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MEMORANDUM

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Date:	November 27, 2007	**RE:**	Preliminary Feasibility Investigation - Adaptive Re-Use Scenarios
Attention:	Gary Martinez	**Project Name:**	Third Church of Christ Scientist
Company:	Martinez & Johnson Architects	**RSA Project #:**	W 2060
From:	Kirk Mettam	**cc:**	RS, JM

Per your request, Robert Silman Associates (RSA) has reviewed the available documents relating to the Third Church of Christ Scientist Building, for the purposes of performing a preliminary structural feasibility investigation into the potential for adaptive re-use of the structure. We understand that the church wishes to evaluate continued use of the facility but with a reduced congregation.

RSA's review is based on the review of the drawings listed at the end of this memo and is limited to structural engineering aspects of the building as well as areas where structural systems are integral with other systems, and their modification would have other repercussions. The intent of this investigation was to establish general opportunities for, or limitations to, potential adaptive re-use schemes. Although no specific schemes have been analyzed at this point, it is assumed that adaptive re-use schemes would require new framed slabs and or reconfiguration (demolition and reconstruction) of the structural elements within the volume of the building.

The Third Church of Christ Scientist building is an example of highly integrated, program specific modern architecture. The resulting design is extremely limited in flexibility and with regard to potential for adaptive re-use. This is expanded further in the appropriate section (Consideration for Adaptive Re-use) of the document.

General Introduction

The Third Church of Christ Scientist building, located at the corner of 16th Street an I Street in Northwest Washington DC, designed by architect Araldo Cossutta, a partner of the offices of I.M. Pei and Partners with structural engineers, Weiskopf & Pickworth, in 1969.

We understand that in 1971, the congregation was approximately 250 strong yet at the direction of the then land owner, The First Church of Christ, Scientist of Boston ("The Mother Church"), the building was designed with an oversized sanctuary of approximately 450 seats. The building was to provide an entrance lobby and a large auditorium space for services, in addition to support spaces and a Sunday school. There are five main elevated levels: a Plaza level, Auditorium level, Balcony level, a partial Fan Room level, and a Sunday school level. A basement below the building and adjoining areas provides parking accessible from a ramp to an adjacent alleyway.

The Third Church of Christ Scientist building is a complex sculptural form when viewed from the exterior of the building. The form consists of an architecturally exposed concrete structure, octagonal in plan, rising to a height of approximately 60 feet above grade, creating the appearance of a solid mass of concrete. A portion of this mass appears to be 'carved out' creating a complex form. A unique assembly of cast-in-place concrete load bearing walls, deep beams and concrete slabs within the structure are used to create the complex geometry.

The structure that creates the exterior architecture has been carefully planned and integrated into the volumes of the building to neatly accommodate the original program. Similarly, the other systems of the building are organized into the volumes created by the structure to support the architectural plan of the interior. Points of integration between these systems include:

- Use of architecturally exposed concrete for interior surfaces
- Use and arrangement of secondary slabs to accommodate primary air distribution (supply and return) throughout the building
- Spatial arrangement of skylights and orientation to provide natural lighting in religious spaces
- Use of adjacencies to accommodate special (artificial) lighting requirements

Substructure
Based on the available drawings, the building appears to be supported on spread footings on natural sub grade. Basement slabs are cast-in-place slabs on grade.

If feasible from an architectural and superstructure perspective, structural infill slabs would likely require a combination of new foundations and foundation reinforcement. Reinforcement could likely be achieved through several common methods, subject to an appropriate investigation to establish cost and feasibility.

Superstructure
The superstructure consists largely of concrete walls and columns supporting 'waffle' slabs. Secondary 'plenum' slabs, supported on short walls above the waffle slabs, are used to create air distribution between the slabs.

Typical 'waffle slabs' consist of a 4" or 5" concrete slab cast integral with a two-way rib system, created by placing square forms, 1'-4" deep, in a regular grid pattern spaced approximately 4' in each direction. Forms are typically omitted to allow for additional reinforcement where needed along beam lines or around columns. This system is efficient for larger spans, but is not readily modified within its depth (i.e. cannot be penetrated horizontally).

Typical 'plenum slabs' consist of 3" of concrete over a 1 ½" metal deck, supported on short 6" block walls constructed at various heights above waffle slabs.

The load bearing walls that are exposed on the exterior of the building and used as the exterior architectural expression are beginning to show signs of deterioration. Moisture penetration and related deterioration of concrete and structural reinforcement has initiated and will continue over the life of the building. Repairs are necessary to maintain the structural integrity of the building and to prevent life safety hazards form falling debris into the open plaza areas below. All repairs would require specialty contractors and methods to assure that the quality of the workmanship was matched with the appropriate aesthetic treatment given the highly visible nature of these surfaces.

The building consists of a variety of unique structural assemblies at each of the five main elevated levels, each described briefly below:

Plaza level
A finished floor at elevation 58'-7 ½" of brick pavers over 2" insulation is supported on a two way waffle slab supported, in turn, by columns that extend through the parking area below. Several

concrete walls 'transfer' at this level – which means that the structure is specially designed to transfer the weight of the structure to other locations on the floor below.

Auditorium level
A 20" deep waffle slab is constructed at elevation 69'-0" as a base, and a gently sloping floor is created to provide various elevations ranging from elevation 70'-10 ½" to 71' – 7". The space between the plenum slab and the waffle slab is carefully allocated to serve as air supply and return plenums throughout the lower floors.

A significant cantilever transfer is introduced at this level to support much of the exterior north face of the building at the levels above.

Balcony level
A cast-in-place concrete, four-tiered balcony (elevations 79-8 ½", 80'-11 ½", 82'-8 ½", 83'-5 ½") is constructed integral with long span beams spanning between corner core elements.

Fan Room level
Intermediate levels (elevation 96'-4 ¾") are created on the north and south sides of the building to provide space for fan rooms, storage, and lighting control rooms for the auditorium below. The center portion of this level remains open to provide volume and to allow natural light into the sanctuary from the east and west skylights above.

At this level, two massive walls span in the east and west between the core elements beyond, and support the fan rooms, the Sunday school and columns that extend up the building to support the upper roof (square roof expressed at the top of the building massing). These walls also become the architectural finish for the auditorium, as well as providing acoustic separation between the sanctuary and mechanical spaces.

Sunday school level
Similar to the Auditorium level, a 21" deep waffle slab is constructed (elevation 106'-9") as a base for a level plenum slab (elevation 110'-11 ½") providing a floor for the Sunday school and air distribution for supply and return air for the auditorium below.

Roof Level
The roof consists of a flat waffle slab, supported on only four columns inset 10' in each direction at the corners. This cantilever condition is possible due to the lack of significant roof loading.

Consideration for Adaptive Re-Use
The Third Church of Christ Scientist building is an example of highly integrated, program specific modern architecture. The resulting design is extremely limited in flexibility and with regard to potential for adaptive re-use. We offer the following conclusions that were drawn from our review and feasibility investigation:

- The main structural elements used to create the complex exterior form extend into the interior of the building and are neatly organized into the original architectural plan of the interior space. Potential new uses of the space would be severely limited by the constraints of these elements as they bifurcate the spaces.

- Structural reconfiguration of the space within the existing building, while possible, would be very difficult, given the realities of construction costs. Structural costs for permanent

and/or temporary stabilization would likely be significant for many reconfiguration schemes.

- The roof structure appears to have limited capacity to accommodate new roof-mounted equipment. It should be assumed that all new mechanical systems will be limited to the interior of the building, unless the roof is reinforced. If reinforcement is considered, the added load would need to be followed down through the various transfer levels.

- Due to the highly integrated mechanical systems, reconfiguration of interior spaces would likely require new mechanical systems and air distribution systems for the entire building, which would, in turn, require new conventional systems (ceiling, wall, and artificial lighting). Any such new spaces will likely lack the character typical of the original religious sanctuary space.

LIST OF DRAWINGS REVIEWED

Drawing No.	Drawing Title	Drawing Date
A-1	Site Plan and Details	6-30-69
A-2	Garage Plan	6-30-69
A-3	Plaza Level Plans – Church Lobby, Office Building Lobby	6-30-69
A-4	Plenum Plans & Details – Church Auditorium Floor, Office Building 2nd THRD Penthouse FL.	6-30-69
A-6	Church Balcony Floor Plan – Office Building Penthouse Floor Plan	6-30-69
A-7	Church Fan Room Level	6-30-69
A-8	Church Auditorium Ceiling Plenum Plan & Office Building Movable Partitions	6-30-69
A-9	Church Sunday School Floor Plan	6-30-69
A-10	Roof Plans	6-30-69
A-16	Church Section Looking North	6-30-69
A-17	Church Cross Section Looking South	6-30-69
A-18	Miscellaneous Sections – Church	6-30-69
A-19	Section Looking North	6-30-69
A-21	Plaza Elevations – Church North, Office Building South	6-30-69
A-22	16th Street Elevation – Church East, Office Building East	6-30-69
A-23	Church South	6-30-69
A-24	Valley Elevations – Church West, Office Building West	6-30-69
T-1	Survey	6-30-69