Gregor S. and Elizabeth B. Affleck House

Visual Assessment with Order-of-Magnitude Budgets for
Lawrence Technological University
Southfield, MI

December 15, 2009
Project No. 62497.ODT

SMITHGROUP
architecture engineering interiors planning
INTRODUCTION
The Affleck House construction was finished in 1942 and is an excellent example of Frank Lloyd Wright’s vision for what he referred to as a “Usonian house.” It has primarily a brick and tide water cypress wood exterior appearance (Exterior Photos). The house is now owned by Lawrence Technological University (University). The University is interested in developing a long-range plan for the home’s restoration and continued use. This report documents a one-day observation of the home for the purpose of identifying visually apparent conditions that require remediation. Observations were conducted and this report prepared by Thomas F. O’Connor, FAIA, FASTM, LEED AP and Paul G. Johnson, FAIA. The intent is to restore the home and its landscaping close to its original appearance and to upgrade the mechanical and electrical systems to modern standards and for future anticipated uses.

Although no longer used as a residence the intent by the University is to develop it to include functions that support the University and the College of Architecture and Design, the professions and professional partners of the University, and the neighborhood and community-at-large.

EXECUTIVE SUMMARY
Except for the retaining and stair walls displacement, the house is structurally sound and in relatively good condition for its age (67 years). Considerable work will be required to design and unobtrusively implement a new electrical system and to develop a method for providing air conditioning. These improvements are necessary to provide for its continued use for the foreseeable future.

SmithGroup recommends that before any future interior work is performed (e.g. staining and varnishing) that a program prioritizing activities be developed. First the home must be made water tight or interior work will be at risk for water damage. Also certain tasks must be performed before others (e.g. brick cleaning before staining and varnishing adjacent woodwork). Cleaning brick adjacent to previously refinished wood may result in repeating part of that work.

The house has had well meaning exterior repairs and maintenance performed over the years. However, some of them have resulted in an unsightly appearance, have been performed inappropriately, have damaged some materials, and are potential sources of future problems. These conditions must be corrected. Future work should be implemented based on professional evaluation and recommendation.

The identified budget cost ranges are conceptual, are based on observations without an in-depth knowledge, and should be treated as order-of-magnitude costs to be used in making decisions about the direction of future work. Gaining an in-depth knowledge will require an investigation of the house and its systems in considerable detail including intrusive probes of its construction to verify conditions (e.g. retaining and stair walls). That information can then be used to develop a program for the house, to prioritize the work, and to establish more accurate budgets and schedules for the work.

The order-of-magnitude budget for the work identified herein is estimated to be $730,000 to $1,240,000 in 2009. How the work is procured, the availability of donated products and services, and how much can be performed at one time will affect costs, since efficiencies are gained by performing more work earlier and at one time. The budget range represents doing less or more depending on priorities and availability of funds and the higher budget includes some sustainable and energy reduction measures. The University should also consider the establishment of a small committee of knowledgeable professionals responsible for recommending any needed repairs or restoration to ensure the continuing integrity of this icon of modern architecture.
HISTORY
The Usonian Concept — Beginning in the 1920s, Frank Lloyd Wright's argument that modern cities were no longer habitable led him to develop his solution for urban problems -- Broadacre City. Wright used "Usonia" in place of American for the reformed, future "America" of Broadacre City, and he used the word Usonian as his solution to the "small house problem." These Usonian houses, and in particular the pre-World War II designs, were a direct response to the changes in the lifestyles of his clients and their needs for a low cost but satisfying dwelling.

Frank Lloyd Wright's Usonian Design was his answer to the need for low-cost housing for the average American. Usonian houses were typically one story, to express the horizontal element of the American mid western plains. Attics were eliminated to avoid building unuseable space and, thus, save money. Instead, Usonian homes had flat roofs. Carports were introduced by Mr. Wright who maintained that garages were built at the rear of the lot for horses. In the modern world, Mr. Wright believed the family would be dependent on the car, which did not need shelter from the elements, only shelter for the occupants getting into the car. He introduced skylights as a way of providing additional light into the house. Mr. Wright believed his new ideas of the home should involve new materials and new technology.

The interiors of Usonian houses were based on modular grids, usually 2- by 4-feet, or 4- by 4-feet as in the Affleck house. This grid was the basis for laying out the plan of interior partitions, furniture, rugs and cabinets. The living areas consisted of spacious and interconnected rooms, combining spaces such as the entry, the dining room, the living room and the music room. Mr. Wright's idea of the modern kitchen was one that opened directly into the living area. At the time, no one would have designed a kitchen in full view of the living room, it was meant to be closed off behind a door, preferably at the rear of the house. Mr. Wright believed the housewife was the worker of the American home, and he designed his kitchen such that she could cook and watch the children of the house at the same time. Mr. Wright believed that windows should not be 'punched out' of walls, as it gave the feeling of living in a box. Instead, the windows took up the entire wall space to enhance the open natural living that Mr. Wright desired.

The Beginning — Early in 1940, Gregor S. Affleck retained Frank Lloyd Wright regarding the design of a new house. Mr. Affleck had grown up in Spring Green, Wisconsin and was a boyhood friend of Mr. Wright. After graduating from the University of Wisconsin in 1919 with a degree in Chemical Engineering, Mr. Affleck invented a fast-drying paint that found use in the automotive industry. "Affleck paint" is still used today and is highly regarded for its qualities of drying and durability.

In response to Mr. Affleck's letter, Mr. Wright told him to go far out of the city and find a site nobody wanted or could build on. At the time the Afflecks lived in the City of Pleasant Ridge, one of Detroit's outer most suburbs. Mr. Affleck found a hilly area along Woodward Avenue in the city of Bloomfield Hills. A subdivision had been planned on the site, but the lots did not sell well because of the terrain. The site consisted of a ravine with an artesian spring at the top. Water from the spring flowed across the site to a pond near the road. Mr. Affleck sent a topographical map to Mr. Wright.

Initial Plans — The initial plans that Mr. and Mrs. Affleck reviewed were essentially the same as the house that was ultimately constructed. In the revisions a balcony was replaced by the loggia porch, the kitchen was redesigned, and the window profiles were changed, among smaller items.

Construction — Erection of the Affleck's "Usonian" house began early in 1941 and was finished early in 1942. As construction proceeded, local interest brought many visitors to the house on Woodward that
was so ‘unusual’ compared to the currently popular ‘colonial’ style. It was perhaps interest in the architect himself that brought out the visitors.

The House — Mr. and Mrs. Affleck lived in the house until they passed away in 1974. Over the years the house had withstood the elements and the design details of Mr. Wright, who had the habit of pushing materials and structure to their limit. Throughout its history, the roof continued to leak and was in need of replacement. The skylights needed major repair. The exterior siding had begun to peel because of coats of varnish applied over the years. The “Usonian” furniture had become shaky after years of visitors. The heating bill was extremely high, as the house was poorly insulated.

The University — In 1980 the children of Gregor and Elizabeth Affleck, Mrs. Mary Ann Affleck Lutomski and Mr. Gregor Affleck Jr., donated the house to the University to ensure it would continue to be available to the public and to inspire students of architecture, much as it had over the years. The Friends of Frank Lloyd Wright, a non-profit group, was formed to lead fund-raising efforts to preserve and restore the house under the direction of Lawrence Technological University’s College of Architecture and Design.

From that time, (until the late 1980’s) a series of restorations and improvements took place, followed by the most recent restoration, replacing the roof and many skylights, restoring the planter, restoring the reflecting pond, (and its filtration system), and replacing damaged exterior cypress siding in 2007. Finally, in the summer of 2008; replacing numerous decayed planks and refinishing the home’s exterior.

The house was added to the National Register of Historical Places on October 3, 1985 [NPS Reference No. 85003005].

PROPOSED USES

To ensure the future viability of the Affleck house the following activities are envisioned as appropriate uses for the house for the foreseeable future.

College and University
- Recruitment — Hold receptions and orientation meetings for prospective and incoming College of Architecture and Design graduate program applicants and students.
- Guest House — Short-term residence for visiting lecturers, scholars, and distinguished guests.
- Advancement — Donor and alumni receptions and activities and public relations functions.
- Organizations — Location for University alumni, clubs, and service group meetings.
- Student Service — Docents for Affleck House and student caretaker(s).
- Education — University-based seminars and continuing education workshops.
- Sustainability — Utilize Affleck House as a demonstration of sustainable reuse of an architecturally significant building.
- Revenue — Potential University revenue base for educational workshops and seminars.
- Partners — Reduced rate as a corporate workshop, seminar, and reception venue for University partners, such as donors, event sponsors, etc.

Professional
- Association Meetings — Location for associations affiliated with Lawrence Tech such as, AIA, ASID, AGC, CSI, ASHRAE, ESD, SME, SAE, etc.
- Corporate Meetings — Location for small corporate meetings and events.
- Professional Exhibits — Location for professional design awards or art exhibitions.
Community
- Public — Conduct general tours and take part in house and garden tours.
- Education — Conduct tours for other institutions (K-12, high school, university).
- Neighborhood — Location for meetings, dinners, receptions, events.
- Art Shows — Location for community art shows or fairs.

CONDITION ASSESSMENT
The following briefly describes those conditions that were observable and are also based on information provided by University staff as to functionality of certain systems and recent improvements. Indicated budget ranges are presented at a concept level and will need to be verified by an in-depth forensic investigation of the House. Any future restoration should be conducted based on the investigation and information that hopefully is available from the Frank Lloyd Wright Taliesin archives [e.g. plans, specifications, correspondence and other information] so the house can be historically restored

FORENSIC INVESTIGATION — Budget $60,000 to $80,000
Fundamental to establishing representative budgets is obtaining more accurate information from which adequate plans and other information can be developed to implement the recommendations. To this end a more detailed intrusive investigation must be performed to identify those conditions. The forensic investigation team would consist primarily of a forensic architect, landscape architect, structural, mechanical and electrical engineers and a civil engineer for site work. The investigation will also enlist the aid of certain contractors to assist the forensic team in probing the house’s construction. SmithGroup recommends that before any substantial improvements are made to the House that this investigation be performed. The investigation will produce detailed information that will be used to develop the needed repairs and improvements to the House and to prioritize those activities. In particular, to identify improvements for sustainability and energy conservation that can be performed without altering the primary architectural fabric of the House and its historic significance.

ARCHITECTURAL
The following are the major observable areas that need to be considered for any future work, which should be investigated and confirmed by a forensic investigation. There will be other incidental items that may or may not be identified by the investigation and that are usually discovered when performing the work of these topics. A contingency allowance for these unforeseen items should be established.

Exterior
Windows (Photos 1, 2, 3, 4) — Budget $20,000 to $120,000
**Condition** — The house has many wood windows and glazed doors of different sizes with some that are tall and narrow. The custom wood windows appear to be in fairly good condition with the University having performed maintenance work on some of the larger windows. All glass is single pane clear glass, which is not considered energy efficient by today’s standards.

**Approach** — There are basically two approaches to consider for the wood windows and glass doors. At the time when substantial glass replacement occurs the glass in the doors should be replaced with safety glass [e.g. fully tempered or laminated] to meet current safety glazing code requirements.

1. Survey the windows and doors and make corrections for any broken glass, failed seals between the glass and frames, and refurbishment of any wood frames that have deteriorated. Then maintain the windows and doors essentially as they are without
replacing any glass. This would be the least expensive but would result in no improvement in energy conservation or safety. Budget $20,000 to $30,000.

2. This approach replaces the existing single pane glass with an insulating glass unit (IGU) and there are three potential types that could be considered.
   a. Preliminary review of the wood frames indicates that it is feasible to replace the single glass panes with conventional thicker IGUs [e.g. approximately ¾ inch thick] and still retain the essential appearance of the wood frames. Replacing the glass would result in changing the thermal resistance of the glass from a current R value of 1 to an R of 4, a 300% improvement as well as providing safety glass. An analysis would need to be performed for the glazed doors to determine if they can carry or can be modified to carry the additional weight of an IGU.
   b. There is a new product [Spacia-SE from Nippon Sheet Glass] just coming into commercial use that may be considered. It also is an IGU with a very thin space of 1/128 inch, 0.2 mm between the glass lites which has a partial vacuum. The lites are restrained from collapsing using 1/64 inch, 0.5 mm diameter support pillars spaced at 7/8 inch, 20 mm on-center. At a distance of about 5 feet the pillars are not noticeable to a casual observer. There is also a permanent port used to evacuate air from the space that would occur near a corner of the unit. As a result, IGUs are typically about ¼ inch or so thick and have similar thermal performance compared to a conventional IGU. If used to replace the existing glass the thicknesses of both products would be roughly equivalent thereby not creating a visible change to the appearance of the wood framing. An analysis would need to be performed to determine, since the product is very new, if it is readily available, available in the sizes that would be required, and available as safety glazing. It is anticipated that this option would be expensive and if implemented could become a demonstration project with the glass manufacturer possibly donating some or all of the cost of the glass product.
   c. A variation [called Spacia-21] of the above product at Item b would incorporate the very thin vacuum space IGU [Spacia-ST] as a lite of a conventional IGU that has an argon gas filled space. This product would have an R-Value of approximately 6; however, the glass from the exterior could have a bluish color cast. Samples would have to be obtained to determine if the color cast would be acceptable. As for Item a, an analysis would need to be performed for the glazed doors to determine if they can carry or can be modified to carry the additional weight of this IGU. It is anticipated that this option would be the most expensive and if implemented could become a demonstration project with the glass manufacturer possibly donating some or all of the cost of the glass product.

Skylites (Photos 5, 6, 7, 8) — Budget $12,000 to $17,000.

*Condition* — Some of the glass at the skylites has been replaced with an insulating glass unit (IGU) and some remain as single pane glass. There is substantial evidence of current or past water infiltration around the skylites. The slope of the glass for drainage is not appropriate and the installation of the glass and its related sealants and flashing has been performed poorly and inconsistent with industry recommendations. Unless corrected future leakage is to be expected.

*Approach* — Correct the slope for drainage and properly install sealants and flashing. To easily accomplish the correction all glass should be replaced with new commercial grade IGU’s that have a high performance coating similar to Viracron 1-2M with an argon gas fill. They should also
have an interior lite of laminated glass to meet current safety glazing code requirements. This will result in changing the thermal resistance of the glass from a current R value of 1 to an R of 4, a 300% improvement, as well as decreasing the SHGC (the solar load) from 0.83 to 0.37, a 124% improvement, thereby substantially improving skylight energy performance. The glass would be set in a new aluminum frame attached to the roof curb. Associated sealants and flashing to the roof system will be replaced and correctly installed.

Roofing (Photos 9, 10, 11, 12) — Budget $15,000 to 20,000 for inspection and periodic minor repairs, for a 10 year period. Budget $22,000 to $30,000 for roof replacement in 10 years.

*Condition* — The roof system on the majority of the house is a single ply rubber membrane roof. While we have not yet determine the amount of roof insulation currently in-place, it likely is not much by today’s standards, given the dimensions of surrounding and adjacent construction. The roof membrane appears to be in reasonable condition at this time. However, due to the aesthetic design of the house, the roof terminations [e.g. at flashing conditions] are contrary to traditional and industry standards regarding heights and transitions. They will be prone to leakage without special treatment.

*Approach* — Rubber roof systems can provide durable and lasting performance with proper inspection and maintenance over time. However, these systems are subject to damage from roof traffic and falling debris from trees.

1. Perform inspections of the roof at regular intervals to determine condition and perform repairs and maintenance as needed for a 10 year period.
2. Limit roof access.
3. Clean roof drains and remove debris twice yearly.
4. Require roof protection during other repair work that requires roof access.
5. Assume roof replacement will be needed in 10 to 12 years.
6. Upon roof replacement, include insulation as much as possible while maintaining the house’s aesthetic appearance. New and relatively thin insulation products are currently being developed that should facilitate attaining reasonable insulation levels. These products should be available by the time roof replacement is needed.
7. Special care in design, detailing, and workmanship will be required for roof replacement.

Roof Flashing (Photos 13, 14, 15, 16) — Budget $12,000 to $15,000 for inspection, periodic minor repairs, and maintenance, for an 8 year period. Budget $20,000 to $25,000 for sheet copper roofing and flashing replacement in about 8 years.

*Condition* — There is extensive copper flashing at the roof areas, which includes copings, skylight transitions, masonry transitions, and copper acting as flat sheet roofing in some locations.

*Approach* — The copper flashing appears to be in poor condition with many over sealed joint repairs by soldering. It also appears that many of the repairs were not properly performed to attain long term reliable performance. Copper flashing, especially when acting as sheet copper roofing, is subject to thermal movement and failure of joints.

1. Perform inspection of the flashing twice yearly to determine condition and perform repairs and maintenance as needed.
2. Limit roof access.
3. Require protection of copper sheet roof areas during other roof repair work and other repair and maintenance work requiring access from the roof.
4. Implement flashing replacements as adjacent items are repaired, such as skylights.
5. Implement flat sheet copper roofing replacement within 8 to 10 years.
6. Special care in design, detailing, and workmanship will be required for replacement of sheet copper roofing and flashing.

Sealant joints (Photos 17, 18, 19, 20) — Budget $6,000 to $10,000.

**Condition** — For most areas the existing sealant joints have been improperly and poorly installed and are in various stages of adhesion failure, which can result in water infiltration and energy loss. There are also areas where new sealant joints may be required, which will be determined during a forensic investigation.

**Approach** — The existing sealants should be removed, the substrates (e.g. masonry and wood) cleaned and properly prepared for new sealant and bond breaker or sealant backing installation.

Brick Tuckpointing (Photos 21, 22, 23, 24) — Budget $150,000 to $200,000.

**Condition** — Unfortunately, inappropriate tuckpointing has been performed in many areas. It appears that a mortar was used that aesthetically and technically does not match the existing. Two colors of tuckpointing mortar would be required – a red to match the brick at the head joints, which are flush joints, and a conventional grey mortar for the bed joints which are raked joints. Also un-accommodated movement has occurred in a few locations resulting in cracked and disbonded mortar joints. Failed mortar joints and improperly performed tuckpointing must be corrected to maintain weather tight integrity.

**Approach** — A 100% survey of the exterior masonry walls should be performed to identify areas needing tuckpointing and to what level. Samples of the original mortar will need to be petrographically analyzed to determine the make-up of the original mortar so a matching replacement can be procured. Replacing mortar with a harder mortar can cause deterioration of the masonry. The tuckpointing should be performed after cleaning and after the masonry walls that need to be stabilized are corrected (e.g. the bowed retaining wall and the displaced masonry at the exterior stair). A 100% tuckpointing survey was beyond the scope of this initial survey so the indicated budget costs are our best opinion until more accurate forensic and survey information is available.

Clean Exterior Brick (Photos 25, 26, 27, 28) — Budget $10,000 to $15,000.

**Condition** — In general the brick is in good condition. However, there are areas where roof tar drippage, efflorescence stains, inappropriate use of sealants and other materials are disfiguring the brick and mortar joints.

**Approach** — Typically, the brick surface should be cleaned before any remedial work is performed (e.g. tuckpointing and mortar and brick replacement). This results in a brick and mortar surface to which replacement materials can be adequately matched when that work is performed.

Sealed Mortar Joints (Photos 29, 30, 31, 32) — Budget $2,000 to $5,000.

**Condition** — Inappropriately, a sealant(s) has been used in several areas to seal over mortar joints. This is not recommended since it prevents infiltrated moisture from exiting the wall.
Trapped moisture over time will result in deterioration of the masonry and can lead to water infiltration.

**Approach** — Remove the sealant(s) and tuckpoint the affected mortar joints during the general tuckpointing work. This budget cost is for removal of the sealant(s)

Fireplace Chimney (Photos 33, 34, 35, 36) — Budget $5,000 to $8,000.

**Condition** — The chimney has been a source of water infiltration into the house which has resulted in efflorescence stains to the interior brick, which will have to be cleaned. Currently there is no cap for the flue opening and it has a temporary cover.

**Approach** — It is recommended that the fireplace not be used as a wood burning fireplace since there is no flue lining only a cement parge coating on the inside face of the brick that functions as a flue lining. A gas log fireplace might be a consideration. A chimney cap will need to be installed hopefully replicating what was originally installed.

Brick Retaining Wall Displacement (Photos 37, 38, 39, 40) — Budget $100,000 to $150,000.

**Condition** — There is considerable lateral displacement of the brick. The cause(s) is unknown at this time although it is suspected that the paving and poor drainage at the carport area is a contributing factor. The cause(s) will need to be determined before the scope of repairs can be determined and an accurate budget established. This item will need to be considered in conjunction with the adjacent stair wall displacement since they both may be related to the same or similar cause(s).

**Approach** — Intrusive probes of the wall and a detailed analysis of the existing conditions will need to be performed to determine the cause(s) of the displacement and resultant damage. The analysis will then provide the information needed to develop a program for permanent repair and restoration of the retaining wall. The indicated budget is a place holder until better information is available.

Stair Wall Displacement (Photos 41, 42, 43, 44) — Budget $50,000 to $100,000.

**Condition** — There is considerable displacement of the brick with large horizontal gaps forming at the mortar bed joints. The cause(s) is unknown at this time. The cause(s) will need to be determined before the scope of repairs can be determined and an accurate budget established. This item will need to be considered in conjunction with the adjacent brick retaining wall displacement since they both may be related to the same or similar cause(s). The indicated budget is a place holder until better information is available.

**Approach** — Intrusive probes of the wall and a detailed analysis of the existing conditions will need to be performed to determine the cause(s) of the displacement and resultant damage. The analysis will then provide the information needed to develop a program for permanent repair and restoration of the stair wall.

**Interior**

Clean Interior Brick (Photos 45, 46, 47, 48) — Budget $5,000 to $10,000.

**Condition** — Previous roof and other leak conditions have resulted in efflorescence stains on the brick surface in certain areas of the house. Unfortunately in some areas the abutting wood work has been refinished which will complicate the brick cleaning while trying to protect the wood finish.
Approach — Clean the efflorescence stains from the brick surface while protecting adjacent finishes [e.g. wood paneling, floor surface, etc.].

Brick Tuckpointing (Photos 49, 50) — Budget $5,000 to $10,000.
Condition — There are isolated areas where some displacement of the brick has occurred which has resulted in cracked mortar joints and in some cases an increase in the width of the joint opening. Some of this might be related to the problems at the retaining and stair walls.

Approach — If possible determine the cause of the displacement and cracking so a permanent repair can be implemented and the mortar joints tuckpointed.

Refinish Wood Paneling (Photos 51, 52, 53) — Budget $5,000 to $10,000.
Condition — There are some areas where water staining from previous roof leaks is still evident at skylites and other areas.

Approach — The affected areas need to be cleaned and refinished.

Update Kitchen and Appliances (Photos 54, 55, 56, 57) — Budget $20,000 to $50,000.
Condition — A decision needs to be made as to how the house will be utilized in the future since the uses will determine what the character of the kitchen should be. For example, should it be restored to its original appearance or set up as a catering kitchen? The upper and lower cabinets appear to be original and should be retained. The counter top however is a replacement. Based on the anticipated future use all new appliances will be needed.

Approach — Determine the future use(s) of the kitchen before settling on a restoration approach. The indicated budget is a place holder until better information is available.

MECHANICAL

Boilers (Photo 58, 59) — Budget $5,000 to $8,000.
Condition — According to University staff the boilers and associated radiant floor heating system are functional with no major problems.

Approach — Survey the installation to determine what repairs or modification may be necessary.

Water Heater (Photo 60) — Budget $1,000 to $2,000.
Condition — The water heater is of recent vintage with no apparent problems.

Approach — Based on the future use of the kitchen determine if the size of the water heater is appropriate.

Add Air Conditioning — Budget $40,000 to $60,000.
Condition — The house was originally designed to use natural convective air conditioning by using the small creek that flowed beneath the house as a source for cool air to be drawn into the house. The small stream no longer exists and this approach, even if possible, is not appropriate for today’s needs. For the house to be adequately used for any anticipated future functions air conditioning needs to be considered for summertime use.
**Approach** — Due to the character of the house’s construction installation of air conditioning will require considerable forethought and innovation so that the aesthetic of the house is not compromised. Conditioning only the public spaces rather than the entire house may be a consideration based on access to implement components and cost. The indicated budget is a placeholder until better information is available.

**ELECTRICAL**

Replace Electrical System (**Photo 61**) — Budget $15,000 to $25,000.

**Condition** — The University has indicated that it is very probable that the electrical system will have to be substantially replaced from the service entrance to power and lighting distribution.

**Approach** — Due to the character of the house’s construction replacement and/or reuse of existing distribution will require forethought and innovation so that the aesthetic of the house is not compromised. Provisions for air conditioning the house will also be required including increasing the size of the electrical service.

Lighting Fixtures (**Photo 62, 63**) — Budget $5,000 to $20,000.

**Condition** — The existing fixtures use a combination of incandescent and fluorescent bulbs. The incandescent fixtures, although masked to some degree with decorative wood work, have semi exposed bulbs. The fluorescent two-foot fixtures are concealed and used mainly for indirect lighting.

**Approach** — As a minimum the existing fixtures could be refurbished and reused as is. However, it is recommended that the fluorescent fixtures be replaced with modern high efficiency fluorescent or LED fixtures that will greatly decrease energy consumption. Expected advances in LED technology should permit replacement of the incandescent fixtures with LEDs. If LED fixtures were available when the house was built it is a certainty that Wright would have used them.

**SITE AMENITIES**

Landscaping (**Photos 64, 65, 66, 67**) — Budget $50,000 to $75,000.

**Condition** — The existing landscaping is in fair to good condition; however, in some areas is over grown and in others has been taken over by weedy plants.

**Approach** — Develop a master landscaping plan for the site that reuses and adds planting and other materials and corrects and adds site lighting to compliment the character of the house. Recondition the former creek bed that runs beneath the house to restore it to its former appearance.

Parking — Budget $10,000 to $20,000.

**Condition** — Parking for functions is limited.

**Approach** — Based on the size of the remaining property determine if there is an area where some additional unobtrusive parking could be added while maintaining the character of the surrounding landscape. A drainable paving system can be used. This could include the use of permeable paving and plantable pavers. The indicated budget is a placeholder until better information is available.
Entry Paving and Drainage (Photos 68, 69, 70, 71) — Budget $20,000 to $40,000.

**Condition** — Although not yet investigated, it is suspected that the addition of paving in lieu of the original gravel surface and inappropriate surface water drainage [i.e. water being directed to the retaining wall] has contributed to the retaining wall bulging and brick displacement.

**Approach** — After repair of the retaining wall remove remaining paving and install a drainable paving system. This could include the use of permeable paving, plantable pavers, or impermeable paving with formal drainage through a catch basin to an adjacent sewer.

Recondition Lower Level Pool (Photos 72, 73) — Budget $5,000 to $10,000.

**Condition** — During the walk through of the house with University staff it was indicated that in spite of recent improvements there are still problems with the pool.

**Approach** — Investigate the pool to determine the extent and character of the problems so a recommendation for correction can be made. A budget for corrective work has been assumed. The indicated budget is a place holder until better information is available.

**CONTINGENCY ALLOWANCE** — Budget $60,000 to $105,000.

Since at this time a forensic investigation has not been performed it must be anticipated that there will be other issues that will be discovered either during the forensic investigation or when resultant construction work is performed. These items could include isolated below grade waterproofing leakage, cracked and/or displaced concrete walks, plumbing supply lines and drainage concerns, plumbing fixture refurbishment or replacement, and other similar items. The indicated budget is a place holder until better information is available.

**SUSTAINABILITY AND LEED CONSIDERATIONS**

For the house to become a viable example for the foreseeable future it is good design and practice to where ever possible implement sustainable and energy conservation measures. Using IGU’s, LED fixtures, permeable paving, and improvements in insulating technology are steps in that direction. The Affleck house could then become a “best practices” example of how to renovate an architectural icon while retaining the essentials of its design when incorporating sustainability and energy conservation. During the forensic investigation other energy conservation and sustainability measures can be considered such as geothermal heating and cooling, and can become a part of the forensic investigation report.

**COST RANGE SUMMARY**

The following table summarizes the concept level order-of-magnitude budgets that can be anticipated. Performing the forensic investigation will allow refinement of the budgets.

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This report was prepared by the SmithGroup Building Technology Studio located in SmithGroup’s Detroit Michigan office.

End of Report
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<th>Min</th>
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<tr>
<td>Refinish Wood Paneling</td>
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SKYLIGHTS
Photo 13

Photo 14

Photo 15

Photo 16

ROOF FLASHING
SEALANT JOINTS
BRICK TUCKPOINTING
BRICK RETAINING WALL DISPLACEMENT
CLEAN INTERIOR BRICK

Photo 45

Photo 46

Photo 47

Photo 48
BRICK TUCKPOINTING
REFINISH WOOD PANELING
UPDATE KITCHEN AND APPLIANCES
Photo 60

WATER HEATER
Photo 61

REPLACE ELECTRICAL SYSTEM
LANDSCAPING