

## VACANT HISTORIC SCHOOL BUILDINGS DISPOSITION PLAN

City of Detroit RFP# 19BW2717

### Building Envelope and Structural Assessment Report

#### Chandler Elementary School

#### Basic Property Information: COD 5-Chandler-9227 Chapin

<b>Short Name:</b>	Chandler
<b>Address:</b>	9227 Chapin Street, Detroit, Michigan 48213
<b>Year Built:</b>	1905
<b>Additions Built:</b>	1922, 1962
<b>Outbuildings:</b>	None
<b>Year Vacated:</b>	2004
<b>Building Footprint:</b>	200 feet x 165 feet
<b>Square Footage:</b>	50,147 sq. ft.
<b>Number of Stories:</b>	3
<b>Building Height:</b>	52 ft.



<b>Current Ownership:</b>	City of Detroit	<b>Structural Framing System:</b>	<ul style="list-style-type: none"> <li>▪ Cast-in-Place Concrete</li> <li>▪ Precast Concrete</li> <li>▪ Brick Masonry</li> <li>▪ Concrete masonry (CMU)</li> <li>▪ Structural Steel</li> <li>▪ Wood</li> </ul>
<b>City Council District:</b>	5	<b>Exterior Wall System:</b>	<ul style="list-style-type: none"> <li>▪ Brick</li> <li>▪ Limestone</li> <li>▪ Sheet Metal</li> </ul>
<b>SNF District:</b>	NA	<b>Window System(s):</b>	<ul style="list-style-type: none"> <li>▪ Wood</li> <li>▪ Aluminum</li> </ul>
		<b>Roofing System(s):</b>	<ul style="list-style-type: none"> <li>▪ Asphalt Shingles</li> <li>▪ Built-Up Roof</li> <li>▪ Gutters</li> <li>▪ Internal Roof Drains</li> </ul>



### Assessment Summary

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**Assessment Date:** May 26, 2020

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**WJE Inspector(s):** Sarah Rush; Andrew Lobbestael

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**Report Date:** November 20, 2020

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**Building Risk Index:** 68.86

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### Cost Estimate

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**Base Rehabilitation Cost Estimate:** \$1,076,450

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**Preparation for Rehabilitation Work:** \$900,000

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**Mechanical, Electrical, Plumbing,  
Fire Protection (\$80/sq ft):** \$4,011,760

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**Sub-Total** \$5,988,210

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**Contingency (25%)** \$1,497,052

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**Sub-Total** \$7,485,262

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**Overhead and Profit (15-18%):** \$1,122,789

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**Sub-Total** \$8,608,051

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**Escalation (6% for 2 years)** \$516,483

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**Sub-Total** \$9,124,534

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**Architectural and Engineering  
Design Services (20%):** \$1,824,907

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**TOTAL COST ESTIMATE:** \$10,949,441

## ASSESSMENT METHODS

### Visual Survey

As requested, Wiss, Janney, Elstner Associates, Inc. (WJE) performed a visual review of the building envelope and structure to assess the viability of the building for reuse. WJE was joined by Mr. Andrew Wald of Interboro Partners and Ms. Jennifer Ross and Mr. Garrick Landsberg of City of Detroit Planning and Development Department. During the time on site, Mr. Wald gathered information pertinent to the general building site and layout of the building, and Ms. Ross and Mr. Landsberg assessed the condition of the historic fabric of the building.

WJE performed a visual review of the building envelope from grade and lower roof levels, using binoculars as needed. The upper roof level was inaccessible due to safety concerns pertaining to the access ladder condition. On the interior, WJE performed a walkthrough of accessible areas of each floor of the building, including the attic and portions of the basement. Localized interior finishes are in a state of deterioration, exposing the structural framing systems in some locations. Up-close examination of building elements and destructive inspection openings involving the removal of building finishes to review underlying conditions were generally not performed.

WJE's observations were documented with tablets and digital photography. WJE has shared our field data with Interboro Partners; City of Detroit Planning and Development representatives; and A.M. Higley Company, the cost estimator for this project. Each observed condition is documented in the field data and assessed as discussed under "Risk Characterization" below. A summary of the conditions observed is provided in the "Building Overview" section below.

### Limitations of Assessment

Limited to four hours on site, WJE visually assessed the exposed portions of the building envelope and structure. Recognizing the limitations on visually detecting distress from afar and the limitations on detecting concealed internal distress, the assessment may not include all current conditions. As such, completion of this assessment is not an indication, certification, or representation that all deterioration or hazards have been observed or recorded, including underlying deterioration not evident from the building exterior or interior. Additionally, the conditions of the building elements discussed herein are exposed to further damage and deterioration due to the existing condition and unoccupied status of the property, and as such, WJE cannot state the conditions discussed herein will remain unaltered and as observed during the visual survey. However, we have performed these assessments in accordance with the requirements of applicable regulations and the applicable standard of care for architects or structural engineers performing such services.

WJE identified structural or building envelope issues that have significant impact on the viability of future reuse of the property. Items posing little risk such as regular maintenance items are not included in the assessment. The assessment was limited to within the walls of the building; on-grade walkways, access roads, parking lots, landscaping, play structures, or other site features were excluded from this assessment. The assessment, remediation, and identification of hazardous materials (e.g., asbestos, lead, etc.) or other environmental issues were also excluded. Based on WJE's past experience with building rehabilitation projects, WJE has assumed existing mechanical, electrical, plumbing, interior finishes, and other building

systems are anticipated be removed and replaced with future reuse of the building, and as such, were not included in WJE's assessment.

## Document Review

WJE performed a cursory review of documentation provided by Interboro Partners to gain familiarity of the property. The documentation provided included:

- Site Plan (included with this report)
- Floor Plans (included with this report)
- Environmental Reports
- National Register of Historic Places Registration Form

Other documents, such as original construction drawings, specifications, or maintenance records, were not made available for our review.

## Risk Characterization

WJE has categorized each significant area of distress, damage, or deterioration observed with a systematic methodology to provide an objective, quantitative characterization of its relative condition and associated risk, or its Condition Risk Index (CRI). The CRI is based on the primary building system affected by the condition and the condition's severity, prevalence, and the associated consequence of failure. A higher CRI score indicates that observed conditions embody relatively higher risk than conditions with a lower CRI. The CRI is the product of each of the rankings below multiplied and normalized to meet a maximum score of 100 per condition.

Specifically, the CRI assigns a numerical value to the following:

- System (Structural, Roofing, Facade, Other)  
Conditions affecting the structure are assigned a higher rating than those affecting the facade or roofing systems. Other includes items such as non-load bearing partition walls and exterior steps, and are assigned a lower rating.
- Building Performance Impact (Minor, Moderate, Advanced, Critical, Imminently Hazardous)  
This parameter addresses the severity of the impact of the observed condition on the performance of the affected building system. Imminently Hazardous is assigned the highest rating. For example, a crack in a concrete slab may be a minor distress, but a damaged prominent skylight is considered advanced distress. Imminently hazardous conditions are discussed immediately with Interboro Partners and the City of Detroit representatives.
- Size/Distribution (Isolated/Infrequent/Frequent/Widespread/Pervasive)  
In short, this parameter rates how large and/or frequent a condition is with respect to the entire affected building system/component. Pervasive is assigned the highest rating. Examples include: an isolated step crack in a masonry wall versus pervasive corrosion of metal floor decking throughout a building.

- Consequence of Failure (Low, Moderate, High)

This parameter allows inspectors to exercise judgment regarding general risk to the public, considering the unoccupied status of the buildings. High is assigned a higher priority, and, for example, might be assigned to a condition whose failure would result in potential harm within the public right of way. Conditions rated with a high consequence of failure are discussed immediately with Interboro Partners and the City of Detroit representatives.

The CRI for each observed condition is summed to calculate a total Building Risk Index (BRI), as provided in this report. The reported BRI is therefore a numerical expression of the relative risk present at one property, as compared to other properties in the scope of this assessment.

Both the CRI and the BRI are expressions of WJE's professional opinion of the relative significance of an observed condition to other building conditions, and the collective relative risk of the structural and building enclosure elements of this property. Neither the CRI nor the BRI are an expression of actual risk or probability of occurrence of any event. The CRI for each condition is tabulated in WJE's electronic field notes. The BRI provides a numerical tool for the project team and the property owners to compare and make decisions about this property and the other properties included in this overall effort, in context with the cost estimate, market analysis and community input. Both the CRI and BRI are intended only for this assessment project. The numerical values do not have substantive meaning beyond the context of the Vacant Historic School Buildings Disposition Plan project.

## Recommendations

Recommendations developed in the assessment are conceptual and are intended for budgetary and planning considerations. Recommendations are provided within the narrative below, and in the field data provided. It is not the intent or purpose of this report or the field data to direct a contractor to bid, or otherwise implement, the recommendations. Significant additional investigation by various professional disciplines is necessary to develop appropriate scopes of repair and rehabilitation efforts to enable the re-use of any facility included in this assessment.

## Cost Estimating

The rehabilitation costs are opinions of probable construction cost and have been developed with the assistance of A.M. Higley Company, a contractor familiar with rehabilitation of historic buildings. The costs have been developed for evaluating the relative cost of repair of distressed conditions as well as establishment of order-of-magnitude repair budgets. They are based on national construction cost data, adjusted based on the local construction market, and our experience with similar past projects.

Understanding the rehabilitation cost may vary depending on type of future occupancy, this assessment assumes the building will be rehabilitated to a weathertight and "grey box" condition with unfinished walls, flooring and ceilings; no mechanical, electrical, plumbing or other building systems installed. The costs assume the rehabilitation work would occur in 2022 and are not inflated should the work occur in future years.

In addition to this "grey box" base rehabilitation cost, an allowance, based on percentage of costs and square footage of the building, is delineated for:

- Preparation for Rehabilitation Work
- Mechanical, Electrical, Plumbing, Fire Protection (\$80/sq ft)
- Contingency (25%)
- Overhead and Profit (15-18%)
- Escalation (6% for 2 years)
- Architectural and Engineering Design Services (20%)

The preparation for rehabilitation work item includes mobilization, hazardous material abatement as well as salvaging for potential later duplication or re-installation pertinent historic interior finishes identified by the City. For the purposes of the cost estimating effort, all roofing replacement or repair work is recommended to be performed with like-kind materials; all windows are assumed to be replaced with new commercial window assemblies in lieu of restoration of existing elements, and any exterior doors are to be repaired or replaced in like-kind. Where like-kind materials may no longer be available, WJE will offer alternative materials for the cost estimating purpose. For rehabilitation design and construction efforts, further evaluation of each of these elements is recommended. All work is recommended to be performed as per the Secretary of Interior's Standards for The Treatment of Historic Properties.

The condition-based subdivision of repair recommendations used to develop the base cost estimate is not representative of how a repair program could be implemented to remediate building conditions. Moreover, the costs assume that all repairs would be remediated in the same rehabilitation project. Execution of separate repair projects, or phasing of the rehabilitation project, could result in increases in the total repair cost. Furthermore, the final scope of repair work and the actual repair costs may vary depending on underlying or concealed conditions that were not apparent during our limited assessment.

## BUILDING OVERVIEW

### Overall

The original building was constructed in 1905 with additions to the east and north added in 1921. The north 1921 addition includes an attached powerhouse. Windows are present at the basement, first, and second levels; classrooms within the basement level are finished and include stairs to access egress windows. Another addition was added to the northeast in 1962 which houses the gymnasium and cafeteria.

The facade generally consists of common bond brick masonry with header courses every six courses. Limestone accent units are present at the entrances, window sills, and horizontal belt courses. A large sheet metal fascia extends around the building perimeter below the flat hip roof, while a decorative wood cornice is exposed on a lower roof area on the north facade. Dormers are present on the north and south facades of the original building portion, which are clad in wood and slate shingles. A small corrugated sheet metal area is present on the exterior wall above the kindergarten alcove located above the boiler room. Decorative sheet metal water tables are present above the west and south entrances. Limestone, clay tile, and sheet metal copings are present within the north building additions. Aluminum replacement windows were set within the original wood window frames, though the aluminum components are now largely missing due to vandals. The entrances consist of conventional steel doors.

The main flat hip roof has asphalt shingles along the building perimeter and a low slope, internally drained roof at the interior of the building footprint that appears to consist of a smooth surfaced bituminous built-up roof (BUR) with an aluminum coating based on a review of aerial photographs. The lower roofs to the north generally consist of internally drained, bituminous built-up roof (BUR) assemblies with slag surfacing and granulated cap sheet base flashing.

The roof structure in the original building is composed of wood decking supported by wood rafters supported by wood beams, trusses, columns, and other "stick" framing methods conventional for wood structures of this vintage. The wood-framed trusses and rafters are supported by load bearing masonry walls. The floor framing of the original building consists of wood decking supported by wood joists. The powerhouse framing is cast-in-place concrete slabs and columns with multi-wythe masonry walls. The 1962 addition has two distinct structures: the east half consists of hollow core concrete planks supported by concrete masonry walls and the west half consists of long-span metal deck and concrete topping slab supported by steel beams, which are in turn supported by steel columns set within the concrete masonry walls.

In general, the building is in fair condition. Masonry repairs are recommended to address distress caused by corroded steel lintels and damage from vandalism. The windows and exterior doors are missing or significantly damaged and require replacement. The roofing is generally in good, serviceable condition with minor maintenance-type repairs recommended within the majority of the roof areas, though the roof over the 1962 gymnasium addition is in poor condition and is recommended for replacement. Overall, the structure is in good condition; this is likely attributed to the good condition of the roofing. However, there are five locations that are permitting water intrusion into the attic which is leading to decay of the framing members, and if not corrected, advancement of this deterioration could develop into significant structural

problems. The finishes are damaged especially within the vicinity of the roof leaks. Further detail of the observed distress is provided below.

## Facade

Corrosion of the steel window lintels is present throughout the building, with some lintels exhibiting significant section loss and pack rust. Sealant has typically been applied between the steel and brick, which may slow moisture from exiting the wall assembly and accelerate corrosion of the steel given that the protective coatings of the steel have failed. The surrounding brick masonry is cracked and displaced in some locations, with significant bowing and displacement observed within the north powerhouse and gymnasium additions. Repairs should include repair or replacement of the distressed brick masonry and repair or replacement of the distressed steel lintels with installation of appropriate through-wall flashing details.

Beyond distress at the lintels, isolated limestone sills are cracked and require repair. Coping units are missing from several of the lower roof areas with roof base flashings pulled away from the masonry substrates. This condition is allowing water penetration into the wall assembly and interior spaces below. The corresponding brick masonry parapets are deteriorated, including areas of cracked and spalled masonry, which requires replacement. Common brick is present at the base of the facades with a surface-applied parge coat. In some regions, particularly at the failed downspouts, the parge coat material is unsound or missing. The exposed masonry contained localized areas of mortar deterioration and spalled brick units, which require repair. Localized cracks are present within the brick masonry chimney, which require repointing and isolated brick unit replacement.

The perimeter sheet metal fascia at the base of the hip roofs is in serviceable condition, though it may be concealing distress within the underlying masonry and/or wood cornice. Where the wood cornice is exposed at a lower roof level on the north facade, peeled paint and water staining are present and localized regions appear decayed. The decorative sheet metal water tables above the entrances are bent, with corrosion staining visible near the skyward surfaces. Further investigation is needed to determine the presence and condition of concealed elements below the fascia in conjunction with the restoration of the decorative wood and sheet metal elements.

The dormers are deteriorated and require repair. Some of the flashings and cladding materials have been removed, exposing the wood sheathing below. The exposed sheathing and wood framing elements, where visible through the sheathing, are decayed in some regions. The wood soffit on the south dormer contains cracked and peeling paint. The louvers on the north dormers are damaged. Restoration of the dormers should be considered in conjunction with the roofing repairs to mitigate additional points of water infiltration and preserve these aesthetic elements.

The aluminum replacement windows are missing and the exposed original wood-framed window frames are significantly decayed, damaged, or missing. The exterior doors are also significantly damaged or are missing. Rehabilitation of the building should include replacement of all windows and exterior doors.

## Roofing

The asphalt shingle roofing within the hip roofs is generally in serviceable condition, though localized regions of displaced flashing and shingles are visible, which generally correlate with observed locations of

structural wood decay below. Several downspouts are missing or damaged, though the surrounding masonry does not show evidence of distress. The upper flat roof was not accessed during our assessment, but based on the limited evidence of water intrusion within this area, the roof appears in serviceable condition. Minor maintenance-type repairs are anticipated within these roof areas to extend the service life of the existing assembly in conjunction with replacement of the missing and damaged downspouts.

The lower low-slope roof areas on the north side of the building have been damaged by vandals. Several coping units have been removed and the base flashing is pulled away from the masonry substrate. Organic growth and vegetation are present on the roof surface in portions of the field of the roof and near failed drains. Cracking and seam failures were present in areas of intact base flashing, and some regions above the 1961 gymnasium addition were soft underfoot. The perimeter walls are distressed due to water penetration through the damaged roof into the wall assembly. Evidence of water penetration is also present within the gymnasium roof structure, which correlates with regions of failed base flashing and failed roof drains. Localized water related distress is present in the south bay of the boiler room, though the remaining mechanical spaces were dry. Based on the extent of distress, the roof above the 1961 addition is recommended for removal and replacement. Localized repairs are recommended within the other lower roof areas to extend the service life of the existing assemblies.

## Structure

There are approximately five locations that are permitting water intrusion into the wood-framed attic which is leading to decay of the framing members. These locations are typically at the transition from the low slope roof to the steep slope roof. One location is due to a missing roof access hatch. The water intrusion has caused damage not only to the wood decking, but also to some of the heavier supporting framing members, columns, and sill plates. Repairs are warranted to stop the water leaks and restore the wood framing. If left uncorrected, the decay which has initiated could advance and become a significant problem with regards to structural strength and/or serviceability.

The gymnasium is constructed partially below grade. Efflorescence and water intrusion are present near base of west exterior wall. The adjacent wood flooring on the gym is also saturated likely from the moisture intrusion at the base of the wall. Additionally, there is also horizontal line separation in the concrete masonry back-up that may be indicative of a structural concern or simply corrosion of horizontal joint reinforcement. We recommend that the west wall be investigated further to determine if there is a significant structural concern. A new waterproofing system may be required along this wall to address the water infiltration.

In the gymnasium, corrosion is present on three areas of the long span metal deck and slab systems<sup>1</sup> in two areas. One location occurs at a roof drain and the other two appear to be related to roof leaks. The locations away from the roof drain are also causing surficial corrosion of the supporting steel beams. Corrosion of the metal deck is not a structural concern if it was used as a form deck but could be a minor structural concern if is behaving compositely with the concrete. Additional investigation would be required

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<sup>1</sup> Initial review of the 1950s-1960s era long span metal deck system indicates the decking is acting non-compositely with the concrete slab, and that the decking was used as a stay-in-place form for the cast-in-place concrete. However, a non-technical, marketing brochure from this era was noted to advertise the decking as a "composite" concrete floor system.

to determine if the deck is composite. At a minimum, the exposed steel is recommended to be cleaned and re-coated with a rust inhibiting paint as part of the rehabilitation effort. Further investigation into the condition of the structure above the corroded metal ceilings is recommended; additional localized repairs may be identified as needed pending the results of such an investigation.

Two of the steel lintels at wall openings in the basement are corroded. It is appropriate to clean and recoat the exposed steel.

The underside of the concrete floor slab above the boiler rooms and fuel room is generally in good condition and the paint is typically intact. However, the very south bay of the north boiler room is saturated and has considerable concrete distress including cracks, spalls, and corroded steel reinforcement that is partially exposed. We recommend an investigation to determine the cause of the water intrusion in the one affected bay in the boiler room and to further assess the condition of the concrete. At this time, we anticipate that structural concrete repairs will be necessary, and may include supplemental reinforcing steel. The repairs should be coordinated with roofing and facade work.

The southwest corner of Room 102 (the old gymnasium) has an active leak that has saturated the concrete and corroded the metal pan in the joist-slab in the floor framing above. The cause of the leak is not known and should be investigated and corrected. Localized concrete repairs may be needed to address the deteriorated condition of the affected joists and slab.

The masonry walls around the stairs in the fuel room have wide step cracks and cracked brick units. Similar cracks are present at the demising wall at the north end of the east wall of Room 101. The cracks may be due to differential settlement and do not represent a significant structural concern. We recommend that the cracks be repointed with new mortar. If cracks redevelop, then it would be prudent to investigate the cause of the cracks.

## **Miscellaneous**

The interior finishes typically consist of plaster on wood lath on the walls and ceilings with hardwood flooring or vinyl composite tiles on the floors. Long term exposure to water has damaged these finishes and a large portion of the finishes will require replacement.

A small fire has damaged the west end of the auditorium stage affecting the stair and stage floor framing. We recommend replacing the damaged framing.

Some localized masonry infill areas and partition walls are damaged from vandalism during the removal of plumbing and heating elements. Repair of these partition walls is recommended as appropriate for potential new use of the spaces.

At one entrance, the concrete sidewalk has settled several inches. At another entrance the concrete sidewalk has settled and the granite step is cracked and heaved. We recommend replacing the sidewalk approaches to eliminate these tripping hazards and provide code-complaint entrances. The granite steps can be reset.

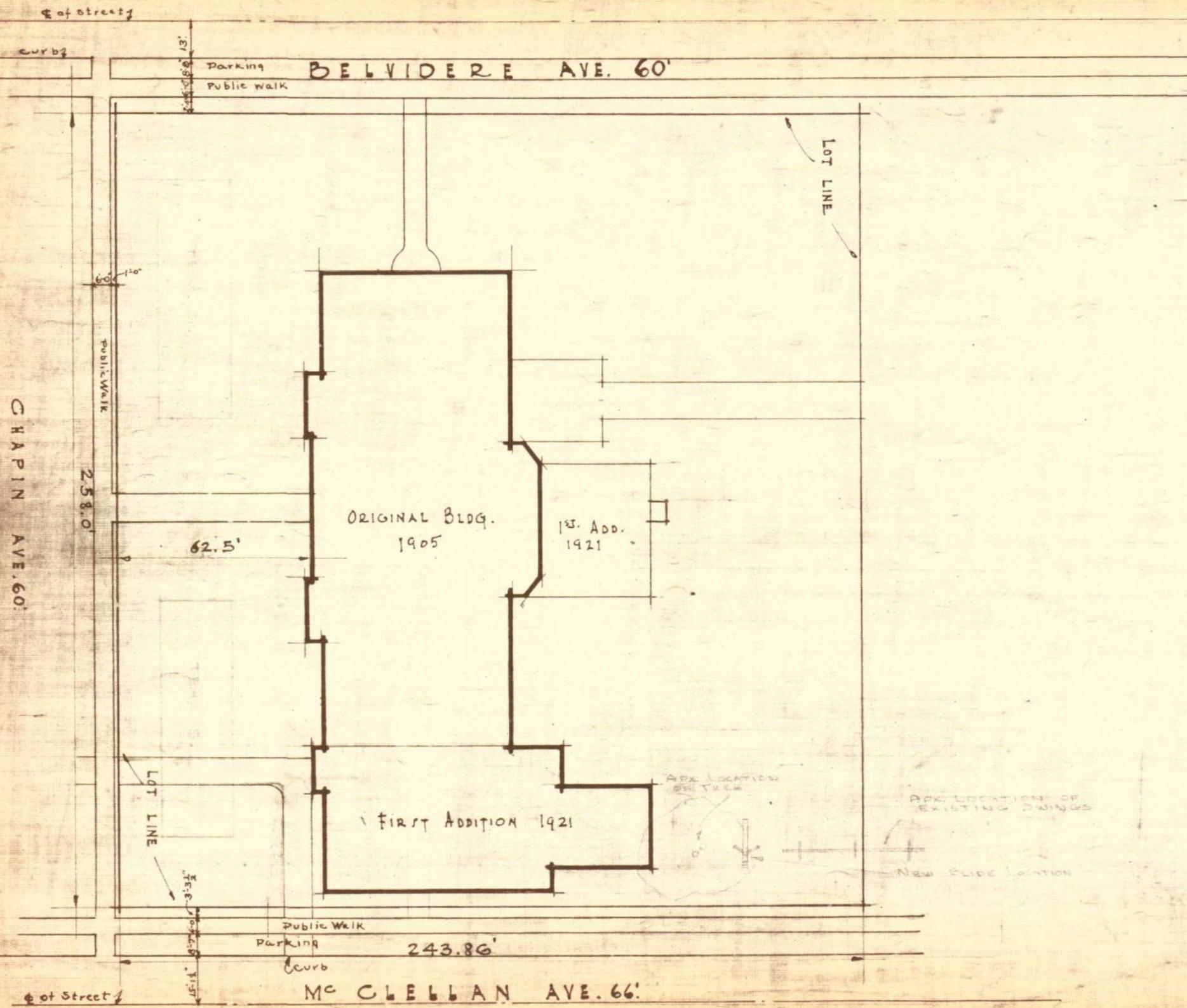
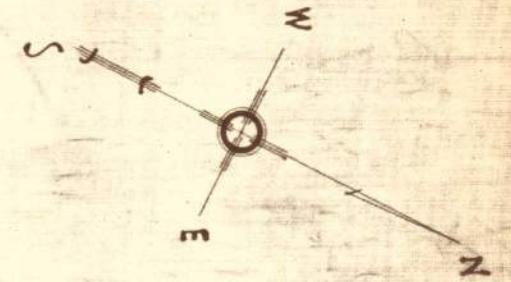
# Z. CHANDLER SCHOOL

DETAIL OF SITE  
SCALE 1"=40'-0"

DEPARTMENT OF ARCHITECTURAL ENGINEERING  
DETROIT BOARD OF EDUCATION  
DETROIT MICHIGAN

DRAWN	DATE	TRACED	DATE	CHECKED	DATE
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BUILDING CONSTR.	1905	1921
FIRST ADDITION		BRICK WALLS WOOD FLOORS BRICK WALLS - CONC. SLAB



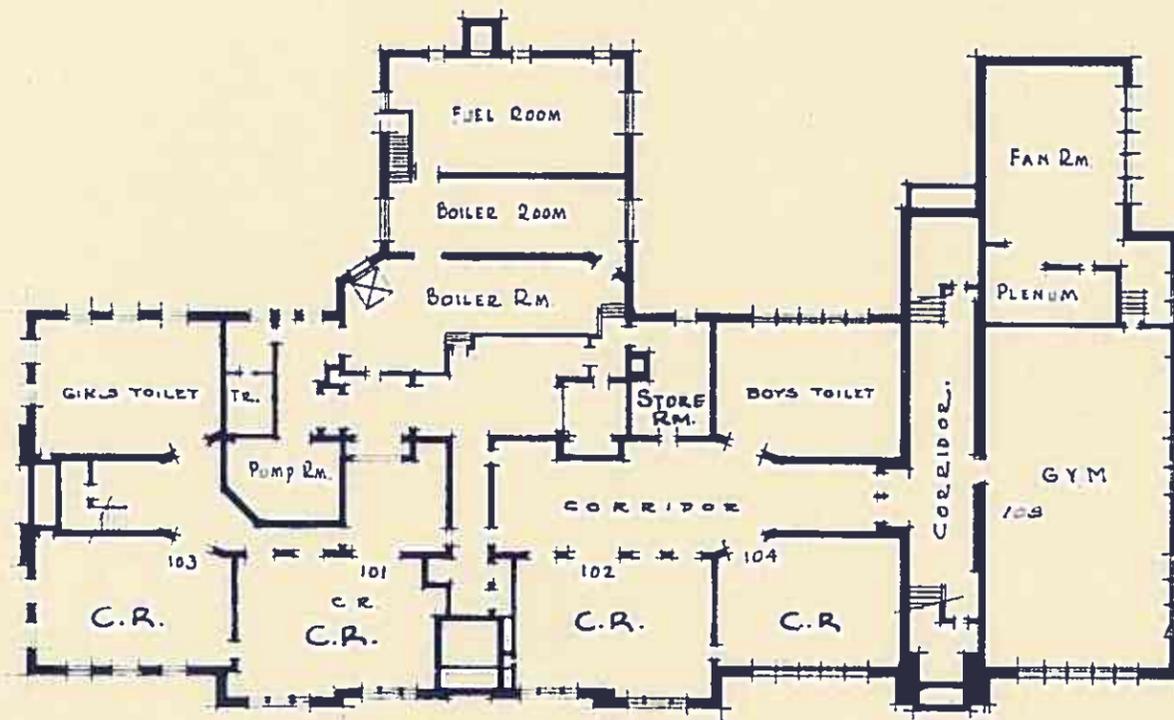
Scale 1"=40'

Z. CHANDLER SCHOOL  
 BASEMENT PLAN  
 SCALE  $\frac{1}{32} = 1'-0"$

DEPARTMENT OF ARCHITECTURAL ENGINEERING  
 DETROIT BOARD OF EDUCATION  
 DETROIT MICH.

DRAWN	DATE	TRACED	DATE	CHECKED	DATE
b.	12-31-20	h.	12-31-20		

CORRECTED 29 AUG 58

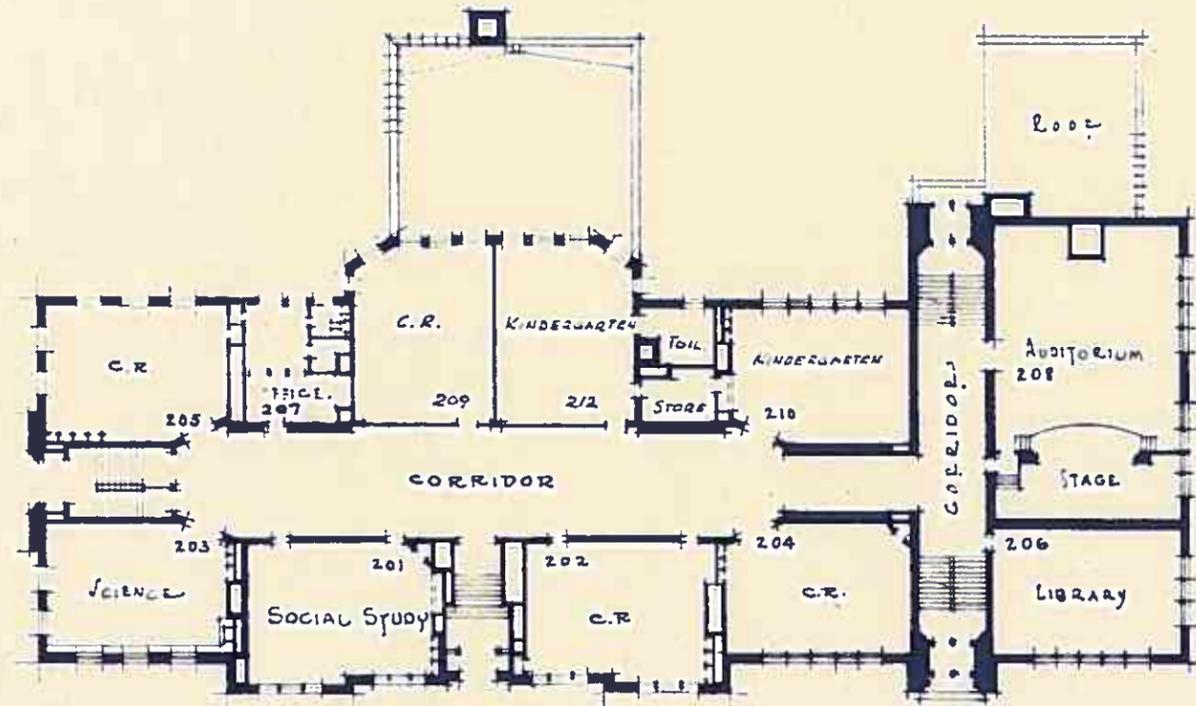


BASEMENT PLAN  
 scale  $\frac{1}{32} = 1'-0"$

**Z. CHANDLER SCHOOL**  
**FIRST FLOOR PLAN**  
 SCALE  $\frac{3}{32}'' = 1'-0''$

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 DETROIT BOARD OF EDUCATION  
 DETROIT MICH.

DRAWN	DATE	TRACED	DATE	CHECKED	DATE
•••	12-31-20	•••	12-31-20		
BUILDING CONSTR.		1905	BRICK WALLS		WOOD FLOORS



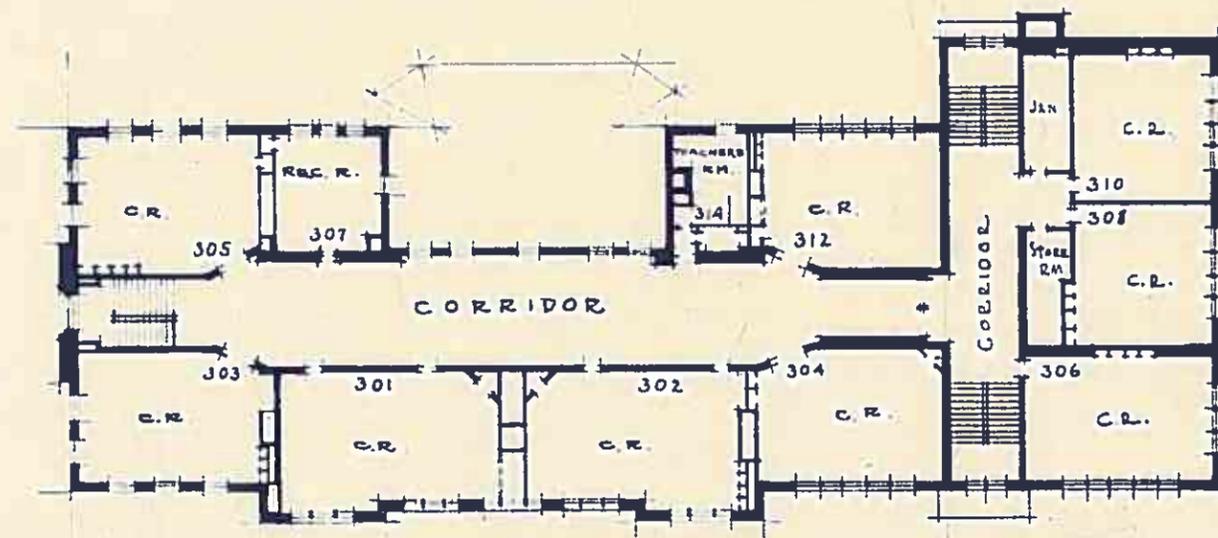
**FIRST FLOOR PLAN**  
 scale  $\frac{3}{32}'' = 1'-0''$

Z. CHANDLER SCHOOL

SECOND FLOOR PLAN  
SCALE 3/32" = 1'-0"

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DETROIT MICH.

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SECOND FLOOR PLAN  
Scale 1/32" = 1'-0"