetrocked back in the 1990's. There is a need for a finished meeting room in the house. The kneewalls at the bottom of the sloped ceilings were furred out and sheetrocked. The space between the wood roof rafters was filled in with fiberglass insulation and sheetrocked. No allowance was made for ventilating the rafter area to prevent dry rot (photos 57-62)

Recommendations: Plaster walls and ceilings should be scraped of their loose and water-deteriorated soft plaster and refinished and painted throughout. The glazed tile on the tower walls need repair. The sheetrocked attic roof needs ventilation for the moisture migration. Paint the interior walls and ceilings **Cost = $27,000**

Interior Woodwork:

The interior woodwork of the windows, doors and baseboards and picture moldings of the first and second floors are made of what appears to be a yellow or heart pine and oak and have a varnished finish. The woodwork, window sash and doors are in good condition. The finish of the woodwork needs study as to refinishing relating to the historic finish (photos 63-68).

Recommendations: Phase I: Minimally restore the woodwork as needed. Protect the woodwork when the replastering work proceeds. **Cost = $20,000**

Building Systems

Refer to the mechanical report on the various building systems.

Phase I:	Provide new oil fired furnace	cost = $ 10,000
Phase II:	Provide freshwater storage system	cost = $ 30,000
	Provide sanitary waste collection system	cost = $ 30,000
Phase III:	Provide unit a/c system for third floor meeting room	cost = $ 10,000
Subtotal		**= $ 80,000**
Total Construction Budget		**= $ 356,500**

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August 24, 2005

Kenneth Hewes Barricklo Architect
173 Green Street
Kingston, NY

Attn: Kenneth Barricklo

Re: "Rondout Lighthouse", aka. "The Rondout 11" aka. "The Rondout North Dike Light Station",
One Rondout Landing, Kingston, NY 12401.
Subject: Preliminary structural review of building.
RSA Job No: 10378

Dear Ken,
Per your request, I visited the site with you on August 11th, 2005. The purpose of the site visit was to perform a preliminary structural review of the lighthouse. Our observations are based on visual observations only, with no probes being opened into the structure, or comments made on the foundation piles or pile cap, architectural, MEP or HAZMAT elements. Original structural drawings were available to us when writing this report.

The Rondout Lighthouse, now vacant, was constructed in 1913. It was a family occupied lighthouse until the late 1940's and is basically a three story masonry structure (two stories over basement) with its tower attached. Historical documents note that the building sits atop a man made island consisting of a concrete plinth poured on wood piles driven into the river bed. A steel cofferdam of formed interlocking plates driven into the riverbed surrounds the plinth. The island was recently connected to the Kingston shoreline by a stone breakwater.

The construction of the lighthouse comprised load bearing exterior brick (varies from 12" to 18" in thickness). The exterior wythe, laid in a Flemish Bond pattern, is 4" of buff colored hard baked brick, laid over two wythes of backup brick with a 2" terra cotta liner brick on the interior. All exterior walls are facetted, or coffered, with expressed piers at the building corners and a modest corbelled brick cornice at the roof eaves, just under the roof gutters. The cellar walls are of poured in place concrete poured on the concrete pile cap (plinth).

The floor structure comprises one way spanning reinforced concrete "T" beams with terracotta block fillers between the beams. This is a type of proprietary non combustible floor system called "Republic Slag Block". The porch over the front door, which used to house a bell and fog horn accessed via the second floor tower window, is constructed from reinforced poured in place concrete. The gabled roof, slate clad, is framed with conventional wood joists which overhang the exterior walls to form the eaves.

Rondout Lighthouses' primary function was to act as a navigational aid for Hudson River traffic. The eastern facing masonry watch tower is capped by a glazed in cast iron observatory. This housed the Fresnel lantern which rotated, via pulleys and weights, on the cast iron gallery floor. The lantern structure atop the tower, the roof, glazing frames, cylinder drum, lantern floor and balcony are all cast iron. Cast iron is more resistant to corrosion than either wrought iron or mild steel and this accounts for the relatively good condition.

Conclusions and Recommendations:
We observed the Rondout Lighthouse to be in moderate to good over all condition. Some problems exist with the building components and these are noted below:

Exterior wythe masonry: The exterior hard buff coloured brick uniformly exhibits excessive cracking that does not appear to relate to foundation problems or corrosion of steel. It is possible that thermal gain on the brick and or the effects of freeze thaw damage resulting from water absorption entrapped within the exterior wythe could be possible. Recent probe efforts to remove some exterior brick have proved difficult. These were found to be very well adhered and bonded to the backup wythes. A large portion of the mortar joints have been serviced recently, being re-pointed with a soft lime based sand cement mix. Before any recommendations for the repair of the brick can be made, more in depth investigations are required. Probes through the exterior walls, opened from the inside should be undertaken. This would reveal the collar joint behind the outside wythe and the relation to the backup ie, all headers tie into backup or are they snapped. The cracks should also be documented to determine if a pattern exists.

Porch over front door: Both the masonry piers (replaced approx 10 years ago) and the poured in place concrete porch from 1913 were observed to be in poor condition. The masonry piers need to be completely reconstructed using correctly sized replacement. The last repair used a slightly different bricks and were poorly laid up allowing rain water to run down the cores of the replacement brick where freeze thaw cycles fractured the face. The reinforced concrete porch slab, numerously patched with sand cement mortar, could be stabilized by removing all the damaged concrete and a new layer of polymer modified patching mortar added over stainless mesh. This repair scheme works if the daylight facing concrete is adequately protected by metal flashing. The flashing acts as a mechanical barrier against the destructive nature of long term water infiltration. If the porch is left unattended for five more years, it may not be possible to salvage the slab, requiring total reconstruction. We also recommend that the existing porch be immediately sounded with a light electric chipping gun, to loosen and remove fractured concrete. These pieces are currently falling from the porch onto the slab in front of the entrance way.

Concrete lintels, sills and ornamental step at foundation wall: The building comprises cast concrete window heads and sills as well as some architecturally expressed trim between the concrete foundation wall and the exterior brick. As the concrete appears serviceable, and not aggressively deteriorated from water and ice, we recommend that the top side of these elements receive a metallic cap. This will greatly help deflect water from entering into the concrete.

Site works: The lighthouse is surrounded by a 6'0" wide +/-, 8" thick +/- reinforced concrete pavement slab supported by a ledge in the foundation at the building side and by the top of the sheet metal and concrete coffer dam wall on the outboard edge. The slab was observed to be in moderate to poor overall condition with much evidence of uniform deterioration of concrete, and corrosion of the reinforcement. Numerous patching campaigns have maintained the serviceability of the slab, however, we predict that the slab will continue to deteriorate, regardless of repairs, ultimately failing and falling into the cofferdam. It is difficult to predict the time frame for this eventuality but we recommend considering complete replacement of this slab. The reconstruction would also include work to the cast concrete steps and top of concrete coffer dam wall.

Interlocking wrought iron cofferdam wall (steel sheeting): Numerous steel plants manufactured interlocking sheeting (Lackawanna, Carnegie, Larssen, Jones and Laughton etc). Basically, the formed 2'0" wide sheets were driven into the riverbed using a power hammer activated by compressed air. The next adjacent sheet was locked into a male – female coupler.

The sheeting, lined with a concrete wall on the inside, was observed in moderate overall condition. Some areas of corrosion have breached the metal and the concrete wall is visible through the hole. The wall should be sounded (at low tide) and any corroded areas patched with a new steel plate. More importantly, the sheeting is capped with a 5" wide bent plate "Z" section. This bent plate capped the open flutes of the formed sheeting. It arrested rainwater from running down inside the sheet. The bent plate was badly corroded, completely lost in some sections. New galvanized bent plates are required to be fabricated and bolted to the concrete plinth so that rain is deflected away from the inside of the sheeting.

Cast Iron Lantern Room: The cast iron lantern room is a unique part of the lighthouse. It was custom fabricated in Albany New York specifically for this location. The cast iron plating, components and glazing was observed to be in good overall condition. A few years ago, the glazing mullions were serviced. They were disassembled and new stainless bolts installed at the connection to the lower drum. We recommend that the cast iron be very carefully cleaned down to grey metal, in particular, any location when plates connect. The original fastners were mild steel flat headed machine screws. These, unlike the cast iron, corrode aggressively and then fracture the cast iron connection. The repair of the cast iron is very difficult and expensive, if possible. It would certainly be worth assessing changing all the fasteners.

We will continue to monitor and help you with assessing the exterior wythe cracking of the masonry. If you have any questions regarding this report, please contact me at 1 212 620 7970.

Sincerely,
Robert Silman Associates

Timothy D. Lynch PE
Associate.

Kenneth Barricklo
Kenneth Hewes Barricklo Architect, PC
173 Green Street
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ROUNDOUT LIGHTHOUSE

An Environmental Assessment

AUGUST 2005

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INTRODUCTION

On August 10, 2005 an environmental assessment was conducted at the Rondout Lighthouse in Kingston, New York. Physical construction features of the building were examined; selected tests were conducted to evaluate the indoor environment, and existing mechanical, electrical, and plumbing systems were reviewed.

This report presents the findings of the inspection and recommendations for adapting the space for other potential use.

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SUMMARY

The Roundout Lighthouse was observed to be in surprisingly good physical condition for a 1913 structure located in a maritime setting. This can be attributed to diligent building envelope restoration efforts set forth in recent years by the Hudson River Maritime Museum and the City of Kingston. These actions have apparently halted the intrusion of rainwater through roofing and masonry joints into living spaces. No active sources of moisture-induced deterioration were found, other than localized wood rot at windows (from normal weathering) and condensation related wood rot in the basement.

Regarding the building's adaptive reuse potential, at present it has no running water and no sanitary facilities. It does have a modern residential-sized electric service. It also has an oil-fired hot water heating system, which has a boiler that is functional but in poor condition from years of corrosion.

Three options for adaptive reuse are recommended for the lighthouse:

- The first, and simplest, would consist of small group daytime usage in conjunction with a dockside boat to provide food service and sanitary facilities. No changes would be needed in the existing lighthouse.

- The second adaptive reuse option would be to open the lighthouse for limited occupancy with no dockside boat to provide sanitary facilities. This would require the installation of a drinking water storage and supply system and a sanitary waste holding tank system, which can be installed in the basement. Available facilities would include limited food service, a daytime unisex toilet, and a sleeping space to accommodate 2-3 overnight guests. No laundry provisions would be present.

- The third adaptive reuse option would be to permanently connect the lighthouse utilities to the town public water supply and sewer system. This is a major first-cost option, but it would allow occupancy of the lighthouse for unlimited duration, and for

any purpose. Air-conditioning could also be provided throughout the lighthouse with this option.

FINDINGS

MOISTURE ISSUES

There has been ongoing concern for unwanted sources of water causing deterioration to the Lighthouse, especially considering its location on the Hudson river, surrounded by water. To assess these potential moisture issues, the building's physical construction features were visually examined, moisture level tests were conducted, and the building's original design drawings were reviewed.

PHYSICAL CONSTRUCTION CHARACTERISTICS

The Lighthouse is a massive masonry structure set on a reinforced concrete access deck and foundation, which is supported by wood pilings. Above the access deck, the masonry perimeter walls were found to measure over 12 inches thick. Although probes were not conducted, the composition appears to be a homogeneous mortared layering of two courses of terra cotta against two layers of brick. The interior finishes are apparently plaster coated plaster board. Review of the original drawings confirmed the heavy masonry construction but yielded no information on how the composition is tied together. The drawings also show the flooring to be reinforced concrete.

Visual inspection found the plaster finish to be delaminating from the plaster board backing in almost every room. None of these conditions, however, were found to be active. Room by room moisture content tests of the environment were performed in search of elevated moisture levels related to the delaminations. Temperature and relative humidity readings measured throughout the building were largely consistent from floor to floor. These readings also closely mirrored outdoor conditions.

The foundation shows some signs of wear and deterioration over time – particularly at the corners and floor/wall intersections. There were minor signs of wood rot in the basement, due to condensation on wood members being in direct contact with the basement floor,

and occasionally wetted by extraordinary tides. An example of this can be seen in the sump pump room, at the base of a wooden shelving support. Despite this, we found no standing water in the basement at the time of inspection.

Windows throughout the building are single-pane type with wood frames. On the interior side they show little sign of deterioration from rot, however their exterior frames and sills have been heavily rotted due to basic weathering over time. They are all due for refurbishing soon, before further deterioration leads to infiltration of water.

The slate roof was replaced in the early 1990s. It appears to be in very good condition, with the exception of an occasional missing or damaged tile. There was no evidence of active roof or flashing leaks in the attic space directly below the roof. At the underside of the slate roof there is an open attic space which has been covered at its rafters by gypsum board. At the knee walls this covering has a wood framing system and an air gap of about 4 inches. Although no active signs of moisture were observed, there was concern about venting this space and its cavity below the roofing. A simple ridge vent in conjunction with the knee wall cavity may be a sufficient solution so long as the slate has been installed to allow it to "breathe".

INDOOR ENVIRONMENT

Temperature and humidity levels were measured throughout the building. It was found that these conditions were about 80-85°F and 61-70% RH throughout. The concurrent outdoor conditions were 80°F and 64% RH. The highest relative humidity levels were observed in the basement.

The measured data is presented in the table below.

Location	Temp (°F)	RH (%)	M.C. (grains/lb)
Outdoors (8/10/05 @ 11am)	80.0	64.0	98.8
Rear Basement – NW	80.0	66.0	102.0
Front Basement – SE	80.0	70.0	108.3
1st Floor – Living Rm	80.0	67.0	103.5
1st Floor – Dining Rm	81.0	67.0	107.0
1st Floor – Kitchen	82.0	65.0	107.3
2nd Floor – SW Bedroom	82.0	63.0	103.9
2nd Floor – SE Bath	83.0	63.0	107.4
2nd Floor – NE Bedroom	83.0	63.0	107.4
2nd Floor – NW Bedroom	83.0	63.0	107.4
3rd Floor – Attic	83.0	61.0	103.9
Beacon @ 3rd Floor	83.0	63.0	107.4
Beacon @ top	85.0	67.0	122.2

MC = Moisture Content (grains of water per pound of dry air)

These readings indicated that there is no active moisture being generated anywhere in the Lighthouse at this time, except in the metal enclosure around the beacon. This localized exception is due to accumulated moisture in this space from nighttime condensation and evaporation activity through the vents at floor level.

ADAPTIVE REUSE

Consideration is being given to offer public tours of the lighthouse, and possibly, accommodate overnight guests. As an historic and architecturally significant building, this reuse must be respectful of the original design elements while accommodating modern convenience needs. A brief overview of the existing building systems is given, existing conditions are described, and three reuse options are presented.

EXISTING HEATING SYSTEM

The original design drawings indicate that the lighthouse once had a coal fired central steam heating system with cast-iron radiators in each room. The only remaining evidence of this system today is the coal bin enclosure and the chimney with flue connection.

At this point there is now an aging oil-fired hot water boiler installed in the basement that is connected to replacement hot water radiators and piping – all arranged as a single heating zone. Oil storage is accomplished using (3) 275 gallon oil tanks, which are piped in parallel. Adjacent to the boiler is what appears to be a makeup water storage tank and pump system. The boiler flue is connected into an existing masonry chimney. The boiler is quite old and shows signs of corrosion on various parts of the cabinet – it should be replaced.

The boiler circulates heating hot water throughout the building to cast iron radiators. The system presently has a single thermostat located in the Dining Room. Should the lighthouse be considered for overnight occupancy in the future, a second thermostat zone should be added as a comfort improvement for the 2nd floor sleeping rooms.

During the summer, the lighthouse has always relied on open windows for natural ventilation and cooling from breezes off the river. There is ample electrical power in the building now to accommodate limited room air conditioning, subject to approval.

EXISTING ELECTRICAL SYSTEM

Review of the original design drawings and visual inspection of the lighthouse yielded no evidence of electric power service to the building originally, although at that time period rudimentary power was coming into use.

Modern electric power is now installed throughout the building. The electrical system serving the building is provided from a submerged cable that enters the building in the north corner and passes through the cistern. The cable terminates at a 100 ampere disconnect switch, which feeds a 20-circuit electrical panel. The existing 100 ampere service is adequate to power the heating system, lighting, sump pump, and limited air conditioning.

EXISTING PLUMBING SYSTEM

The original design of the lighthouse contained a plumbing system intended to support a small family's continuous occupancy and lifestyle. Drinking water was collected from roof drains into a large two-section brick cistern still in place in the basement. A sanitary waste system was connected to a bathroom on the second floor, as was the kitchen sink and the soapstone sink in the basement. The waste water was piped directly into the Hudson River. All of the plumbing still remains in place today, but is no longer in use. The waste piping into the river has been disconnected.

The existing plumbing system in the building, while not in use, was installed to serve the 1st floor Kitchen, 2nd Floor Bathroom, and a soapstone sink and floor drain in the basement. The system consists primarily of copper water distribution piping and cast-iron sanitary and vent piping.

Built into the basement is a large cistern, which is fed from two rain leaders; one is on the north and the other on the west corner of the building. The cistern is lined with brick and

has a central partition, which is still intact. The building's electric service passes through this space.

Presently, the building has no active water supply. Located in the basement is a domestic hot water heater and water softener/filter, both of which are disconnected. These items appear to have been placed in the basement but not fully installed some time ago. There may have been an attempt to connect them to the cistern and to treat its otherwise non-potable water.

ADAPTIVE REUSE OPTIONS

Three reuse options integrated with the historic building arrangement have been developed for consideration. They are described herein:

Option 1: Make no modifications to the lighthouse. This approach would rely on a dock-side boat to provide food and sanitary facilities to visitors, whose stay would be limited to a few hours at a time. A temporary portable air conditioner might be installed in a public assembly space.

Option 2: Modify the lighthouse for limited (overnight) occupancy. To accomplish this, the largest and most essential modification would be to make the plumbing system operational. This would be accomplished by installing a waste holding tank and potable water supply tank. Each tank would be located in the basement. A new sanitary main would need to be run across the basement and into the waste holding tank. The tank can be tied an existing adjacent vent riser located at the wall adjacent to the cistern. The potable water tank would require a pumping and treatment system.

The size of each storage tank is directly dependent upon the maximum number of occupants and length of their visit. A individual on a 1-hour tour has different requirements than a group on a weekend stay. In fact, the decision to include bathing facilities

(tub/shower) would have a significant impact on both domestic water consumption and waste storage. Assuming a minimum occupant usage of 50 gallons per day, a group of four people on a 3-5 day stay would require a 1000 gallon water storage tank, and similarly-sized waste holding tank. Knowing the projected occupancy will also permit sizing and selection of a suitable domestic hot water heater.

Because radiators are already located throughout the house, the heating system would not require substantial modification (for daily or weekend visitors) other than replacing the boiler and adding a second independent heating zone for the 2nd floor.

The suitability of the electrical system is dependent on the anticipated use of the space, and the decision whether or not to air condition the building. Limited air conditioning (such as 3-4 small window units) can be supported by the existing system.

Option 3: Modify the lighthouse for extended (unlimited length) occupancy. This would require connecting the existing plumbing system to the town water supply and sanitary services located on land about 1000 yards away. As part of the new sanitary and water services being run from the mainland to the lighthouse building, it would be appropriate to also run new (higher capacity) electrical power at that time. All services can be run simultaneously and follow the same routing scheme to minimize cost. This first-cost of this option would be the highest of the three options.

RECOMMENDATIONS

- SHORT TERM

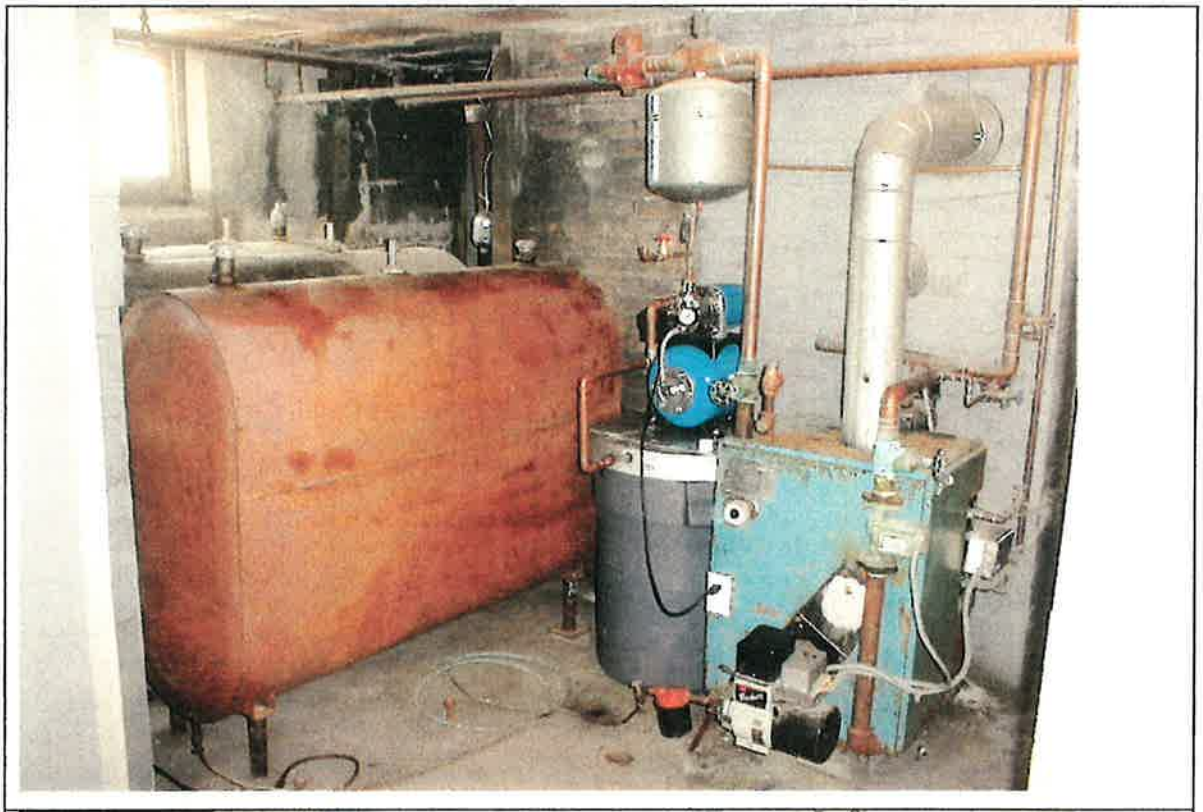
Recent improvements to the building envelope have essentially halted the previously reported moisture difficulties relating to the plaster finishes. As a preventive measure, it is recommended that a simple ongoing environmental monitoring system, consisting of electronic data loggers, be established to provide adequate warning of future changes in moisture conditions. One data logger located in the basement, main floor, attic, and outdoors would be sufficient.

We recommend that the present hot water boiler be replaced, and windows refurbished throughout the building. The aging boiler should be replaced with a new oil-fired unit. This will reduce the risk of a heating system failure, which could have devastating consequences if pipes should freeze/burst in winter time.

- LONG TERM

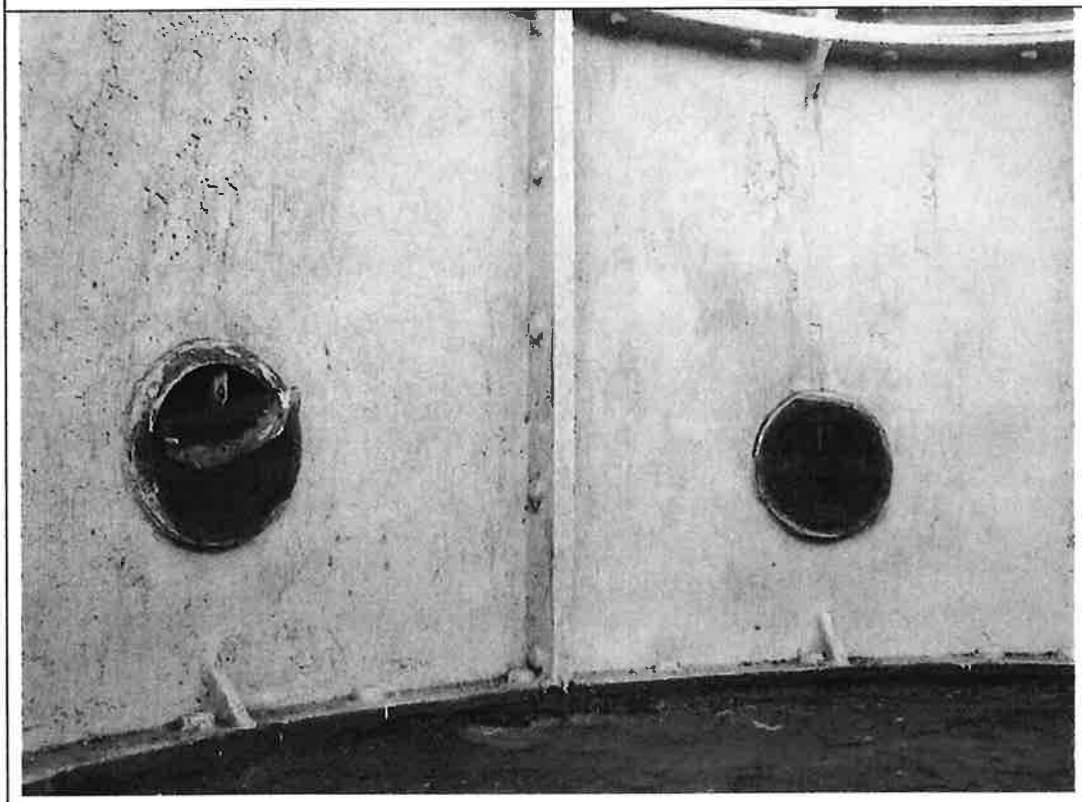
The selection of the three reuse options need not be decided now, but rather as the demand for access increases. The best option will be the one that best satisfies the future needs of the space, at the lowest possible maintenance and highest possible return.

APPENDIX: PHOTOGRAPHIC DATA



Existing Heating System – Boiler, Oil Storage Tank (top) and typical radiator (above).

Evidence of rot at wood window frames.



Existing air vents in Beacon – possible source of moisture infiltration.

Existing access door in basement floor – original sanitary piping passes through

Existing electrical service – 100 amp panel and disconnect switch.

PHOTOGRAPH CAPTIONS

Overall Views

1. View from southwest
2. View from southwest
3. View from north
4. View from west
5. View from northeast
6. View from southeast

Concrete Porch

7. Shored edge of porch of most serious cracking
   Note condition of spalling ceiling
8. Detail south side and top of brick faced pier
9. Detail concrete roof from outside of shoring
10. Detail concrete porch roof from porch
11. Detail of underside of spalling concrete porch roof
12. Detail temporary rubber roof on top of concrete porch
13. Detail northeast side porch roof at tower
14. Detail northeast side porch roof at brick pier
15. North brick porch pier
16. South brick porch pier

Concrete slab walkway around house

17. Crack in slab at east corner of house
18. Cracks in slab at corner of house
19. Cracks in slab at corner and foundation wall at north corner
20. Cracks in slab and foundation wall at northeast side
21. Cracks in porch slab above upper corners of basement window-northeast side (southwest side mortar)
22. Cracks in slab and foundation wall at east corner of house

Concrete house pier platform and steel caisson

23. Steel landing platform connection to pier platform
24. Steel landing platform connection to pier platform. Note spalled slab edge
25. Southeast view at flagpole
26. East to northeast condition.
    Note missing steel caisson angle cap
27. Missing caisson cap on southwest side
28. East view of corner of caisson and cap, concrete pier, walkway slab and cast iron railing.
29. Details of east view of corner caisson and cap, concrete pier, walkway slab and cast iron railing.
30. Cast iron railing with nylon safety netting, northeast side.

Brick walls

31. Repointed vertical cracks at corners and in wall at south corner of tower.
32. Detail of repointed vertical cracks at corners and in wall at south corner of tower.
33. Detail of south corner of house corner pier with repointed vertical cracks. Note other hairline cracks.
34. Detail of west corner of house corner pier with repointed vertical cracks. Note other hairline cracks.
35. Detail in plane of wall of flemish bond and vertical cracks.
36. Detail of east corner of tower with vertical cracks. Note relation of cracks, below, in concrete foundation wall.
37. Center of northwest wall: wall not pointed above window sill.
38. West corner of northwest house wall: wall not pointed above window sill.

Slate roofing

39. Missing slate on northeast side of ridge.
40. Missing slate off northeast side of ridge near tower.

Windows

41. East side of tower: window that requires complete restoration.
42. Detail of east side of tower window that requires complete restoration.
43. East tower basement window requires complete restoration (west side window in similar condition) Note sump pump pipe thru sash
44. Tower top: porthole missing on east side.

Cast iron lighthouse top

45. Interior deteriorated paint due to high levels of condensation.
46. Detail of interior deteriorated paint due to high levels of condensation.
47. Glazing bar repairs to exterior muntins
48. Glazing bar repairs to exterior muntins.

Floor construction

49. Terra cotta tile floor system exposed in basement. Detail.
50. Terra cotta tile floor system exposed in basement in south corner. Note exposed concrete foundation wall joints and basement window. Outside concrete walkway at level of horizontal construction joint.

Floor finishes

51. Basement concrete floor with steel access door to original sanitary piping.
52. First floor : concrete porch, saddle and interior linoleum flooring in tower.
53. First floor: tower linoleum flooring and raised wood saddle at door to interior room, strip flooring. (Second floor similar).
54. First floor: interior strip wood flooring to linoleum flooring in kitchen.
55. First floor: trap door to cistern under kitchen pantry.
56. Tower linoleum floor to concrete floor of third floor attic.

Plaster ceilings and walls

57. Typical condition of plaster ceiling and wall, worst condition.
58. Typical condition of plaster ceiling and wall, worst condition.
59. Spalling plaster from underside of floor construction.
60. Spalling glazed brick tile of tower.
61. Attic, third floor ceiling and walls: sheetrock covering of roof rafters and furred exterior wall.
    Note exposed roof ridge board and exposed clay tile to side of window jamb-side.
62. Attic, third floor ceiling and walls: stud kneewall framing at bottom of ceiling, roof finish.
    Note line of rafters beyond.

Interior woodwork

63. Typical window woodwork and picture molding.
    Note deteriorated wall and ceiling plaster. South house corner.
64. Kitchen interior door and wainscoting. Typical door.
65. Typical door and picture molding (first and second floors).
66. Typical condition of door frame, baseboard and flooring (first and second floors).
67. Basement: Rotted door frame due to flooding.
68. Basement: Rotted door frame due to flooding
    Note dropped door head and brick tile loss at head.

Building systems

69. Electric service cable exposed on northwest side through cistern overflow pipe.
70. Lightning protection secured to cast iron lookout platform. View looking down toward concrete platform around house off east corner of tower.
71. Box gutter downspout entrance through concrete foundation wall to cistern in basement at north corner of house.
72. Sump pump for basement under porch.
73. Fresh air intake for original waste piping through northeast wall.
74. Original sanitary pipe outlet to river on northeast side through caisson wall.

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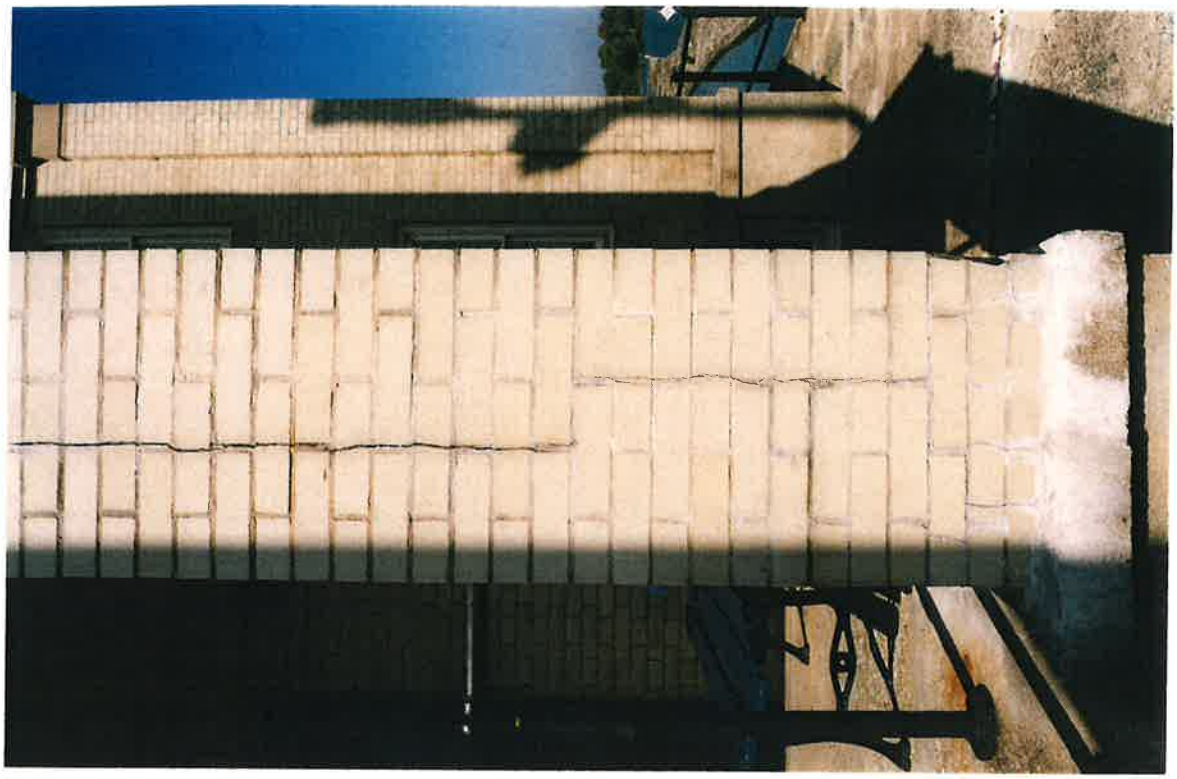

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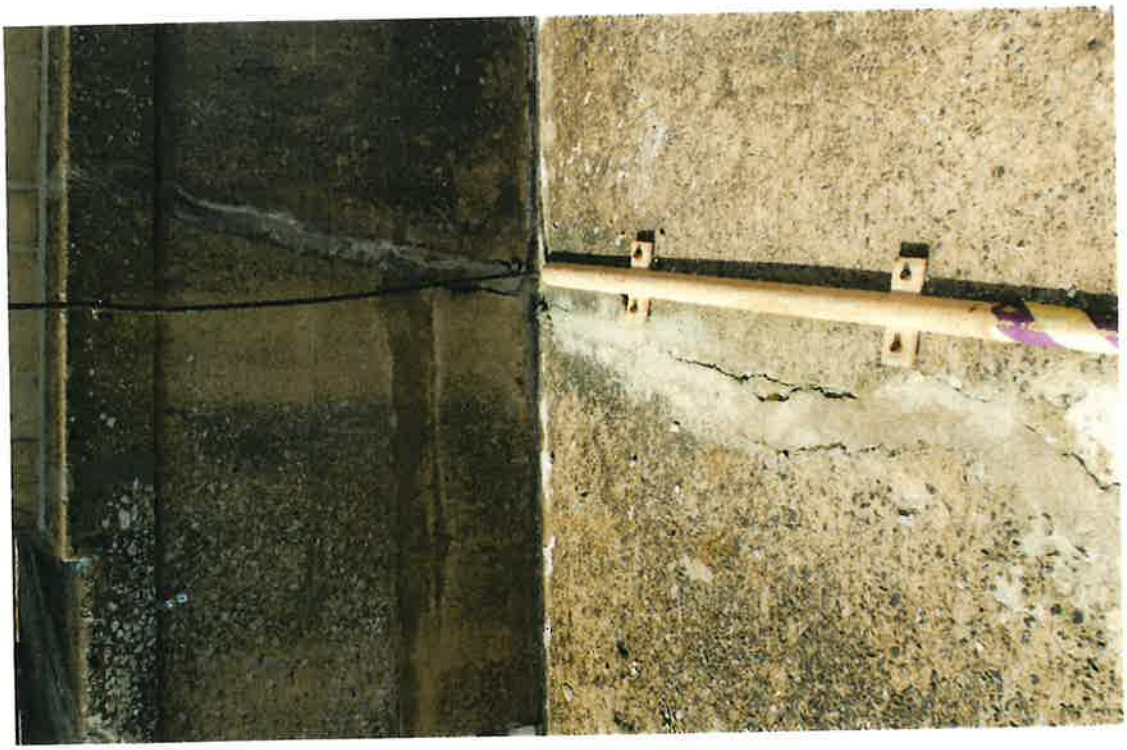

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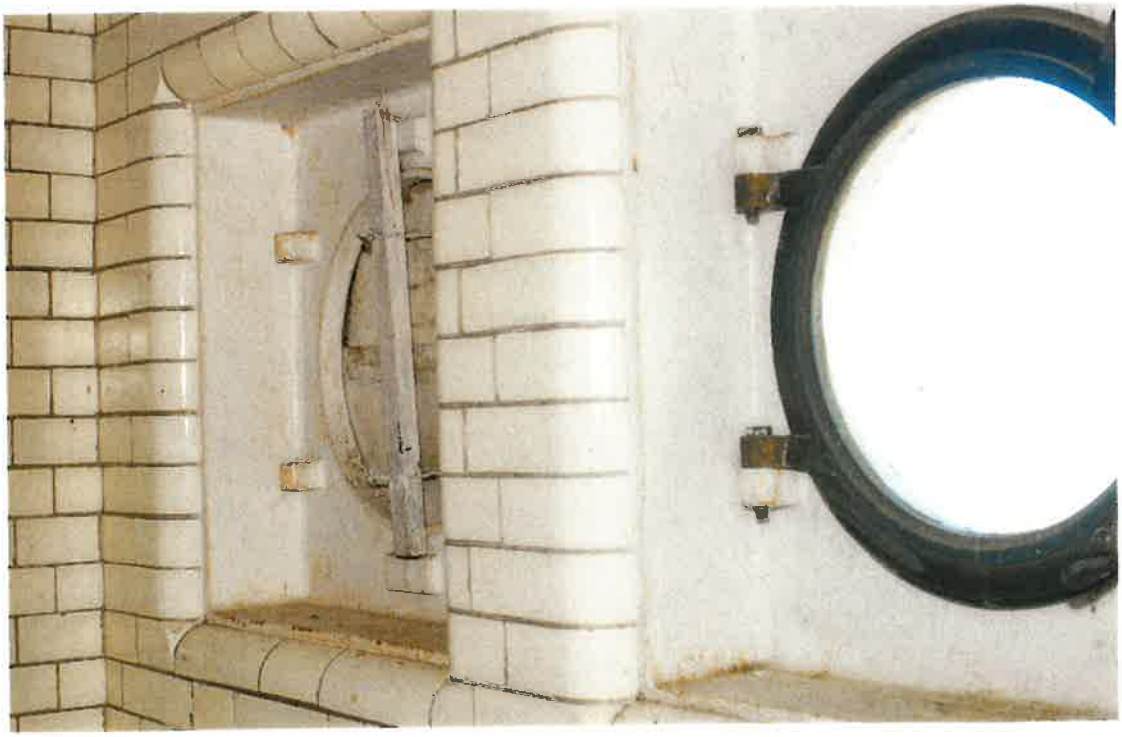

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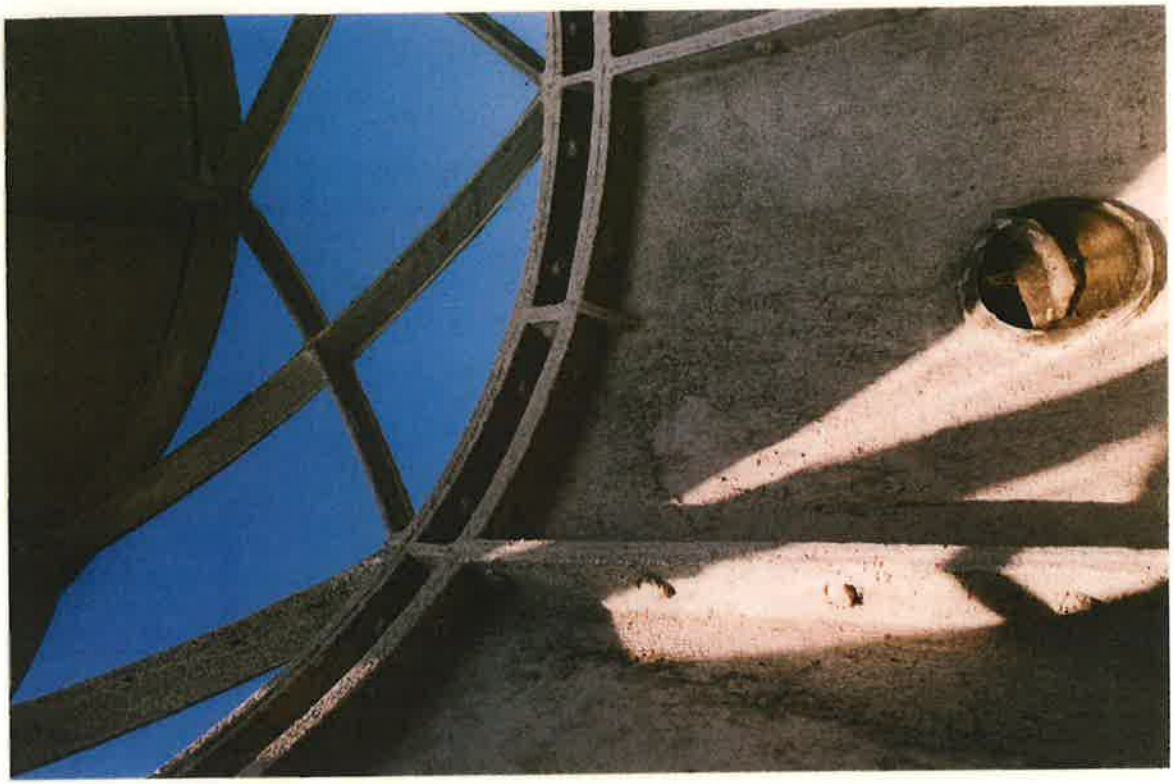

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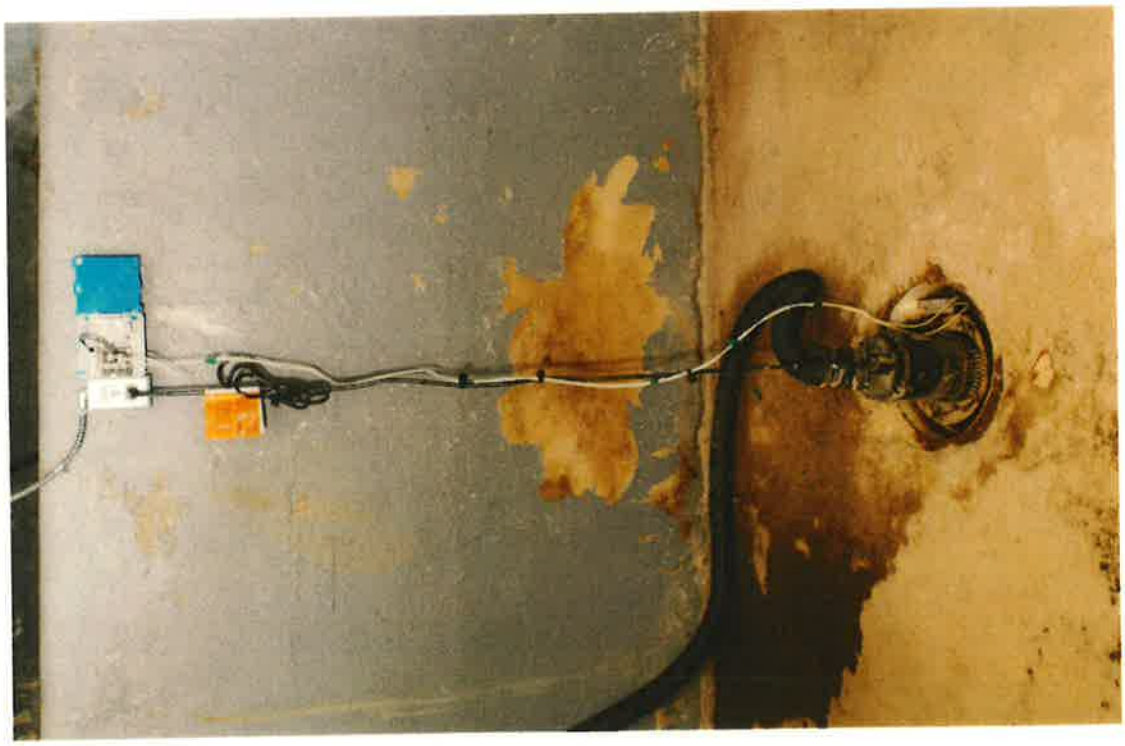

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BUDGET ESTIMATE

Phase I

Concrete Porch • rebuild structure	18,000
Concrete Slab Walkway • rake out and repoint cracks	6,000
Concrete House Pier Platform and Steel Caisson • repair cracks and provide steel cap	28,000
Brick Walls • no work this phase	0
Slate Roofing • repair slates	500
Windows, Doors, Cornice and Painting • restore tower and basement windows (3 windows)	9,000
Cast Iron Lighthouse Top • no work this phase	0
Floor Construction • repair exposed steel in floor beam construction	5,000
Floor Finishes • no work this phase	0
Plaster Ceiling and Walls and Painting • repair plaster and paint	27,000
Interior Woodwork • no work this phase	0
Building Systems • provide new oil-fired furnace	10,000
Total Cost	**103,500**

Phase II

Concrete Porch • no work this phase	0
Concrete Slab Walkway Around House • rebuild walkway, remove and reinstall metal railings	57,000
Concrete House Pier and Steel Caisson • no work this phase	0
Brick Walls • repoint remaining 20% of masonry	26,000
Slate Roofing • no work this phase	0
Windows, Doors, Cornice and Painting • paint windows, doors, cornice	28,000
Cast Iron Lighthouse Top • restore cast iron window and exterior roof and railings and paint all interior	10,000
Floor Construction • no work this phase	0
Floor Finishes • no work this phase	0
Plaster Walls, Ceilings and Painting • no work this phase	0
Interior Woodwork • no work this phase	0
Building Systems • provide freshwater storage system • provide sanitary waste collection system	 30,000 30,000
Total Cost	**181,000**

Phase III

Concrete Porch • no work this phase	0
Concrete Slab Walkway • install metal protection in railing	27,000
Concrete House Pier and Steel Caisson • no work this phase	0
Brick Walls • no work this phase	0
Slate Roofing • no work this phase	0
Windows, Doors, Cornice and Painting • no work this phase	0
Cast Iron Lighthouse Top • no work this phase	0
Floor Construction • no work this phase	0
Floor Finishes • refinish wood flooring	15,000
Plaster Ceiling, Walls and Painting • no work this phase	0
Interior Woodwork • refinish all interior woodwork	20,000
Building Systems • provide unit a/c system for third floor meeting room	10,000
Total Cost	**72,000**

Summary

Phase I	= 103,500
Phase II	= 181,000
Phase III	= 72,000
Total Cost	**= 356,500**