lett

BUILDING CONDITION ASSESSMENT REPORT

City Of Peterborough
The DelaFosse Library

Aug. 13th, 2021

Certified

Corporation

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EXECUTIVE SUMMARY

Lett Architects was engaged by the City of Peterborough to assess the extent and approximate value of upgrades necessary to bring the DelaFosse facility to today's standards of accessibility and energy efficiency and address the floor deflection issues on the main level. The report examines these and other related issues to imagine a renewed facility for a service life of 25 to 40 years. This report offers an overview at a moderate level of detail to generate a general assessment for the facility.

The structural floor was found to be deficient to meet the requirements of a modern library and a solution was proposed. The washroom fixture count was assessed using todays standard and imagining a fully utilized facility. A single use universal washroom was recommended for the main floor and gang washrooms at the lower level. A passenger elevator is required to access all four levels of the building. While a relatively new HVAC was installed in the building, it serves only the upper level. Again, imaging the facility fully utilized, best practice is to provide air conditioning and fresh air to the lower level. This report recommends that plus other air quality upgrades. The roof appears to be the single most advantageous location to improve the thermal envelope.

PHOTO NO. 21

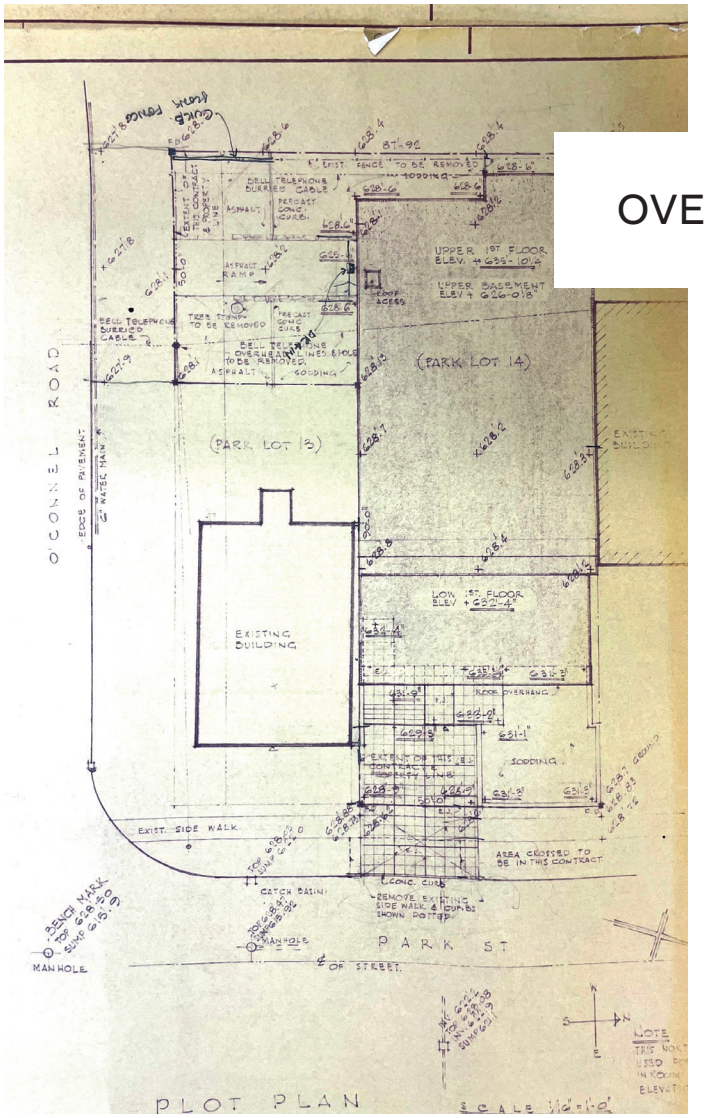
It was reported that hazardous materials form part of the material fabric. Being familiar with buildings of this vintage in the region, we can speculate there may be more than has been reported. We are recommending an allowance for abatement.

Many of the above-mentioned elements (elevator, floor structure upgrades, HVAC, washrooms) come with a considerable quantity of demolition, reconstruction, structural interventions, and repair of damaged finishes. This work is complicated by the fact that the site has many constraints for access. There are long and twisted runs for hauling heavy materials and removal of demolition debris. There are existing finishes to protect. These factors give us cause to recommend higher than normal cost estimates for work of similar value for new construction.

Lett retained structural, mechanical, and electrical engineers to provide input on this report. We have authored our own schedule of probable construction costs based on inputs we receive and our own professional judgement. The cost estimate amounts to just over 3 million dollars. A breakdown is provided in this report. It's a significant investment and one that would require a strong response from the community to make it worthwhile.

In many ways the DelaFosse Library is a fine building. It has good pedigree, being an example of the work of architect Eb Zeider. It is generally well built and the interior finishes, being of good quality, have held up well. On the other hand, the building suffers from an undersized floor structure, a poor performing envelope, hazardous materials, and a constrained site to access for reconstruction. This report addresses both sides of this story.

OVERVIEW



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DESCRIPTION OF THE FACILITY

The DelaFosse Library is located at 729 Park Street in Peterborough. It is a branch library of Peterborough's main facility on Alymer Street. It was opened in 1965 and is named after Frederick Montague de la Fosse, who was the Chief Librarian of the Peterborough Library from 1910 to 1946.

The two-storey building is bookended by neighbouring commercial buildings on Park Street and has access from O'Connell Street to the south where several parking places appear to be reserved for the facility.

The two-storey facility measures approximately 490 square meters (5275 sq. ft.) per floor, summing to 980 square meters (10,550 sq. ft.).

The upper floor is outfitted as a community library, it's original use, with an information desk and staff offices, stacks, reading and study areas, and a children's library to the rear. The main floor area is split between two levels, one floor area being about 1.5 meters higher.

The lower level of the facility is partially finished and outfitted. There are staff rooms, a mechanical room, public washrooms, and two large open and interconnected rooms, presumably reserved for programming. The floor level spilt of the upper level is echoed in the lower level. A lift reserved for books only is positioned in the middle of the floor plate to serve all four levels of the facility.

There is an enclosed stair at the rear corner of the building linking the two storeys and leading to an exterior exit. This door leads to a paved ramp up to the parking area off O'Connell Street.

REPORT OBJECTIVES AND OUTLINE

Lett Architects Inc. were invited to review, assess, and report on the adaptability of the facility to meet today's standard for accessibility, energy efficiency, and serviceability. We visited the site on May 28th to perform a visual review and collect photographs and general measurements. We were met by building superintendent Doug Davis with the City of Peterborough. He had information to share about the building as well as an archive of drawings and other records.

This report is organized in six parts:

- Building Envelope (energy efficiency and protection from the elements)
- Building Structure (serviceability of main floor)
- Accessibility (washrooms, doors, elevator)
- Mechanical and Electrical Systems (plumbing, HVAC)
- Other Architectural Issues and Features (heritage, designated substances, building code)
- Probable Construction Costs

Lett engaged professional support from Denis Kotobelli, P.Eng., from AMR Engineering to review the structural components of the building. From Durham Energy Systems (DES) Lett engaged Luigi Conforti, P.Eng. and Jeff Greer, P.Eng., to review the electrical and mechanical systems. Scott Donovan, OAA, from Lett is the author of this report and is responsible for the architectural scope.

Included herein are observations and commentary based on one or more visits to the site to perform visual reviews of the premises but did not include any invasive or destructive investigations. DES Engineering has prior experience with the building through their design of HVAC upgrades that were employed several years ago. The purpose of the review and subsequent analysis and comments was to ascertain the quantity and quality of building renovations that would be required to upgrade the facility to today's standard. We understand this to be the first of what could be further study and ongoing dialogue with the owner to fully prepare a brief for renovations. This report is to offer an overview at a moderate level of detail to generate a general assessment for the facility.

This report imagines DelaFosse as a renewed facility for the 21st century. It sees this 56-year-old building as a revitalized amenity fully equipped for a service life of 25 to 40 years. It envisions a vibrant and fully utilized community hub. Most of the current challenges the building faces are addressed through the targeted improvements discussed in this report.

PHOTO NO. 19

PART I BUILDING ENVELOPE

The DelaFosse Library was designed and constructed in the early 1960's, a decade before the time when the impact of energy performance in buildings and the consumption of fossil fuels was considered important and worthy of conservation.

Buildings of this vintage are typically uninsulated or minimally insulated. Mechanical heating and cooling systems were oversized to keep occupants comfortable without the need to address air tightness and insulation levels. Typically they do have good performing weather proofing systems that manage moisture and repel water, but they do not perform well thermally.

Following is commentary on the major elements of the building envelope: exterior walls, roof, windows, and doors.

EXTERIOR WALLS BELOW GRADE

The exterior walls below grade are cast in place of concrete with rendered plaster interior finish. The walls appear to be dry with no moisture or water damage evident. It is possible to add insulation to the interior face of the wall. Much of the lower level is open and large expanses of the walls are free and unencumbered. However, there isn't always a significant benefit to insulating walls below grade, at least compared with insulating other areas of the building. This subject requires further investigation to determine the cost-benefit to the owner.

EXTERIOR WALLS ABOVE GRADE

Exterior above-grade walls are comprised of concrete block with a rendered plaster finish on the interior and a cementitious rendered stucco finish on the exterior. The east walls (Park St.) have brick veneer instead of stucco. From views above the ceiling on the upper floor and a review of the original construction drawings there is no indication of thermal insulation within the exterior wall assembly. However, it may be the case, as was usual for a building of this vintage, that the cores of the concrete blocks were filled with vermiculite, a substance now considered hazardous. Testing would be required to verify this.

PHOTO NO. 16

About twenty percent of the exterior wall area abuts neighbouring buildings. Half of that is in contact with the neighbour, which mitigates heat loss, and the property to the south has a narrow gap between buildings which inhibits the opportunity to retrofit the walls externally.

Further analysis (energy modelling) would be required to determine whether there would be a net benefit to add insulation and new cladding to the exterior walls. It was noted during a site visit that the exterior stucco rendering may contain asbestos. The expense of a new exterior insulated rain screen system including asbestos abatement may not prove feasible considering the cost versus the long-term benefit. Exterior cladding also impacts windows, doors, roof edges, and whether there is access to the site for construction is a significant consideration.

Insulation can be placed on the inside surface of exterior walls. Further analysis would be required to determine the impact of moisture migration through the wall. Insulation shifts the nature and quantity of moisture migration through walls and can lead to failures at the exterior finishes. The placement of interior insulation requires new framing and wall finish. As above, the expense of this level of thermal retrofit may exceed the long-term benefit.

For the purposes of this report, we are not recommending changes to the below grade and above grade exterior walls. We recommend further study to gain more insight into the benefits and understanding of options. No construction costs have been allocated for this work.

ROOFING AND ROOF INSULATION

The roof has a modified bitumen membrane which appears to be more than five years old but less than ten. It appears to have some service life remaining but is showing early signs of localized failure (a large area of insulation has lifted, for example). The amount of insulation below the roofing membrane was not determined, however there appears to be some, which would be expected based on the age of the work. The library likely has access to

PHOTO NO. 15

PHOTO NO. 6

these records. Regardless, reroofing with additional insulation would be the single most impactful upgrade to increase the thermal performance of the building. The roof enjoys easy access from the side parking area and the existing membrane will soon be due for replacement. There is no parapet or overhang so increasing the thermal insulation thickness, replacing the waterproof membrane, and treating the edge with prefinished metal coping is a simple and cost-effective approach to addressing thermal performance.

WINDOWS

It appears the windows have been upgraded to thermal glazing units from what would likely have been single pane glazing of the original building. It's not clear when the new glazing was installed. Because the area of glazing is small, especially with respect to the wall and floor area, energy performance of the windows is not an area of concern. It would be prudent to perform a closer inspection of the windows to review the air tightness of the perimeter as part of an overall thermal performance review.

The building has a clerestorey window above the main circulation desk. It is equivalent to a skylight but the glazing units are on a slope, not set flat. Again, a thorough review of this glazed assembly was not performed. However, no obvious failure points were detected, inside or out, and while the performance of the glazing units may not be high, there is no reason to probe further for this report. As above, it would be prudent to perform a review of the glazing and air tightness of the perimeter seal as part of an overall thermal performance review.

EXTERIOR DOORS

The building has two exterior entrances/exits (Park Street and O'Connell Street). As noted elsewhere in this report, new insulated frames and doors with weather stripping and thermal glazing units are recommended to replace the existing doors and accessories.

In summary, we are not recommending changes to the windows and clerestorey, but we are recommending full replacement of exterior doors. Cost estimates are included in the schedule.

PART II BUILDING STRUCTURE

PHOTO NO. 20

Following is a summary of the structural report submitted by Denis Kotobelli. The full report can be found in the appendix.

The building structure is a combination of concrete, masonry, and steel construction. The basement walls are generally in good condition. The exterior walls above grade appear to be in generally good in condition. The exterior walkway/ramp is cracked and spalling in several locations. "Based on our visual inspection of the structure and review of available original drawings, in our opinion, overall existing building structure is generally in good condition." (DK)

The main floor consists of a composite concrete and steel pan deck supported on open web steel joists. The joists are supported on exterior walls or on steel beams carried by steel columns.

"Existing structural drawings indicate a superimposed design dead load of 35 pounds per square foot (psf) and design live load of 60 psf for the ground floor. Ground floor structure appears to be in reasonably good condition although library staff has noted some vibration in the floor in the Adult library area which currently is where the book stacks are located." (DK)

The building was designed as a library and as noted above, the structure was designed to meet 60 pounds per square foot. The current building code carries that figure for reading rooms and study rooms, but book stack areas are now mandated to meet 150 pounds per square foot.

PHOTO NO. 02

"...the existing ground floor structure does not have sufficient capacity to safely support the required loading in stack areas." (DK)

The recommended course of action is in two parts; immediate, temporary action and a long-term solution.

"As a temporary measure, until remedial action is complete, we recommend that existing loading at the stack area be reduced immediately within the allowance of 60 psf which the floor is currently designed for." (DK)

The long-term solution is as such:
"To reinforce the exiting floor to meet the required loading we propose to install new steel beams parallel with and in between the existing open web steel joists." (DK)

Additionally, the existing central steel beams that carry the joists need to be reinforced with either additional columns (including concrete footings cut into the floor) or, if this is not acceptable architecturally, reinforced existing steel beams by providing additional welded sections to increase strength and stiffness, including underpinning existing column footings.

AMR offers construction cost estimates for this work which can be found in this report. Figures are also in the structural report, but they reflect only the structural steel components. The cost estimates in this report round those numbers out to include associated costs by other trades and impacted work.

PART III ACCESSIBILITY

PHOTO NO. 17

While it is apparent that some accessibility upgrades have been made to the facility, overall it does not comply with today's standard. The main floor is above the sidewalk elevation and the building has two levels within each floor area, separated by stairs. Access to the lower storey is by internal stair. The lower storey houses the only public washroom facilities and none of them meet today's standard.

ACCESS TO PARKING

It appears that parking is available for library patrons off O'Connell Street. For new construction, the building code and the OADA sets requirements for access from parking areas to the building. These cannot always be met with existing buildings. Part 11 of the building code addresses this. There is a ramp leading from the O'Connell parking area to the lower level of the library, but it appears to exceed the maximum gradient. However, there is an accessible path via a public sidewalk from the parking area to the main entrance of the library.

MAIN ENTRANCE

The main entrance of the building is located on Park Street. It has been upgraded for accessibility through the addition of a ramp from the public sidewalk to the door and hardware at the door to activate an automatic door operator. The door width appears to meet the width requirement.

The existing concrete ramp was not measured to determine if it meets today's standard for slope. The guards and handrails are not adequate to meet today's code. Much of the concrete and masonry work that comprises the ramp needs repair. The stairs that approach the front door also require accessories such as handrails both sides, tactile warning strips, and improvements to the nosing contrast strips. We recommend a contingency for repairs or partial reconstruction.

The entrance/exit door from O'Connell Street is wider than usual, possibly originally conceived as a loading door. This opening could be upgraded to an accessible entrance employing a push button door operator and key fob access if required.

PHOTO NO. 03

INTERIOR DOORS

While there are not many individual rooms in the facility, none of them have doors that meet the width requirements for today's standard for accessibility. We found all doors except the exit stair measure 31 inches. The standard is 38.

There are approximately five doors that serve staff needs (connections to/from the public areas to rooms for work and rest). Some of these are within wood frame walls but most are in concrete block walls, the latter of which has more significant cost implications to remedy. In some cases, the doors do not meet the side opening accessibility requirements (12" – 24" of space adjacent a door for push or pull form a wheelchair). This implies reconfiguring some internal partitions to meet the standard.

Service room doors (janitor & mechanical rooms) are not required to be accessible, so no changes are needed here. Doors to the public washrooms are being addressed through the proposed reconstruction.

The main entrance currently has a pair of doors, one pair for each side of the vestibule. While they are on push button door operators, they may not meet the standard for width. It is recommended that these doors be switched to a single 40" wide door with operator hardware. This new opening does meet the exit width requirements as mandated by the building code.

Construction costs estimates for new exterior and interior doors including remedial work around interior doors for wheelchair access have been included in the schedule.

WASHROOMS

There are three washrooms in the facility: female and male public washrooms (one and two water closets each) plus one single private staff washroom. None of them meet today's standard and the overall fixture count for the facility is lower than today's code requirement. The rooms that currently house the washrooms are not sufficient in size to meet the considerable areas required for accessible washrooms today. However, there is space available within the lower level to accommodate a new design.

PHOTO NO. 14

MALE-FEMALE WASHROOM REQUIREMENTS

We have recalculated the occupancy count for the facility to current code standards. We considered retaining the Fire Department posting for the lower level at 120 persons. Both floor levels have approximately 300 square meters of open floor area. We assume the upper level is a reading room and the lower level is program space. Using data from the Ontario Building Code and adjusting down for the Fire Department posting, we calculate 330 persons for the entire facility. This leads to washroom fixture requirements of four water closets for males and seven for females. We recommend a single universal washroom (UWR) on the main floor for convenience and the remaining fixture count be met by constructing new male and female washrooms on the lower storey. The public gang washrooms would therefor contain two toilets and one urinal for the male washroom and six toilets for female washroom.

These rooms will be considerably larger than the existing public washrooms. We have indicated rough sizing for them on the Proposed Floor Plan, Lower Level. The larger size is necessary because of the increased fixture count and the increased floor areas required for manureability. The UWR scheduled for the main floor is similarly large because of the requirements for turning radius and adult change table, all code minimum requirements.

The male-female split can be changed to a single gender-neutral washroom if so desired. This distinction doesn't make significant difference at the level we are calculating for areas, costs and fixture counts.

We have not included the existing single staff washroom to this calculation as it does not meet accessibility requirements. We do not recommend removing as it can enjoy continued use as a convenience washroom.

This is a preliminary exercise to determine impact on the floor area and for order of magnitude pricing. Construction costs for new washroom facilities would be considerable. One loadbearing wall may need to be altered and the lower level slab would require cutting and patching for new plumbing. A partial breakdown of figures is available in the schedule.

ELEVATOR

Both storeys of the building are comprised of two levels, with a height variation of 1.5 meters joined by stairs. To meet the standard for accessibility, a lift or passenger elevator would be required to bridge all four levels. There is a lift for books only located in the geometric center of the building. While the opening is not large enough to convert to an elevator shaft, it is in the right position. From this location a lift or elevator could access all four levels of the building.

PHOTO NO. 07

While there are options for elevating devices ranging from light duty wheelchair lifts to high-speed passenger elevators, a limited use, limited application (LULA) elevating device would serve the needs for a facility of this size. However, for long term durability and user satisfaction we recommend a passenger elevator. A holeless dual cylinder unit would be cost effective and practical due to the construction challenges to install in an existing building. While intended for people, it could also be used to serve the library needs for a book lift which would be removed with the take-over of this floor area.

The expense for the installation of an elevator would be considerable. It would require a cut in the existing steel framed floor, additional framing and footings for the new opening, and an enlargement of the concrete pit now in place for the book lift. The pit would require a significant excavation at the lower level (new footings for columns and lift walls). Interior excavation work is problematic because of the limitations posed for removal of soil, lack of access for machinery, and placement of concrete. While possible, the expense would be significant. Probable construction costs are noted in the schedule.

PART IV MECHANICAL & ELECTRICAL SYSTEMS

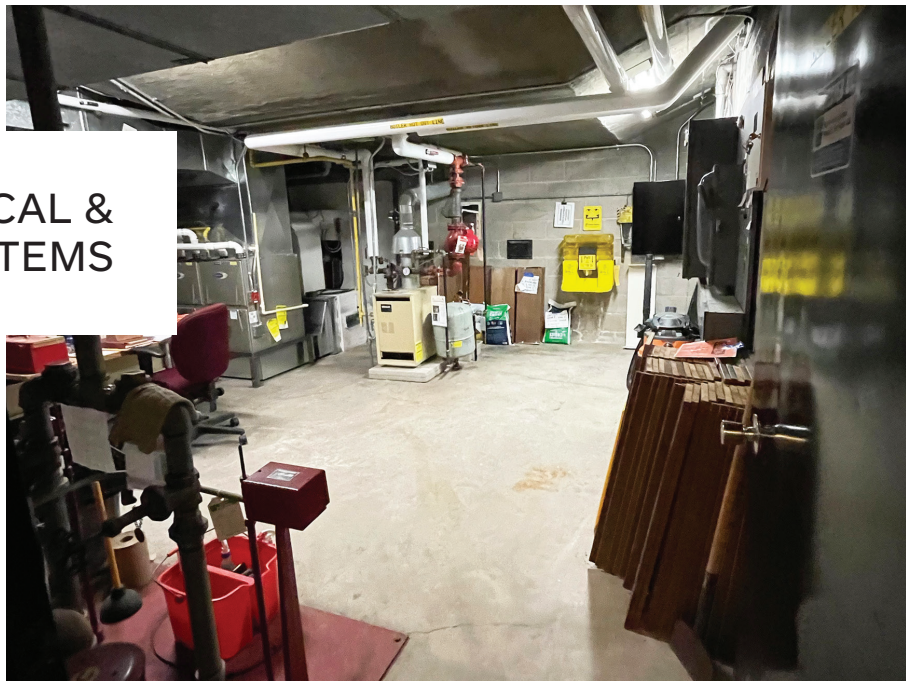


PHOTO NO. 13

HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

Mechanical engineer Jeff Greer from DES reviewed the library and offered commentary regarding the proposed upgrades of the HVAC systems and plumbing.

As background, the HVAC system was renewed in 2013 with DES providing design services. The new work included heating, cooling, and ventilation to the upper level only and linked that system to a new building automation system (BAS - monitors temperature, performance, device failure, etc.).

Mechanical services to the lower level have not changed significantly since original construction. This floor area is served by hydronic and electric heaters. There is no direct ventilation provided to the lower level.

HVAC upgrades under the proposed facility renewal would introduce heat and exhaust air ducting to new washrooms (two down and one up). Heating would be provided to the new washrooms through hydronic heaters drawn from the existing boiler which has capacity.

DES encourages consideration be given to betterment of the air quality in the lower storey program rooms. It is unclear to what extent these rooms are currently being utilized, but because the facility is envisioned as a fully occupied, active facility, best design practices prevail. A new HVAC system is proposed to deliver air for heating, cooling and ventilation. Alternately, a measured amount of air from the upper storey HVAC unit could be directed to the lower level. The BAS would need to be expanded to capture alterations to the HVAC system. Costing for a new system is reflected in the construction cost schedule.

PHOTO NO. 09

Many locations within the upgraded facility, both new and proposed rooms, would require new / revised exhaust ducting, fans, and grills. These include staff kitchen and washroom, janitorial closets, new washrooms, and the elevator machine room.

Because the lower level does not have a finished ceiling, all or most of the mechanical services can be outfitted within that space without the need for extensive demolition. The exhaust ducting from existing rooms (staff kitchen and washroom) would require localized demolition and core drilling through concrete walls.

PLUMBING SYSTEMS

As noted above, the plumbing fixture count has been raised to suit current building code standards based on the maximum occupancy a library facility of this size could anticipate. The building drain was noted on the original mechanical drawings from 1963 as four inches. DES reports that if this is accurate it will sustain the new loads imposed by additional fixtures. He recommends a scope be completed to ensure the line is clear and unobstructed. The original drawings and cleanout covers observed on site suggest that a building trap may still exist in the outgoing sanitary drain. It is recommended that an allowance for its removal be included in any proposed plumbing work.

In addition to the new fixtures required for all washrooms, new pumps are recommended for domestic hot water recirculation and storm water (pit pump). Further, new fixtures for the janitor's room are recommended.

Given the age of the facility, periodic sampling of the potable water for lead concentrations at fixture outlets and/or an allowance for the replacement of all original domestic water piping within the building be included in future plans.

Costs associated with the miscellaneous plumbing upgrades to existing equipment have been recorded in the costing schedule.

ELECTRICAL SERVICES

Electrical engineer Luigi Conforti from DES reviewed the facility and offered comments regarding proposed upgrades to the electrical systems and fixtures. Areas noted for new work include electrical service to washrooms, automatic door openers, and the proposed elevator. Luigi noted the existing power supply should handle new loads imposed by upgrades. As noted elsewhere in this report, renovations to the facility would trigger a review of life safety systems (fire alarm devices, emergency lighting and exit signage). Therefore, upgrades to these systems would also be anticipated and are included in the costing.

PHOTO NO. 12

The specific items called out in the electrical report (submitted by email) are summarized as follows:

- Electrical supply to proposed automatic door operators and general lighting to proposed washrooms.
- Power supply and fixtures associated with upgrades to life safety devices (fire and smoke alarm devices, pull stations, emergency lighting and exit signage) plus possible upgrade to existing alarm panel.
- Electrical supply to elevator and accessory fixtures including a new panel
- Recommended new exterior lighting for main entrance, specifically to illuminate path of barrier free travel.
- Replace all bulbs with LED luminaires or with new LED fixtures

Costs associated with the electrical upgrades have been recorded in the costing schedule.

PHOTO NO. 05

PART V OTHER ARCHITECTURAL FEATURES AND ISSUES

HERITAGE FABRIC

The DelaFosse Branch Library opened officially on December 1, 1965. The facility was named in honour of Frederick Montague de la Fosse. The building signage at the Park Street entrance distinguishes the spelling of DE LA FOSSE as three words. We have noted and acknowledge the anglicization the French surname to DelaFosse in all current correspondence and media.

The building was designed by Zeidler Craig Architects who practiced in Peterborough from the 1950's to late 60's. Original blueprints were made available which confirms this information. Zeidler Craig are responsible for the design of many distinguished public and private buildings in Peterborough. Their legacy, through their clients, is consistent adherence to the tenants of early modernism. Eb Zeidiler, who studied at the Bauhaus Institute in Germany, emigrated to Canada after the Second World War. His work in Peterborough reflects the modernist values and stylistic elements of European Modernism of the first half of the 20th century. Some of Zeidler's buildings are on Peterborough's heritage watch list. Today the Zeidler Partnership has six offices internationally, including Toronto where the firm established after departure from Peterborough.

The DelaFosse Library follows this architectural language and contains some significant features within the interior, namely the clerestorey roof window and the fireplace gathering pit. Beyond that there are very few noteworthy features.

The clerestorey window is a finely detailed and executed feature above the main circulation desk (see photo on report cover). Aside from illuminating this central space in the building, it is articulated with solid wood ribs that align with the window mullions.

At least a couple of details within the library share a likeness with other Zeidler buildings in Peterborough. The stepped gathering pit on the main floor is a storytelling place for children and youth. (see photo NO. 05) A similar architectural element can be found at the Cherney House on Roper Drive, also by Zeidler. The architectural motif of the cap on the book lift (see photo NO. 22) can be likened to the exterior frieze on the Beth Israel Synagogue, Weller St. (see photo NO. 24).

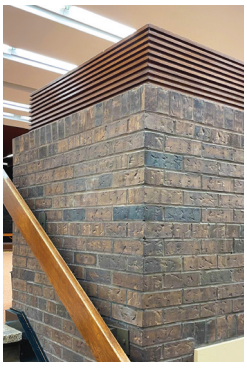


PHOTO NO. 22

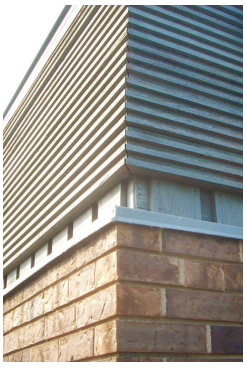


PHOTO NO. 24

PHOTO NO. 01

Doubtless there are other architectural features found at DelaFosse that are replicated elsewhere around town. It's reassuring that DelaFosse is not unique in Peterborough as an example of Craig Zeidler's work.

Beyond the heritage value, it should be noted that the architectural finishes on the main floor are robust and of high-quality and remain in good condition. The terrazzo floors, interior masonry and smaller features such as the wood shelves of the book stacks point to a time when superior quality of finishes was the norm. Similarly, the furniture collection, comprised of lounge chairs, wood table chairs and wood tables, are also of good quality, remain in good condition, and are stylistically current with the time of original construction.

CODE COMPLIANCE

The building is two storeys of non-combustible construction and can be argued as having access to two streets for firefighting. As such it meets the current requirements for an unsprinklered building, which it is. As noted earlier, there almost certainly would be upgrades called for fire and life safety devices, but there would not be a requirement for a sprinkler system.

HAZARDOUS SUBSTANCES

It was reported that the floor tile on the lower level contains asbestos. This was not confirmed but should serve as a red flag and we have included abatement in our construction cost schedule. It was also noted that the exterior stucco finish may contain asbestos. Since this report does not recommend changes to the exterior fabric, it's possible that renovation work may not impact the exterior finish and no recourse be taken. As noted above, it might be the case that vermiculate was used as insulation in the exterior walls. Changes to the exterior walls were not in the scope of this report. However, we did make further allowance for abatement as a precaution.

PHOTO NO. 10

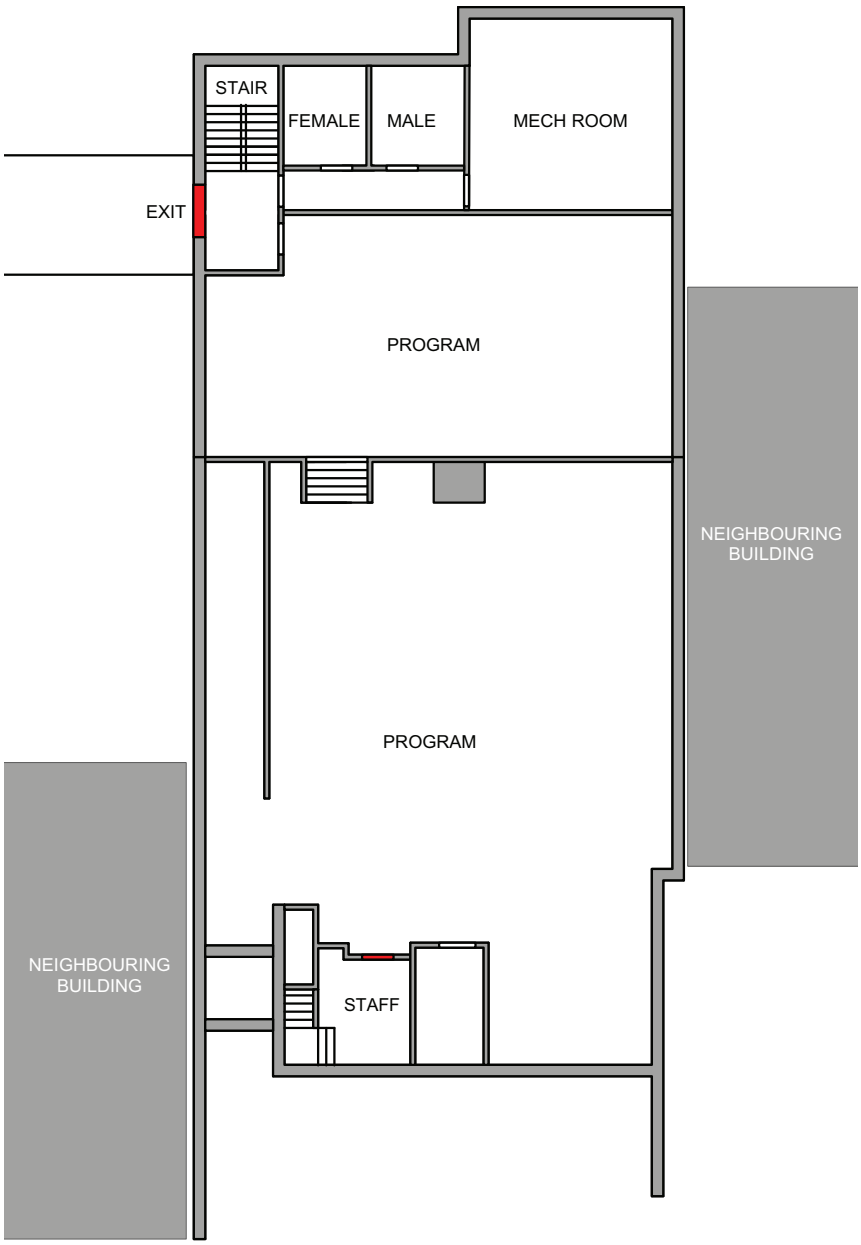
PART VI CONSTRUCTION COST ESTIMATES

The estimate of probable construction costs was prepared by Lett Architects and represents a professional opinion of costs based on our experience and that of our consulting engineers on projects of a similar scale and condition. Lett Architects cannot guarantee that the actual project cost will not vary from this opinion.

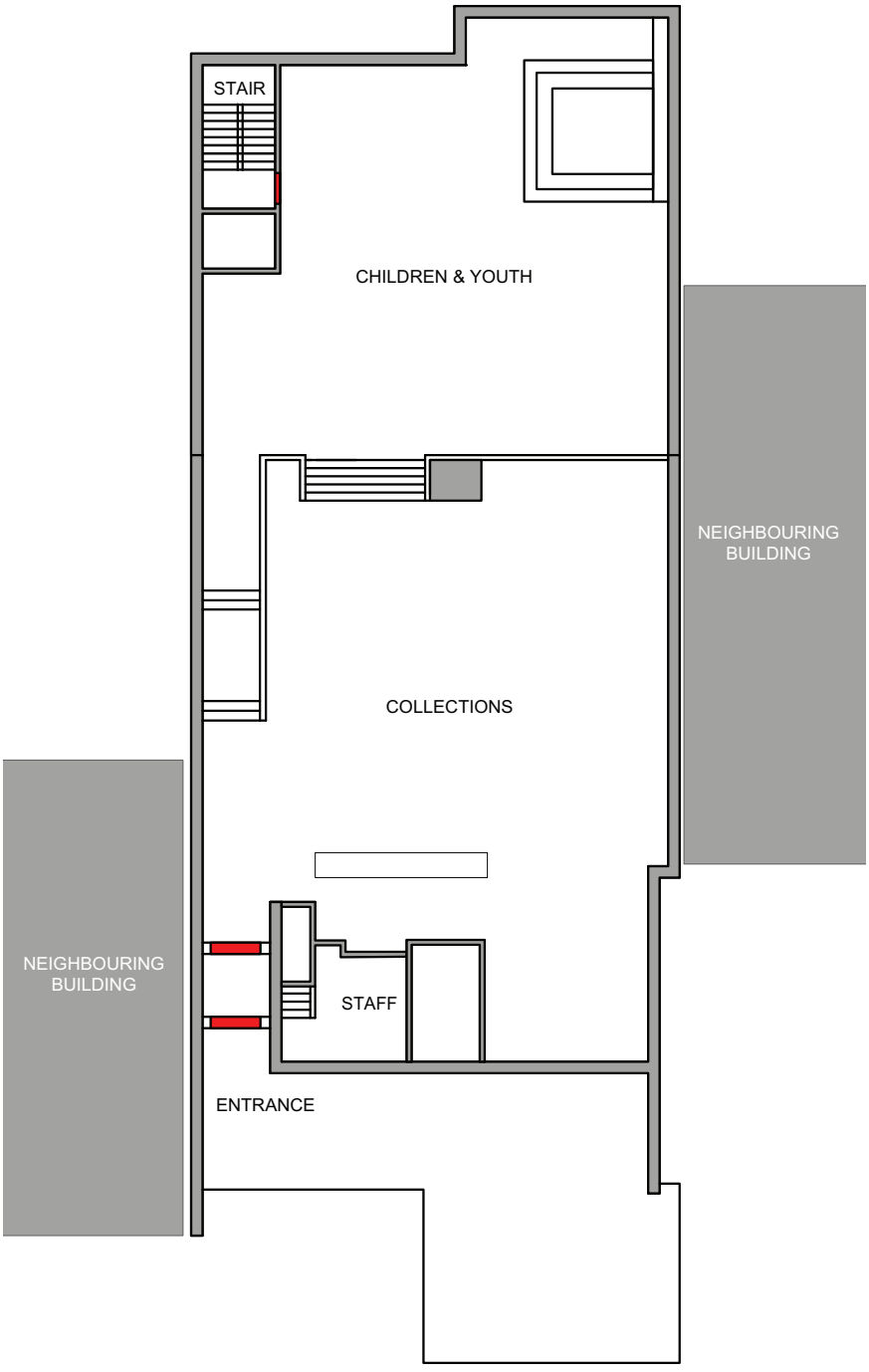
ELEVATOR	DEMO: FLOOR CUT	9,000	
	DEMO: SLAB	20,000	
	FRAMING MAIN FLOOR	15,000	
	PIT FORMING, NEW POUR	40,000	
	CMU SHAFT WALLS	45,000	
	M&E SERVICES	25,000	
	FINISHES	45,000	
	ALLOWANCE	10,000	
	ELEVATOR PACKAGE- SUPPLY & INSTALL	150,000	
	SUBTOTAL ELEVATOR		359,000
WASHROOMS	DEMO: LOWER LEVEL	15,000	
	TRENCHING, NEW CONC. SLAB	20,000	
	STRUCTURAL: REMEDIAL WORK	15,000	
	PLUMBING	70,000	
	CMU PARTITIONS	40,000	
	ELECTRICAL GENERAL	10,000	
	FIXTURES & EQUIPMENT	20,000	
	FLOOR, CLG. & WALLS FINISHES	60,000	
	CONVECTORS (HEAT)	20,000	
	EXHAUST FANS & DUCTING	10,000	
	UWR MAIN FLOOR COMPLETE	40,000	
	SUBTOTAL WASHROOMS		320,000
MAIN FLOOR REINFORCEMENT	DEMOLITION & PREP	10,000	
	NEW FTGS. & CONCRETE	9,000	
	MATERIALS: STEEL	75,000	
	DELIVERY, ASSEMBLY, INSTALLATION	60,000	
	FINISHING	15,000	
	MAIN FL. REINFORCEMENT SUBTOTAL		169,000

HVAC: NEW RTU	CONVERT EXIST. HVAC TO LOWER LEVEL	30,000	
	NEW RTU & DUCTING TO UPPER LEVEL	150,000	
	CONTROLS	40,000	
	STRUCTURAL FOR NEW RTU	40,000	
	NEW RTU SUBTOTAL		260,000
MECHANICAL: GENERAL	MISC. MECHANICAL UPGRADES: PUMPS	10,000	
	STORM PIT PUMPS	20,000	
	CORING & CUTTING	9000	
	ADDITONAL EXHAUST FANS & DUCTING	20000	
	MECHANICAL SUBTOTAL		59,000
EXTERIOR DOORS	MAIN ENTRANCE	25,000	
	REAR ENTRANCE	9,000	
	EXTERIOR DOORS SUBTOTAL		34,000
ROOFING	ROOFING ($30/SF WITH INSULATION)	150,000	
	FLASHING AND METAL COPING	20,000	
	CLERESTOREY CURBS	10,000	
	DRAINS	6,000	
	ROOFING SUBTOTAL		186,000
INTERIOR FINISHES	LOWER LEVEL CEILINGS ($6/SF)	24,000	
	LOWER LEVEL FLOORING ($10/SF)	40,000	
	PARTITIONS	40,000	
	DOORS & HARDWARE	40,000	
	ALLOWANCE FOR REPAIRS	25,000	
	INT. FINISHES SUBTOTAL		169,000
ELECTRICAL: GENERAL	LED FIXTURE REPLACEMENT	60,000	
	NEW SUBPANELS	20,000	
	ALLOWANCE-CONTINGENCY	10,000	
	ELECTRICAL SUBTOTAL		90,000
FIRE & LIFE SAFETY	DEVICES, SAFETY LIGHTING, NEW PANEL	90,000	
	FIRE & LIFE SAFETY SUBTOTAL		90,000

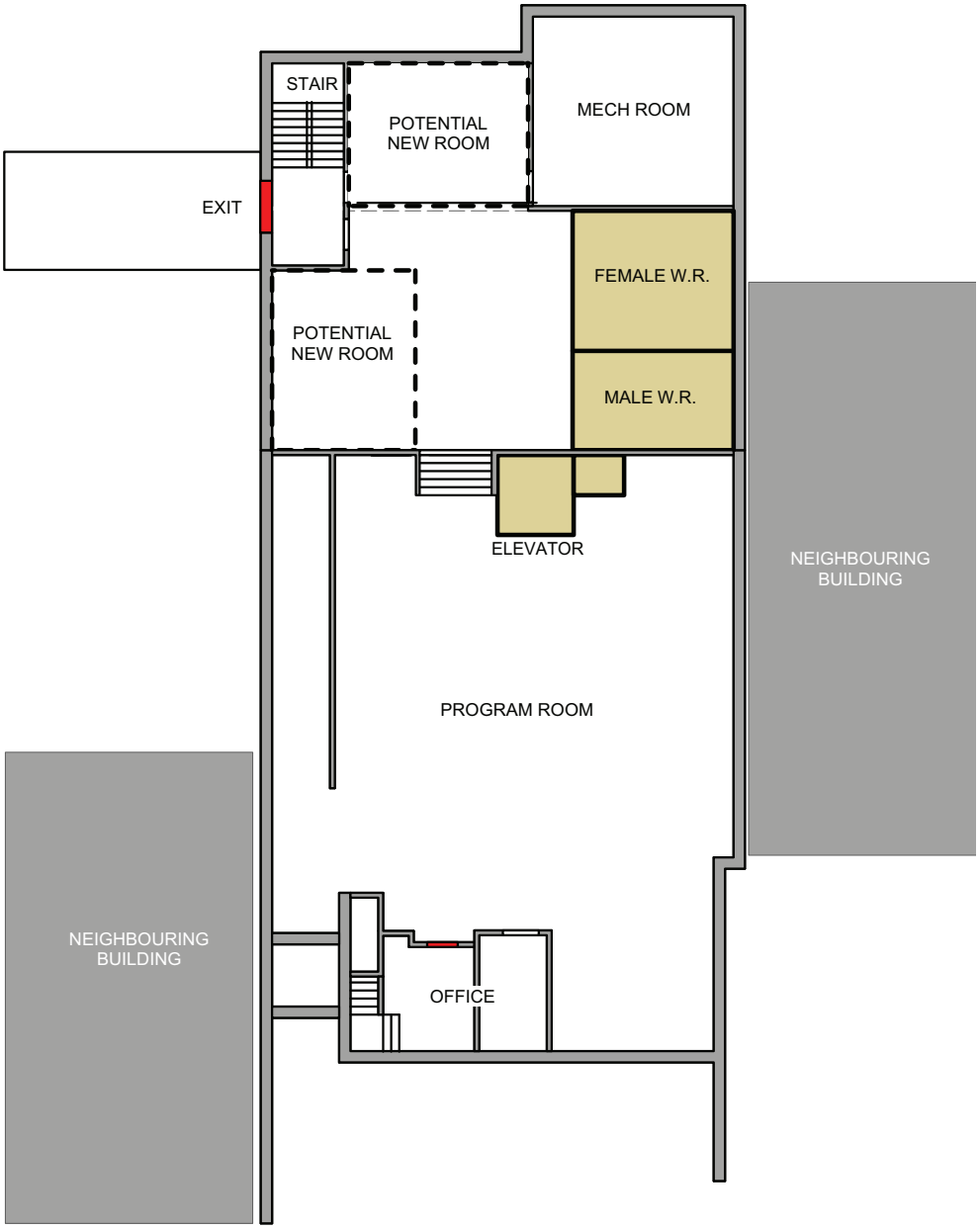
HAZARDOUS MATERIAL ABATEMENT	LOWER LEVEL FLOOR TILE ($3/SF)	15,000	
	ALLOWANCE FOR ADDITIONAL	10,000	
	ABATEMENT SUBTOTAL		25,000
REPOINTING, REPAIR	WALL CRACK, BRICK VENEER	8,000	
EXTERIOR RAMP	RENEWAL OF CONCRETE RAMP AND ADJACENT FINISHES	65,000	
	EXTERIOR WORK SUBTOTAL		73,000
FURNITURE & EQUIPMENT	ALLOWANCE	60,000	60,000
	CONSTRUCTION SUBTOTAL	1,894,000	1,894,000
DESIGN	CONSULTANTS 13%	246,220	
CONSTRUCTION	GENERAL REQUIREMENTS 9%	170,460	
	BUILDER'S FEE 5%	94,700	
	DESIGN CONTINGENCY 10%	189,400	
	TESTING, INSPECTION, FEES	70,000	
	DESIGN & CONSTRUCTION MARK-UP SUBTOTAL		770,780
	PROJECT TOTAL		2,664,780
HST	13%		346,421.4
TOTAL			3,011,201



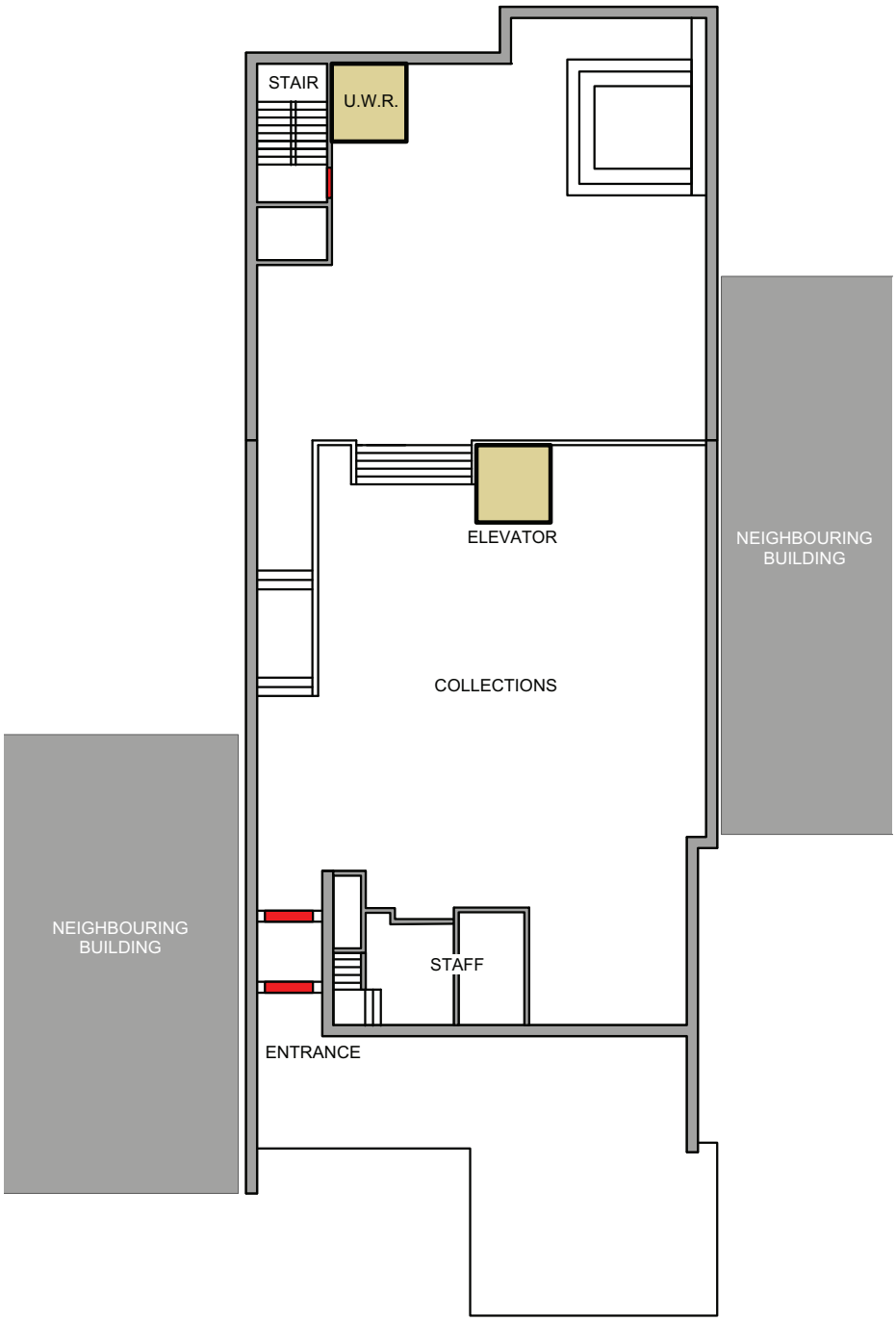
LOWER FLOOR PLAN: EXISTING



UPPER FLOOR PLAN: EXISTING



LOWER FLOOR PLAN: PROPOSED



UPPER FLOOR PLAN: PROPOSED

AMR Engineering Limited
Structural Engineers

920 Alness Street
Suite 205, Toronto, ON
M3J 2H7

Tel 416-551-1611
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www.amrengineering.ca

August 11, 2021 **AMR Project No.: 21-2151**

Lett Architects Inc.
138 Simcoe Street
Peterborough, Ontario
K9H 2H5

Attention: Mr. Scott Donovan

RE: Structural Assessment Report
De La Fosse Branch Library
729 Park St S, Peterborough, Ontario

1.0 Introduction

AMR Engineering Limited (AMR) was retained by LETT Architects on behalf of City of Peterborough to carry out a visual structural review of the existing DelaFosse Branch Library building. Representatives from AMR visited the structures at 729 Park St. South in Peterborough, Ontario on Friday, May 28, 2021. As requested, the purpose of the review was to assess the structural condition of the building and make recommendations on any immediate remedial work required and to upgrade the structure to meet current Ontario Building Code requirements. This review was made on random sampling basis with no attempt to review or inspect every element or portion of the building. Material testing was not conducted. Some original existing drawings were made available for review (refer to Appendix B).

2.0 Existing Documents

The following drawings and reports were made available to us for our review.

1. Original Structural Drawings (S1, S2) prepared by Craig, Zeigler & Strong Architects, sealed by G.B. Dowdell and dated April 7/64.

2. Original Architectural Drawings (A1 – A3) prepared by Craig, Zeigler & Strong Architects and dated April 7/64.

3.0 Field Observations & Building Description

The existing building structure in its present state is a one-storey building with full basement and has a footprint of about 136'-7" x 50'-0". (Photo #1) The building structure is a combination of concrete, masonry, and steel construction.

Basement

Exterior perimeter basement walls consist of 12" thick reinforced concrete walls supported on concrete strip footings. Interior basement walls consist of 8" or 10" block supported on concrete strip footings. Basement floor on western side of the building stack area is about 3'-6 1/4" higher than the main lower basement area. There is a concrete stair connecting the two levels. There is also a lift located at the central portion of the structure which serves lower basement level and main ground floor level. Lift shaft walls consist of block wall construction. (Photo #2)

Basement walls where visible are generally in good condition. A vertical crack was noted in interior basement wall above the corner of the opening. (Photo #3)

Basement floor construction consists of 4" thick concrete slab on grade. There are no visible signs of any excessive and/or uneven settlement. At the time of our visit the basement was dry and there were no visible signs of any water penetration through perimeter walls and floor slab.

Exterior Above Grade Walls

Exterior above grade perimeter walls of the building typically consist of 12" concrete block except for east and partially north elevation which consists of 8" concrete block with 4" brick veneer. Above grade walls generally have drywall finish on the interior. There were no visible signs of any water penetration at the reviewed areas.

Exterior face brick (veneer) is generally in good condition. Mortar joints generally are to in good condition. (Photo #4)

Exterior Ramp & Stairs

Exterior stair consists of reinforced concrete slab supported on block foundation walls. Exterior stairs are in fair condition with some minor cracking observed. It was noticed that some prior concrete patch work has been carried out at one of the steps. Some

corrosion is visible at the bottom of the metal railing located at the center of the stair and concrete has stained at few locations. (Photo #5)

Exterior ramp slabs appear to be solid concrete panels approximately 6” thick on grade with masonry retaining walls at one end for grade difference. Some concrete panels have experienced cracking. Steel railing posts are anchored to the side of the foundation wall/slab. Generally, cracks and concrete spalling can be observed at all railing post locations. Existing retaining wall on north side of ramp has experienced extensive cracks and splitting closer to the grade level. (Photo #6-8)

Ground Floor

Ground floor consists of two main sections, the Adult library and the Boys & Girls library. The Adult library is at the same level as the main entrance. The Boys & Girls library is at a higher level and is accessible by as set of steel stairs and an interior ramp on west side (Photo #9). The Boys & Girls library is currently used as reading room. At the north-west corner (Story Corner) there is sunken pit which consists of reinforce concrete construction (Photo #11).

The ground floor structural framing at both library areas consists of 2.0” concrete slab on 1.5” deep steel deck supported on steel open web steel joists at approximately 4’-8” o/c maximum. (Photo #10). At the Boys & Girls library area the floor joists are spanning in east-west direction and are supported on interior block masonry walls. At the Adult library area joists are spanning in north-south direction and are supported on concrete or block masonry walls at one end and on interior row of steel beams at the other end in the centre of the building. Steel beams are supported on steel columns and footings.

Existing structural drawings indicate superimposed design dead load of 35 psf and design live load of 60 psf for the ground floor.

Ground floor structure appears to be in reasonably good condition although library staff has noted some vibration in the floor at the Adult library area which currently is where the book stacks are located.

Roof Framing

Based on review of existing structural drawings, roof framing consists of 1.5” steel deck supported on 30” deep long span open web steel joists spaced at 6’-6” o/c. Gauge of steel deck is not specified on the existing drawings available. Joists are spanning in east-west direction and supported on exterior block walls. Roof farming had finishes and was only visible in some limited areas. (Photo # 12)

Existing structural drawings indicate superimposed design dead load of 21 psf and design live load of 60 psf for the roof.

4.0 Discussions, Conclusions and Recommendations

Based on our visual inspection of the structure and review of available original drawings, in our opinion, overall existing building structure is generally in good condition considering the exposure and age of the buildings.

It was mentioned by staff during our visit that the floor structure at Adult library area has some noticeable vibration especially when a large group of people walk along the center aisle. A heel drop test was performed on the floor at the center aisle which identified the presence of slight transient vibrations.

The design criteria for any floor structure requires that both the strength and serviceability requirements of the code be met. In general, the strength requirement ensures that the structure can safely support the intended loading imposed on the floor structure.

The building is currently being used as a Public Library which is in accordance with the original intended occupancy. The existing ground floor has been designed for live load of 60 psf. However, current building code requirements as per OBC Section 4.1.5.3 for this occupancy are as follows;

(a) Libraries (stack areas) = 7.2 kPa (150 psf)

(b) Libraries (reading and study rooms) = 2.9 kPa (60 psf)

The following are our recommendations based on our observations and review of existing drawings;

1. Based on this comparison and our review of the original structural drawings and the as-built construction of the floor system, the existing ground floor structure does not have sufficient capacity to safely support the required loading in stack areas.

   Normally if the existing structure is undersized for strength, it would also be undersized to meet the serviceability requirements therefore larger than allowable deflection could be the cause of the vibration issues observed.

We recommend that existing loading at the stack area be reduced immediately within the allowance of 60 psf which the floor is currently designed for.

In order to reinforce the exiting floor for the required loading we propose to install new steel beams in between existing joists at all ground floor framing under the Adult library area. Note that if area at the rear (the current reading room) is intended to be used to support stacks as well, then it shall also be reinforced in a similar method.

We propose to reinforce the existing central steel beams by adding new steel columns and footings between the existing. Alternatively, if this is not acceptable architecturally steel beams will need to be reinforced by providing additional welded sections to increase their strength and stiffness and underpinning existing column footings.

2. We recommend that existing crack at the top of the opening in the basement shall be repaired by injecting grout into the voids and monitoring the area for development of any further cracks in the future. The crack appears to be stress crack and is probably due to overloading in the area.

3. Based on our visual inspection of exterior brick work mortar joints and bricks appear to be in good shape. We recommend re-pointing the localized weathered mortar joints to prevent any further deterioration. With regular inspection, the City can anticipate many more years of serviceable life from the exterior masonry.

4. We recommend that landscape retaining wall at the ramp area along with the lower section of the ramp be removed and re-constructed.

5.0 Estimate of Probable Costs

It shall be noted and understood that estimated costs provided here are based upon present extent of deterioration, historical unit prices from similar projects, and conceptual repair strategies. Detailing of the various items for each design concept has not been fully developed, nor have implementation schemes been selected. Probable costs do not include "soft costs", extended warranties, engineering fees, or HST unless noted otherwise. The opinions of probable costs should be considered class "D" amounts.

A contingency amount of 10% should be included in all construction budgets to allow for variation in competitive bidding and additional work required due to hidden and/or unforeseen conditions uncovered during construction.

Item #	Recommendation	Probable Cost (2021 Dollars)
1	Reinforcing of existing ground floor (Includes for structural steel work only for Adult library area)	$75,000
2	Repointing of interior basement wall crack	$3,000
3	Repointing of exterior brick	$3,000
4	Demolish and re-construct exterior ramp section and retaining wall	$20,000

Definitions:
Soft Costs – are defined as building operational and indirect costs, costs incurred by the site as a result of the construction project namely administration, potential tenant issues, security, etc.
Class "D" probable costs – a statement of general requirements and an outline of a solution. An order of magnitude opinion (degree of accuracy 25% - 50%).

6.0 Limits of Liability

The review of this property was of a visual nature only. This inspection was made on a random basis with no attempt to review or inspect every element or portion of the structure. The intent of the inspection was to determine areas of visually obvious deterioration and need for repair and to determine, in a general way, the overall quality and sufficiency of the work inspected but not to ascertain the quality of sufficiency of any particular aspect of the structure.

Our review of the systems did not include a review of the safety aspects of the installation as this falls under the Jurisdiction of the Governing Authorities. In addition, testing of the building materials for Occupational Health and Safety or substance of potential environmental concern was not conducted.

This report is intended to provide the client with a general description of the systems employed in the structure and to comment on their general condition, which may be apparent at the time of our inspection. The intent is to give the client recommendations on any immediate repairs required.

The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the Client. AMR Engineering Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Thank you for selecting AMR Engineering Ltd. for this project. AMR would be pleased to assist you with the implementation of our recommendations. Should you have any questions or concerns, please do not hesitate to contact this office.

We trust this meets your present requirements. If you have any questions please do not hesitate to contact the writer.

Sincerely,
AMR Engineering Limited

Denis Kotobelli, MEng, P.Eng., LEED® AP BD+C

Appendix "A" – Photographs
(Pages 9-14)

Photo #1 – Library Main Entrance

Photo #2 – Existing Basement

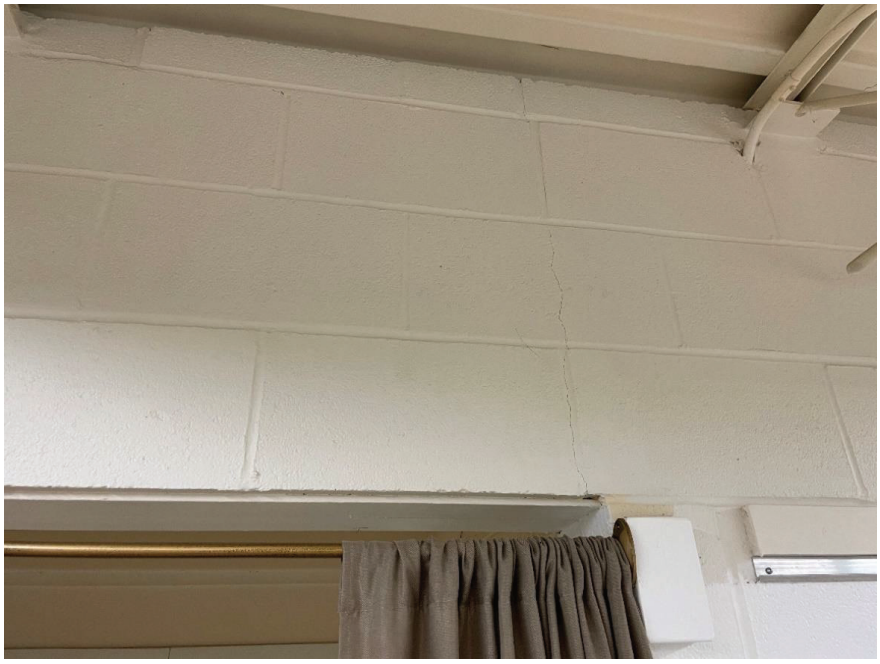


Photo #3 – Vertical crack above corner of interior opening

Photo #4 – Brick at exterior elevation

Photo #5 – Exterior stair

Photo #6 – Exterior ramp

Photo #7 – Ramp retaining wall

Photo #8 – Ramp retaining wall

Photo #9 – Existing ground floor

Photo #10 – Existing ground floor framing

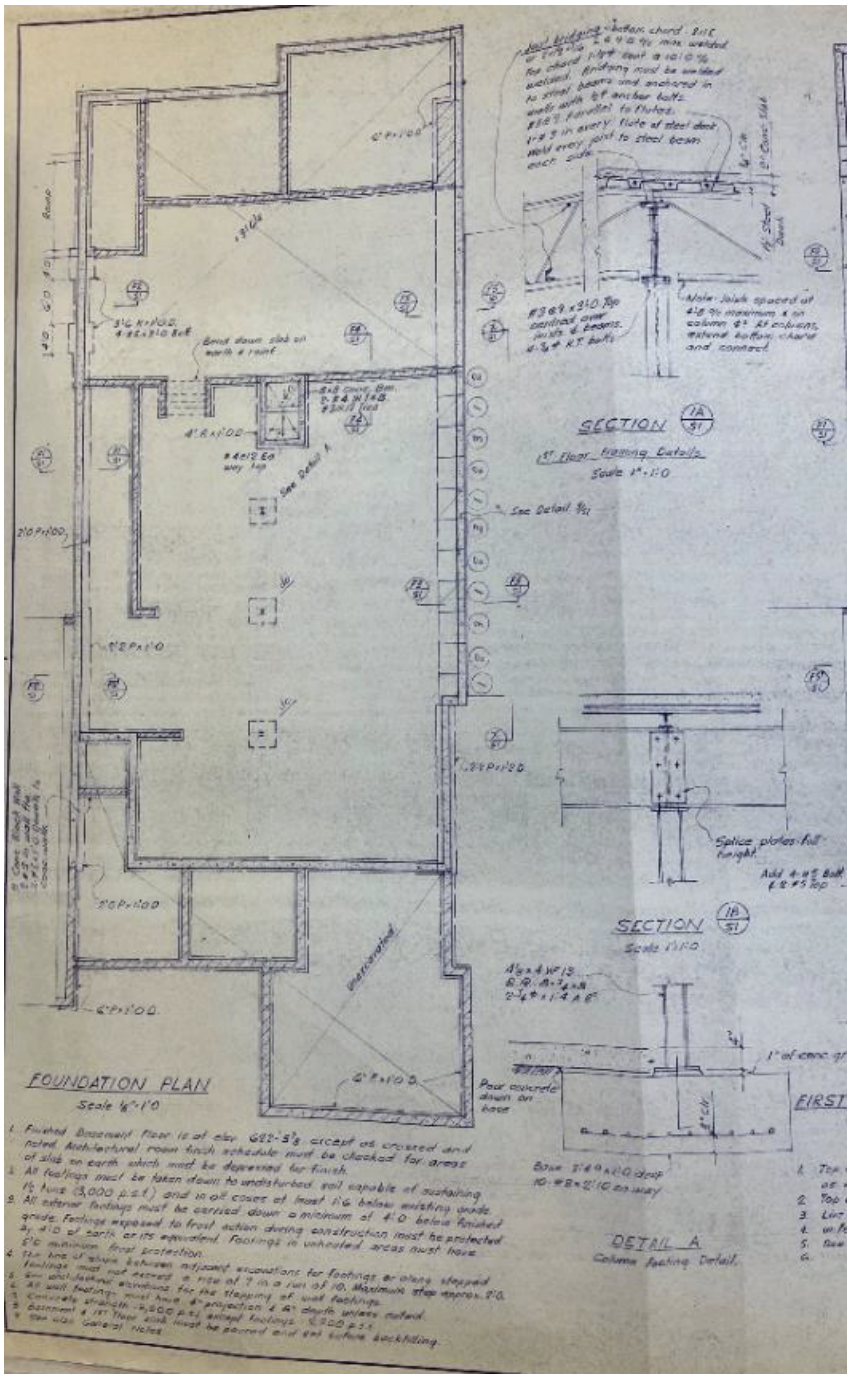
Photo #11 – Sunken lecture pit

Photo #12 – Roof framing

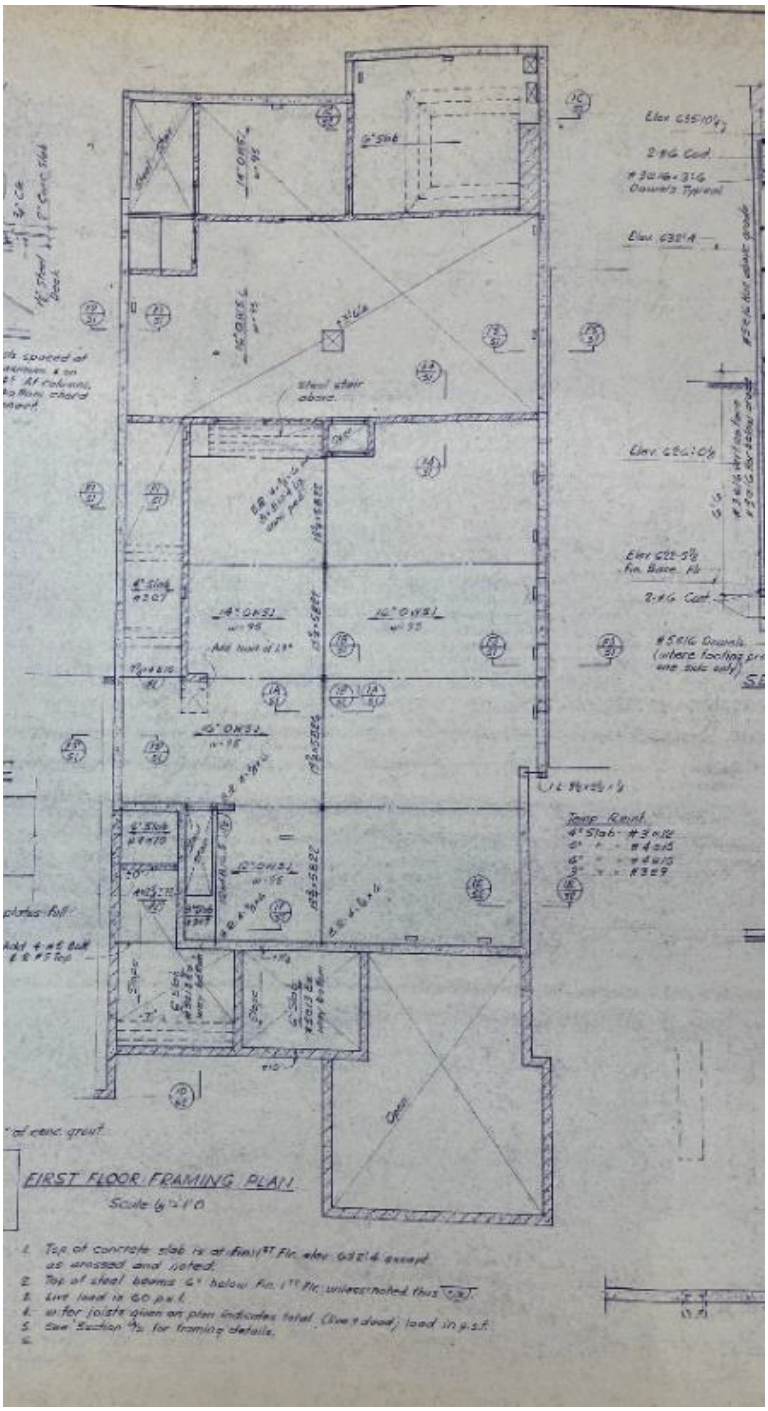
Appendix "B" – Existing Structural Plans

(Pages 16-19)

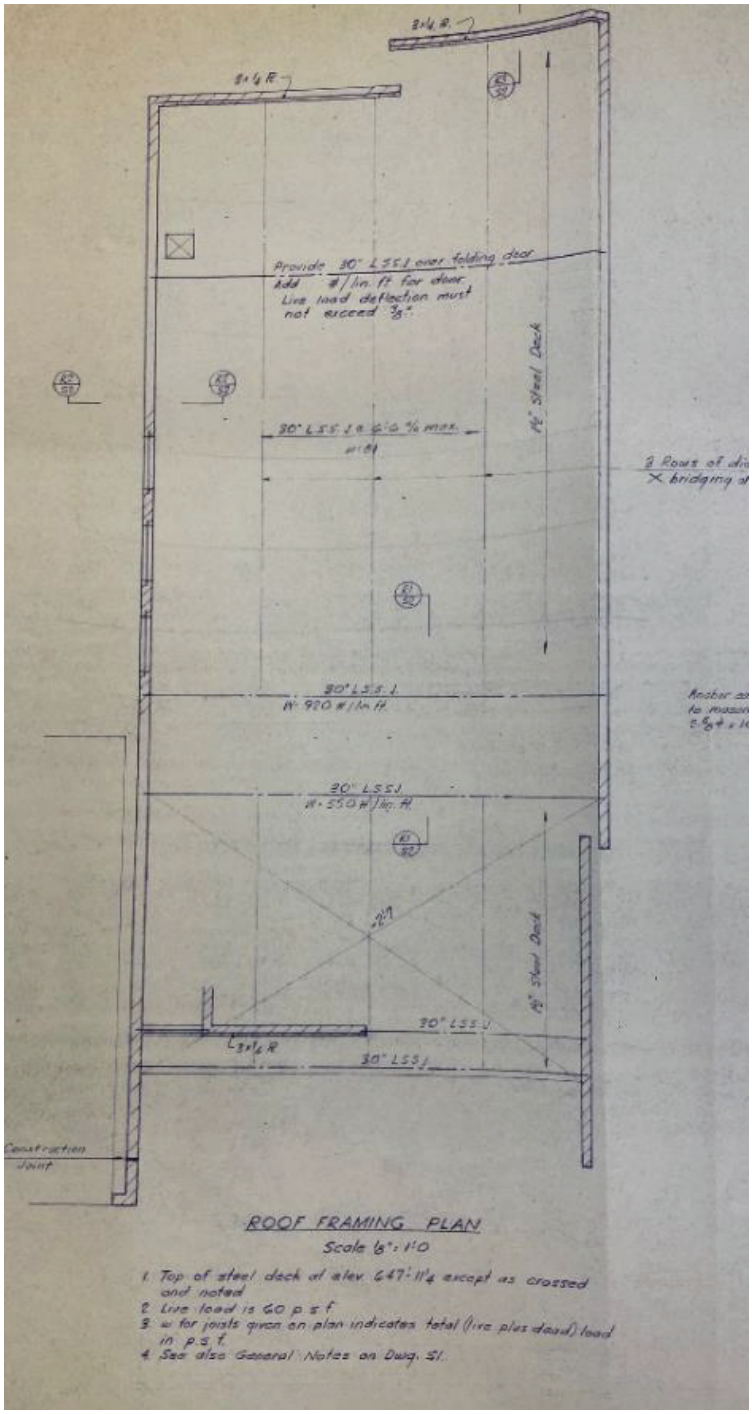
Foundation Plan S1



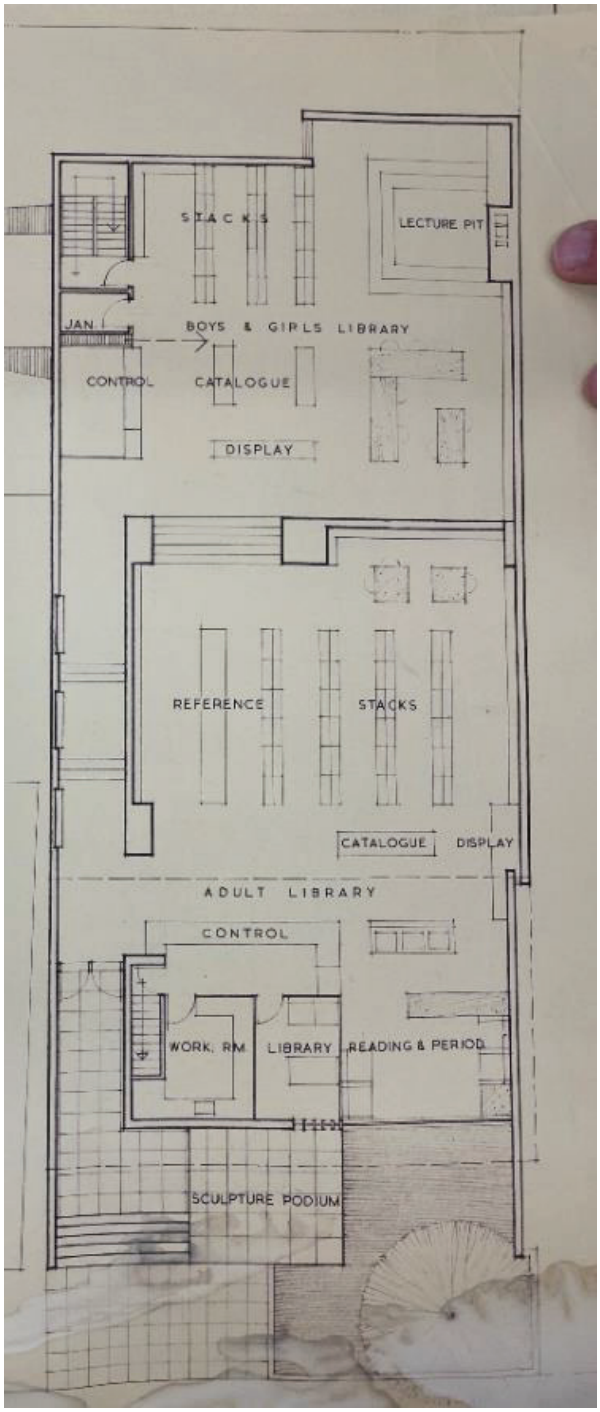
First Floor Framing S1



Roof Framing S2



Arch Ground Floor Plan A2

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