Existing Conditions Assessment

for the

Dougherty Arts Center

prepared for the

City of Austin
Parks and Recreation Department

15 September 2010

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This Assessment was prepared under the authority of W. Owen Harrod PhD, AIA Texas Registered Architect 16346, in consultation with the Structural Engineer, MEP Engineer, Roof Consultant, and Cost Estimator listed on the report cover page, who are responsible for the content of the appendices prepared by their respective offices. This Assessment does not constitute an Architectural Drawing or Specification. The building drawings contained within this report are derived from record documentation that has not been verified for completeness, currency, or accuracy: these drawings are provided for information purposes only. This report is not intended, in whole or in part, to be used for regulatory approval, permitting, or construction.

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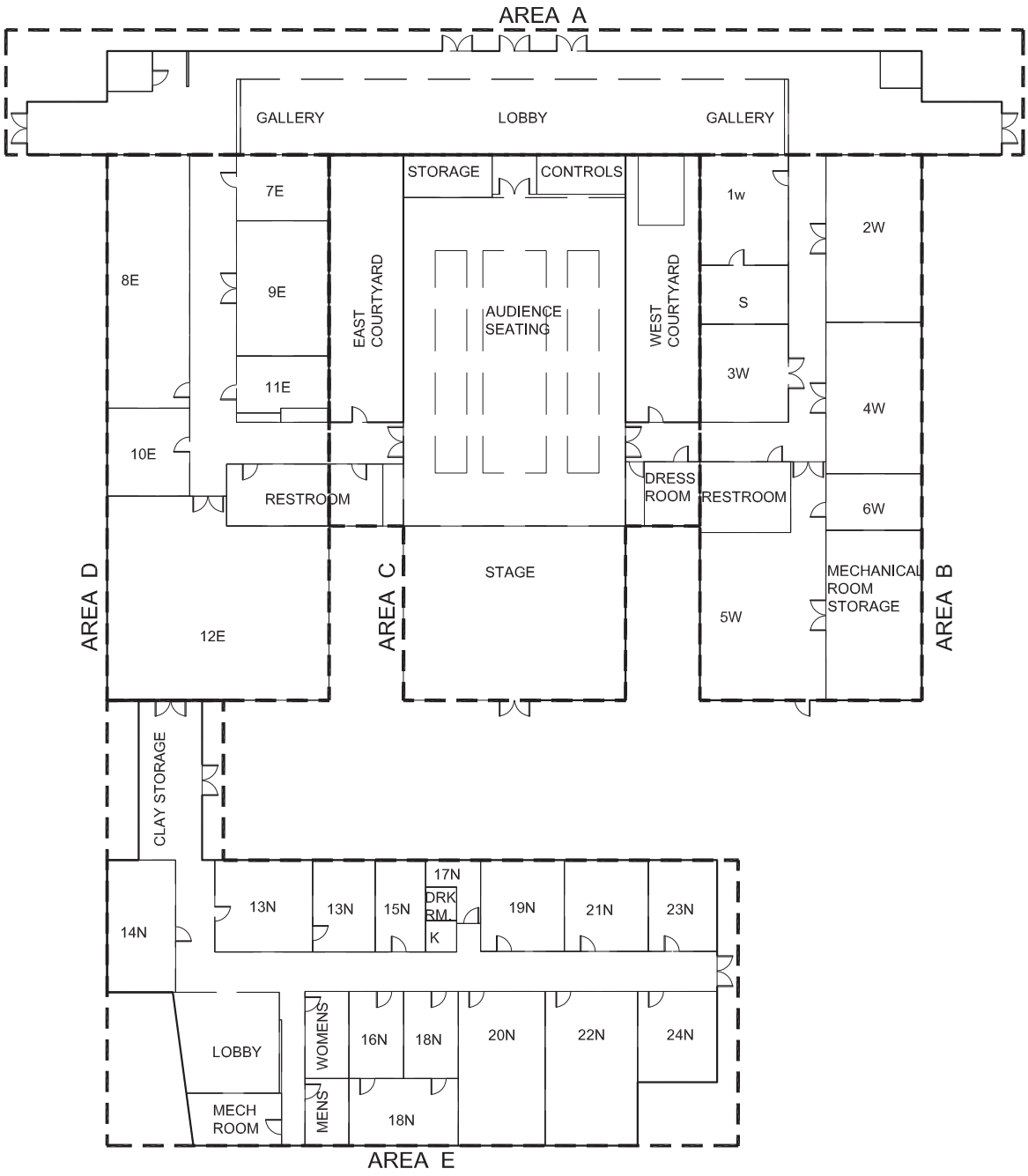

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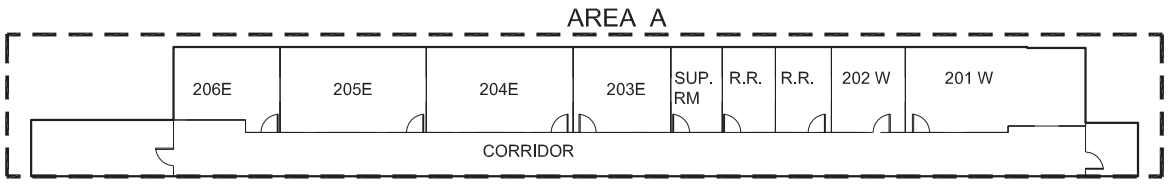

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EXECUTIVE SUMMARY

The existing Dougherty Arts Center building was constructed in 1947 for the Federal Government as a Naval and Marine Reserve Center.

Apart from the installation of the theatre in the late 1970s (Area C, as designated in this assessment) and repairs to the office wing (Area A) following a fire in the early 1990s, the building has never been comprehensively rehabilitated, and remains substantially as originally constructed in 1947: including the presence of asbestos containing wall panels and siding and the potentially widespread presence of red lead anti-corrosive primer. Those components of the original building surviving in their original condition have exceeded their nominal service lives, technically reaching a serviceability limit state, and will require either replacement or comprehensive rehabilitation if the building is to remain in use.

The City of Austin has established objectives for the rehabilitation of the existing Dougherty Arts Center, including a 30-year minimum service life and LEED certification for the rehabilitated building and coordination of the repair program with a list of spatial and functional objectives for the future needs of the facility.[1] However the particular regulatory constraints associated with the existing building and its site render concurrent compliance with all of the City's objectives fundamentally infeasible.

The existing building and its site are located within the FEMA designated 25-year floodplain of West Bouldin Creek. In a 25-year storm event, the building would be deluged and effectively rendered inaccessible to emergency service responders by the inundation of the adjoining roadways to a depth in excess of three feet. Construction of a new building on the site of the Dougherty Arts Center would be prohibited by current code, which will also severely limit the extent of any rehabilitation of the existing building. No "substantial improvements" to the existing building, as defined by the building code, would be permitted in order to ensure that no proposed rehabilitation would result in either an increase in the existing risk to public health and safety posed by the building itself, or an increase in the corresponding risk to property. Accordingly any permissible rehabilitation would by code have to include significant improvements to the flood resistance of the building, in terms of both structural design and the elimination of finishes and materials deemed by the Federal Emergency Management Administration (FEMA) to be unduly susceptible to flood damage, such obligatory upgrades not being defined as "substantial improvements".

In addition to the floodplain considerations, the rehabilitation of the existing building will be further constrained by the location of an existing landfill on the site. Although consultation with TCEQ has indicated that the presence of the landfill will not preclude the rehabilitation of the existing building, it will influence the cost and complexity of

[1] The document *Dougherty Arts Center Building Program Needs*, provided to the assessment team by facility staff.

such a project. In addition, it should be noted that the presence of this un-remediated landfill, with its potential impact on indoor air quality, is fundamentally inconsistent with the objectives of the Green Building Council, administrator of the LEED rating system, for any property used for educational purposes.

In fiscal terms, the projected cost for the rehabilitation of the existing Dougherty Arts Center would be on the order of $6,900,000. This sum reflects bringing the building into compliance with current codes and, insofar as possible, the City's stated programmatic objectives. The rehabilitated building would incorporate substantial improvements over the existing building in terms of life safety, comfort, and energy efficiency, but far more limited enhancements to the size, configuration, and character of the existing facilities. In addition, the rehabilitated building would retain the inherent liabilities of the existing facility, relating both to the un-remediated landfill and to the susceptibility of the building to flood damage. The same mathematical models predict a cost on the order of $6,600,000 to build an entirely new building of the same total area, and containing the same functional elements, as the existing Dougherty Arts Center[2].

[2] This price includes the cost of site work (site grading, utilities, parking, pedestrian and vehicle circulation, etc.) for the hypothetical new building, but not for the existing building, for which no such expenses would be required. All of the cost projections referenced in this assessment include only direct construction costs (including contractors' bonds, insurance, and overhead), not soft costs associated with project management, design, permitting, commissioning, testing and inspection, or financing. The cost projections likewise do not include such expenses that may need to be accommodated in a future project budget but which cannot be projected in the absence of a defined project scope, including potential costs associated with the disposal or repurposing of the existing facility or potential land acquisition costs.

INTRODUCTION

The following is a summary assessment of the existing Dougherty Arts Center, organized in terms of the disparate areas of the present building, as defined in terms of their structural independence. The assessment considers the geometric compatibility of these building areas with the programmatic requirements provided to the design team by the City of Austin, including the summary *Dougherty Arts Center Building Program Needs*, and the amendments necessary to bring the existing areas into compliance with applicable codes in the context of the proposed program.

A structural assessment of the existing building prepared by Structures, Inc. is included in this report as Appendix A.

A mechanical, electrical and plumbing assessment of the existing building prepared by Encotech, Inc. is included in this report as Appendix B.

A roof assessment of the existing building prepared by Amtech Building Sciences, Inc. is included in this report as Appendix C.

A cost projection outlining, on the basis of parametric cost data, the projected costs associated with the accommodation of the City of Austin's program in accordance with prerequisite project criteria including the achievement of the minimum 30-year service life for the renovated buildings, and the achievement of LEED certified rating for the project in compliance with applicable codes and ordinances prepared by Project Cost Resources, Inc. is included in this report as Appendix D.

The findings of the structural; mechanical, electrical and plumbing; and roofing assessments; and the cost projection are incorporated into the CONCLUSIONS and RECOMMENDATIONS sections of this report.

References in this report to environmental conditions pertaining to the existing building, including identification of hazardous materials, were compiled from documentation provided by the City of Austin that may not be complete, current, or accurate.

GENERAL BUILDING DESCRIPTION

The Dougherty Arts Center, located at 1110 Barton Springs Road, was built in 1947[3] as a Naval and Marine Reserve Center (Naval Reserve Armory). Historical photographs from the late 1940s, correlated with observations of the existing building fabric, confirm that the Dougherty Arts Center has not been substantially modified since its original construction, although repairs and localized modifications (as described below) have occurred.

The design of the Naval and Marine Reserve Center consisted of a two-story masonry-clad headhouse, three interconnected metal wings, and a single story masonry-clad classroom building. Comparison with other Reserve buildings constructed after the Second World War suggests that, as would be expected, many elements of the present Dougherty Arts Center reflect the military standards applicable to its original construction. The two-story headhouse (identified as Area A in the following report) may be a project specific design[4], or at least a project specific adaptation of a standard design. The somewhat incongruous classroom building (Area E) certainly seems to be unique, its configuration derived from the characteristics of the site. The three projecting metal-clad wings certainly are not. These wings (identified as Areas B, C and D in the following report) are standard military warehouse buildings, substantially identical to thousands of similar prefabricated buildings manufactured during the Second World War.[5] These prefabricated buildings, immortalized as "Butler Buildings" in military lore – although Butler was not the only manufacturer to supply them – were 40' wide and utilized a 20' structural bay (allowing the construction of larger or smaller buildings from the same basic components). Those at the Dougherty Arts Center have five such structural bays, as clearly visible from the pattern of the windows on their exteriors. In all likelihood the metal wings of the Dougherty Arts Center were fabricated under a wartime contract, and were used in the construction of the Naval and Marine Reserve

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[3] This date was provided by the City of Austin. Other City of Austin documents cite a date of 1941 for the construction of the building. The architectural design of the existing building, a comparison with other Naval Reserve facilities, and a review of the existing fabric, appear to conclusively substantiate a post-war date of construction. A detailed historical analysis of the building was not within the scope of the present assessment, and is not strictly relevant to the present report. Nevertheless such an analysis may indicate the phased construction, or reconstruction, of the building during the 1940s, necessitating the refinement of the presumed date of the start of construction. It is known from photographic evidence, however, that as of 1948 the building appeared to have been newly completed in its present configuration.

[4] That the headhouse may be unique to Austin is suggested by stylistic and material similarities to contemporary local projects, including specifically the bathhouse at Barton Springs, built in 1947.

[5] For example Building N127 at Moffet Field in California, which was erected in 1950 from six standard 4,000 (nominal) sf metal warehouses, rather than the three 4,000 (nominal) sf metal buildings used in Austin.

Center simply because they were available (having already been paid for and stockpiled by the Federal Government). This expedient is known to have been adopted in other post-war reserve facilities, including the Naval Reserve Center in Jackson, Mississippi.

As a military facility, the Naval and Marine Reserve Center in Austin was presumably built in compliance with federal standards, rather than local codes.

After the Naval and Marine Reserve Center was rendered redundant, the building was obtained by the City of Austin in the mid 1970s for use as an arts center. The conversion of the existing building evidently involved only limited modifications to the 30 year old fabric, which was apparently retained wherever possible. In 1978 the building was named for the philanthropist Mary Ireland Graves Dougherty, becoming the Dougherty Arts Center.

The two-story portion of the building was damaged by a fire in the early 1990s, and subsequently rebuilt.

In addition to the Dougherty Arts Center building itself, there is a five-bay garage building existing on the site. This building is known to have been constructed prior to 1948: its location and alignment suggest it was built together with the Naval and Marine Reserve Center. Insofar as the *Dougherty Arts Center Building Program Needs* provided by the City of Austin does not address the garage as an element of the Dougherty Arts Center, this building was not considered in detail within this assessment, in or included in the cost projections for the rehabilitation of the existing facility.

ARCHITECTURAL ASSESSMENT

Building Area:	A (two-story masonry office block, historically identified as south wing, front wing, head house)
Gross Building Area:	~6,400 sf
Date of Construction:	1947
Prior Occupancy (2003 IBC):	A-1 Presumed (Assembly)
Proposed Occupancy (2003 IBC):	A-1 Presumed (Assembly)

Programmatic Considerations: The existing Building Area A was apparently designed, in terms of building area, clear heights, orientation, and configuration with the programmatic requirements for its intended use as administrative offices for the 1947 Naval and Marine Reserve Center. This Area was remodeled in 1990 under A.M.D. Project Number 89-15. The scope of work for this project included "construction of new partitions, painting, roofing, siding, wainscot material, floor joists, doors and frames, wood flooring, and gypsum board materials… installation of mechanical, electrical items, toilet facilities and one elevator."[6]

The second floor of this building area is presently utilized for administrative offices, in accordance with its original design. Although the continued use of the second floor of Area A for this purpose is a practical proposition, such a use is objectively conspicuously inefficient in light of the very narrow width of this building area, permitting only a single-loaded corridor.

There are presently six offices existing on the second floor (in addition to rooms used as offices in Areas B, D and E). Facility staff project a need for 16 total offices, accommodating 26 employees. The present number of offices is insufficient for this need. In addition the distribution of offices throughout the building is inherently inefficient. Concentration of offices in a single location, where programmatic requirements allow, permits the effective use of common ancillary spaces, including toilets; break areas, storage closets, and workspace for administrative staff.

The ground floor of Building Area A is used as an exhibition gallery (the Julia C. Butridge Gallery), building vestibule, theatre lobby, and corridor.

The existing building contains sufficient area to accommodate the present program elements utilized by the City, although the layout, (natural) lighting, and environmental controls of the ground floor gallery, in particular, are less than satisfactory. The area of the existing gallery, approximately 2,500 sf, is appreciably smaller than the 5,000 sf of gallery space desired by facility staff, and absent the supporting facilities (most

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[6] *Project Manual: City of Austin Dougherty Arts Center Renovations Project: Phase II.* Sinclair Black and Andrew Vernooy, Architects. September 1990.

pressingly preparation and storage space and installation infrastructure) required for its effective use in accordance with relevant standards such as the Texas Association of Schools of Art *Exhibition Space Recommendations*. The location of the gallery within a floodplain (see REVIEW OF FLOODPLAIN CONSIDERATIONS, below) is a matter of particular concern.

Code Compliance: A detailed description of building code issues relating to the rehabilitation of the Dougherty Arts Center is provided under REVIEW OF APPLICABLE CODES, below. The following summary addresses specific code issues relevant to Area A.

The construction of Area A appears generally consistent with Type IIIB, as defined by the *2003 International Building Code* (IBC), although wood framing, of unknown fire resistance, is known to exist in this building area. Area A has no fire sprinkler system and contains no occupancy or area separations. In accordance with 2003 IBC 302.3.1, insofar as the differing occupancies contained within the Dougherty Arts Center as a whole are not provided with code-compliant occupancy separations per 302.3.2 the building shall be subject to the height and area limitations associated with the most restrictive occupancy classification applicable to the building. With respect to the Dougherty Arts Center, this would be the A-1 classification associated with the theatre. The maximum nominal building area permissible under current code for an unsprinklered building of Type IIIB construction is 8,500 sf per IBC Table 503. The existing building, with a total area in excess of 26,000 sf, is conspicuously larger than would be permitted for a comparable new construction under current code.

Building Area A was not designed in compliance with regulations enacted subsequent to its construction, including specifically LDC 25-2 Subchapter E and the *Texas Accessibility Standards*,[7] although the accessibility of this Area was improved during the 1990 remodel project. Nevertheless the Condition Report and Recommendations prepared for the Dougherty Arts Center in 1998[8] notes that the "second floor restrooms [in Area A] are nearly compliant, but they lack the full clearances within stalls for wheelchair maneuvering. It would require major wall movement to bring these into compliance."

[7] The preparation of this report did not include a comprehensive accessibility audit of the existing site. Based on the limited documentation provided to the project team, as substantiated by visual observations of the site, comprehensive incidental accessibility improvements should be anticipated in the context of any proposed renovation of the existing buildings, on the order of replacement of existing door hardware and sills, installation of toilet room grab bars, signage, etc.. Only accessibility improvements having a significant impact on project costs or space allocations, such as the installation of ramps or elevators, are individually noted in this report.

[8] *Dougherty Arts Center Condition Report and Recommendations*. Amtech Roofing Consultants, Inc. 29 September 1998.

Shell: The exterior cladding of Area A consists of ashlar veneer and cement plaster (stucco) as originally constructed in 1947. Both the ashlar and the stucco exhibit pervasive cracking, failures already noted in the 1998 Condition Report. "Cracked stucco on the front wing is admitting water to the interior of these masonry walls and appears to result in not only rain entry, but is also the source of entry for raccoons and other small animals… stress movements in the building are the likely cause of these cracks and it may be best to consider other materials which are not as subject to damage due to structurally related building movement."[9] These materials were not replaced in response to the 1998 report, and cracking, evidence of water infiltration, and rodent infestation continue to affect Area A.

The plaster surface of Area A were not installed in accordance with the current standards of the Portland Cement Association, as codified in the *Portland Cement Plaster/Stucco Manual* per ASTM C1063, *Standard Specification for the Installation of Lathing and Furring to Receive Interior and Exterior Portland-Cement Based Plaster*. The absence of control joints as recommended by these publications is likely contributing to the stressing and fragmentation of the stucco veneer.

The north wall of Area A was noted as being clad with asbestos slate shingles in the 1998 Condition Report. The Report does not state that these shingles were tested and confirmed to contain asbestos, although their dimensions, configuration, and surface finish are consistent with transite shingles in common use in the 1940s. These have not been abated, and remain in place. The Condition report noted that such shingles "become friable when disturbed". They are presently overgrown with vines (as in the courtyard between Areas C and D), which have rooted into the transite.

The windows on the second floor of Area A are wood vertically-sliding sash units with single panes of clear float glass. These windows are not clad, and are painted inside and out. The condition of these windows, which generally appear to remain economically serviceable, suggests that they were installed during the 1990 remodeling project, and are not original to the building. Observations of the exterior of the building indicates that maintenance of these wood windows has been inconsistent. The exterior casing displays pervasive evidence of water damage to the wooden members, including exposed nail heads, separated joints, and rot, due to inadequate maintenance of the protective paint.

The doors and windows at the main entrance to Area A are also unclad wood units. These appear to consist of both elements original to (or approximately contemporary with) the 1947 construction and more-recent replacement components. As with the second floor windows, those at the main entrance appear to remain economically serviceable, at least in the short term. The older portions of these windows (specifically the transoms above the entry doors) exhibit signs of water damage and differential movement, as well as indications of past repairs (e.g. the excessive thickness of glazing

[9] Ibid.

putty at each of the individual transom lites) suggesting, in the context of the presumed age of the windows, approaching the end of their economically serviceable lives.

Interiors: The interior configuration of the Area A reflects the 1990 reconstruction of this area to serve its present (and projected future) use.

The second floor is subdivided into individual offices by partitions of unknown construction. The finish materials, gypsum wallboard, 2x4 acoustical ceiling tiles, carpet, VCT, flush wood doors, are typical of contemporary office construction. These materials exhibit pervasive evidence of problems with the integrity of the building envelope, from widespread staining of ceiling and floor finishes to delamination of VCT (in the copier area) and carpet (Rooms 201W, 203E) to mechanical damage to ceiling tiles (Room 203E)[10]. The second floor finishes remain usable, at least in the short term. The gypsum wallboard and doors appear to remain generally serviceable. The carpet, VCT, and ceiling tile are in generally poor condition, and can be considered to have exceeded their economically serviceable lives.

The ground floor gallery is the largest volume in Area A, occupying most of the first floor. Although the configuration of this long, narrow space, which simultaneously serves as gallery, vestibule, lobby, and corridor, is less than ideal for its current functions, the fabric of this room (VCT floor, gypsum walls and ceiling) appears to be generally serviceable. The conspicuous irregularity of the tile floor, which indicates both delamination and cupping of individual tiles and telegraphing of differential movements of the underlying slab (particularly at the presumed location of slab control joints where no corresponding joints were provided in the tile), attests to the approaching economic unserviceability of the tile installation.

The stairs at the east and west ends of Area A are enclosed in masonry (CMU and site-cast concrete shafts). Both locations exhibit evidence of apparent differential movement of the shaft enclosures and the adjacent building. The existing handrails do not comply with IBC 1009.

Special Construction and Demolition (Hazardous Materials): The presence of asbestos cement shingles on the north wall of Area A is noted above. The treatment of this material in older buildings is addressed on behalf of the Secretary of the Interior in the series of Technical Preservation Service articles, as follows: "According to the EPA, a material containing asbestos is deemed potentially hazardous only in a friable state, which means when it can be crumbled, pulverized, or reduced to a powder by hand pressure. Asbestos-cement is not considered friable, and therefore not hazardous, because the cement binds the asbestos fibers and prevents their release into the air under normal use conditions. However, asbestos-cement products are classified as

[10] It is not immediately evident whether this damage resulted from improper maintenance or differential movement: evidence of both potential causes can be seen elsewhere in the building.

friable when severe deterioration disturbs the asbestos or mechanical means are used for chipping, grinding, sawing, or sanding, therefore allowing particles to become airborne."[11] Testing of this material was not included in the scope of the present report. However it should be noted that the present growth of vines on the north wall of Area A is resulting in mechanical damage to the shingles, potentially reducing them to a friable state.

Evidence of water infiltration was evident throughout Area A.

Area A is known to be inhabited by rodents and other pests. Observation of the building envelope indicated multiple discontinuities in the building skin permitting free ingress of vermin.

Special Construction and Demolition (LEED): The greatest opportunity for the accrual of LEED points for the renovation of the existing building Area A appears to be in the context of energy performance. Given the inherently poor performance of the existing building envelope, which includes unshaded, single-glazed windows and (where observable) poor envelope insulation, significant improvements should be feasible. However the code constraints discussed elsewhere in this report may preclude truly optimizing the energy performance of the building envelope.

LEED credits associated with materials and resources and indoor environmental quality are certainly eminently achievable in the context of the rehabilitation of Area A.

[11] Amy Lamb Woods. *Keeping a Lid on It: Asbestos-Cement Building Products*. Presented at Preserving the Recent Past 2 Conference, Philadelphia, 2000 and available July 2010 on the TPS website http://www.nps.gov/history/hps/tps/recentpast/prparticle.htm.

Building Area:	B (single story metal building, historically identified as west wing, spline)
Gross Building Area:	~4,400 sf
Date of Construction:	1947
Prior Occupancy (2003 IBC):	A-1 Presumed (Assembly)
Proposed Occupancy (2003 IBC):	A-1 Presumed (Assembly)

Programmatic Considerations: The existing Building Area B was designed, in terms of building area, clear heights, orientation, and configuration, as a component of the 1947 Naval and Marine Reserve Center.

Building Area B is presently used as classrooms. Facility staff project a need for a total of 15 classroom/studios, each appropriately sized for 15 students. The appropriate size for such a studio is between 800 sf and 900 sf, in accordance with applicable standards.[12] There is only one existing studio at the Dougherty Arts Center that is appropriately sized for this number of occupants (Room 12 E in Area D).

None of the existing classroom/studios in Area B (Rooms 2W, 4W and 5W) is appropriately sized for its current use, on the basis of the program information provided by the City. In addition, all of these classroom/studios retain the original windows of the Naval and Marine Reserve Center: none have been provided with fenestration appropriate to their use (e.g. properly oriented windows and skylights for drawing or painting studios; shaded windows for animation, filmmaking, and computer graphic studios; and no windows at all for darkrooms and acting studios).

Code Compliance: A detailed description of building code issues relating to the rehabilitation of the Dougherty Arts Center is provided under REVIEW OF APPLICABLE CODES, below. The following summary addresses specific code issues relevant to Area B.

The construction of Area B appears generally consistent with Type IIB, as defined by the 2003 IBC, although some wood framing is known to exist in this area. Area B has no fire sprinkler system and contains no occupancy or area separations. In accordance with 2003 IBC 302.3.1, insofar as the differing occupancies contained within the Dougherty Arts Center as a whole are not provided with code-compliant occupancy separations per 302.3.2 the building shall be subject to the height and area limitations associated with the most restrictive occupancy classification applicable to the building. With respect to the Dougherty Arts Center, this would be the A-1 classification associated with the theatre. The maximum nominal building area permissible under current code for an unsprinklered building of Type IIIB construction is 8,500 sf per IBC Table 503.

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[12] The International Building Code presumes 50 sf per occupant for an art classroom (classified as a "shop or other vocational area", the AISD Educational Specification Standard for a high school art classroom (a classroom accommodating facilities comparable to those desired by Dougherty Arts Center Staff) requires 60 sf per student.

Building Area B was not designed in compliance with regulations enacted subsequent to its construction, including specifically LDC 25-2 Subchapter E and the Texas Accessibility Standards.[13]

Shell: The exterior cladding of Area B consists of metal panels described in the 1998 Condition Report as having "leaked enough to cause deterioration of the interior wood framing members supporting the interior wainscot. The external metal wall surfaces are rusted, bent, and damaged to the point that salvaging is not an option."[14] There is no evidence of comprehensive maintenance of the metal panels occurring between 1998 and 2010. There is pervasive evidence of failure throughout the cladding of Area B, including multiple locations where panels can be seen to have been penetrated by continuing oxidation (rusting), as well as widespread evidence of water infiltration.

The existing building skin of Area B (metal panels with exposed fasteners) is generally projected to be at best a 30-year system, although present manufacturers' warranties for the weather-tightness of comparable installed systems seldom exceed 20 years. The metal cladding of the Dougherty Arts Center is at least 63-years old as of 2010, and may be still older if fabricated under a wartime contract. This material has exceeded any defensible projection of its reasonable service life, and has remained in use well past its serviceability limit state.

The majority of the windows in Area B appear to be original to the building. The 1998 Condition Report noted "Many of the exterior windows are badly rusted with some unable to close due to broken parts or other problems. Various window panels are broken and have been filled in with a variety of inappropriate products including cardboard and plywood."[15] The photograph of the east wall of Area B that accompanied this comment in the 1998 Condition Report documents that only limited and discrete improvements to the existing windows were made over the following twelve years. The windows in Area B are, essentially without exception, economically unserviceable. In addition to their conspicuously poor present condition, these windows, constructed from non-thermally-broken steel frames single-glazed with clear float glass, with fault prone operators and with gaskets and weather seals long since perished, provide an appalling degree of thermal inefficiency, with a corresponding impact on both occupant comfort

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[13] The preparation of this report did not include a comprehensive accessibility audit of the existing site. Based on the limited documentation provided to the project team, as substantiated by visual observations of the site, comprehensive incidental accessibility improvements should be anticipated in the context of any proposed renovation of the existing buildings, on the order of replacement of existing door hardware and sills, installation of toilet room grab bars, signage, etc.. Only accessibility improvements having a significant impact on project costs or space allocations, such as the installation of ramps or elevators, are individually noted in this report.

[14] *Dougherty Arts Center Condition Report and Recommendations*.

[15] Ibid.

and on energy costs for the building. The poor thermal performance of the existing windows is substantiated by the multiple window air conditioners installed in Area B. These window units were noted in the 1998 condition report as "inefficient and costly to operate."[16] In many cases, the very same window units illustrated in the 1998 report remain in operation in 2010.

The wall panels and windows on the west side of Area B were painted more recently than those on the east side, and were incrementally better protected from the weather as a consequence. This paint is now in poor condition.

Interiors: The interiors of Area B consist of a variety of differing finishes of differing age and provenance. In general, the interior materials within Area B are in poor condition, exhibiting pervasive, and essentially ubiquitous, evidence of water damage.

The 1998 Condition Report noted that the "the loss of every [exterior] surface including the walls, roofs, windows and doors is so extensive that the interior of the building cannot be maintained against water and weather intrusion during construction."[17] There is no evidence to indicate that any actions taken between 1998 and 2010 have materially impacted this conclusion, although it should be clarified that the referenced protection from weather intrusion is not a physical impossibility, but rather an economic one. The present ostensible value of the interiors of Area B that would remain following remediation of asbestos containing materials (see below), the generally poor condition of these materials, and the public health and safety considerations associated with their potential re-use, indicate their removal and replacement with appropriately-specified contemporary materials to be the only fiscally and ethically defensible course of action in any rehabilitation project.

Evidence of water infiltration was evident throughout Area B. A mold report has not been provided by the City of Austin.

Special Construction and Demolition (Hazardous Materials): Portions of Area B were included in a 1990 asbestos abatement project, which identified the removal of "ACM wrapped steam pipe and ACM debris" from this area.

The wainscot in portions of Area B is known to consist of asbestos-containing transite panels.[18] In addition, these panels are known to have been painted with lead based paint.[19]

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[16] Ibid.
[17] Ibid.
[18] The presence of asbestos is documented in the *Scope of Work for Department of Public Works and Transportation Asbestos Abatement Services Agreement: Asbestos and Lead Based Paint Abatement in Support of Life Safety Improvements Dougherty Arts Center* (1998) which identifies the cement fiber board wainscot as containing 50% chrysotile asbestos as confirmed by Environmental Hazard Services L.L.C..

The 1998 Condition Report notes the presence of "red primed steel" throughout the building that may contain lead paint.[20] It is known that during the period when the building was constructed so-called red lead paint (containing lead tetroxide) was in common use as an anti-corrosive coating. The US Navy certainly used paint of this kind throughout the 1940s, although it is unknown whether it was employed in the construction of the Naval and Marine Reserve Center. Limited testing by Environmental Hazard Services L.L.C. in 1998 confirmed the presence of lead based paint on the interior walls of the building (0.035% - 0.45% lead by weight) and on the exterior doors (0.607% lead by weight) where tested, suggesting the presence of such coatings throughout the existing building.

Area B is known to be inhabited by rodents and other pests. Observation of the building envelope indicated multiple discontinuities in the building skin permitting free ingress of vermin.

Special Construction and Demolition (LEED): The greatest opportunity for the accrual of LEED points for the renovation of the existing building Area B appears to be in the context of energy performance. Given the inherently deplorable performance of the existing building envelope, which includes a non-thermally broken metal roof installation; unshaded, single-glazed, non-thermally broken windows; and (where observable) poor envelope insulation, significant improvements should be feasible. However the code constraints discussed elsewhere in this report may preclude truly optimizing the energy performance of the building envelope.

LEED credits associated with materials and resources and indoor environmental quality are certainly eminently achievable in the context of the rehabilitation of Area B.

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[19] Ibid.

[20] *Dougherty Arts Center Condition Report and Recommendations*.

Building Area:	C (single story metal building, historically identified as theatre wing, spline)
Gross Building Area:	~5,000 sf
Date of Construction:	1947
Prior Occupancy (2003 IBC):	A-1 Presumed (Assembly)
Proposed Occupancy (2003 IBC):	A-1 Presumed (Assembly)

Programmatic Considerations: The existing Building Area C was designed, in terms of building area, clear heights, orientation, and configuration, as a component of the 1947 Naval and Marine Reserve Center. A review of the plans of contemporary Naval Reserve facilities with similar plans (e.g. the Naval reserve Center in Jackson, Mississippi) suggests that this Area would have constituted the original drill hall of the facility.

Building Area C is presently used as a theatre and ancillary facilities.

The existing building contains sufficient area to accommodate the present program elements utilized by the City, although accessibility, circulation, and occupancy separation conditions (see below) are less than ideal. The existing Area C is conspicuously inadequate to accommodate the longer-term objectives articulated by Dougherty Arts Center staff, including a 300 seat semi circular theater and a 250 seat black box theater with flexible seating possibilities with appropriately scaled and configured support and ancillary functions. Insofar as there is no possibility for expansion of the Dougherty Arts Center at its present site (see FLOOD CONSIDERATIONS, below), building Area C is clearly insufficient for the projected facility needs.

Code Compliance: Code compliance issues for Area C are generally as per those discussed for Area B (above), with additional requirements pertaining to the use of Area C as a theatre.

According to IBC 303.1:

> Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering together of persons for purposes such as civic, social or religious functions, recreation, food or drink consumption or awaiting transportation. A room or space used for assembly purposes by less than 50 persons and accessory to another occupancy shall be included as a part of that occupancy. Assembly areas with less than 750 square feet (69.7 m2) and which are accessory to another occupancy according to Section 302.2.1 are not assembly occupancies. Assembly occupancies which are accessory to Group E in accordance with Section 302.2 are not considered assembly occupancies. Religious educational rooms and religious auditoriums which are accessory to churches in accordance with Section 302.2 and which have occupant loads of less than 100 shall be classified as A-3.

Insofar as the City of Austin describes the Dougherty Arts Center Theatre as a 150-seat proscenium theatre of 3,700 sf, and given that the area of the Dougherty Arts Center Theatre does not comply with the requirements of IBC 302.2, the theatre must be classified as an A-1 occupancy in accordance with the letter of the code. Any consideration of the theatre as an existing, non-complying condition, would be obviated by LDC §25-11-33.

The present building does not comply with the requirements of IBC table 503 for an A-1 occupancy. Brining the building into compliance with the provisions of the IBC applicable to new construction would have to be a priority of any renovation project. In terms of life safety, various options would need to be considered, including providing fire sprinklers throughout the building or providing occupancy separations between the theatre and educational areas of the facility. In additional, compliance with IBC 410 would be mandated for "all parts of buildings and structures that contain stages or platforms…" Insofar as the requirements of this section are quite stringent, particularly with respect to fire separations between each room appurtenant to the stage (a classification subject to broad interpretation in accordance with the applicability requirements of IBC 410.1), providing an occupancy separation for the theatre may prove result in significant cost savings relative to applying the requirements of 410 to the entire building.

Shell: The exterior cladding of Area C consists of metal panels, per those described under Area B (above). The north end of Area C is substantially identical to the north end of Area B (and that of Area D), suggesting that all three wings of the 1947 building were originally identical. However the panels presently installed on the middle portions of the east and west walls of Area C appear to be appreciably newer than those existing elsewhere on the building, having a galvanized finish rather than the multiple layers of weathered paint visible in other locations and being appreciably less afflicted by corrosion and mechanical damage. Insofar as these ostensibly newer panels have no windows, in contrast with the corresponding panels in Areas B and D, it may be concluded that the exterior walls of Area C were reconstructed when the theatre was built after 1978, although no documentation to this effect has been provided by the City of Austin. The condition of the unpainted exterior panels in Area C, which are the only metal siding or roofing panels on the existing building which remain ostensibly economically serviceable, is consistent with an installation date circa 1978.

Interiors: The interiors of Area C consist of a variety of differing finishes of differing age and provenance. As noted for Area B, the reconstruction work necessary to replace the failed roofing in this location (the newer skin remaining in reasonable condition) and to bring the project into compliance with current code (specifically in this context compliance with IBC 801.1.3, as described under REVIEW OF FLOODPLAIN CONSIDERATIONS, below) will require the removal and replacement of the preponderance of the interior construction. Although it may be possible to salvage and reuse fittings and equipment (particularly portable fixtures, equipment, and furnishings

from the existing theatre), determination of the economic feasibility of such a course of action is beyond the scope of the present report and would have to be considered in the context of a comprehensive consideration of the recycling, disposal, or reuse of materials made redundant by the reconstruction of the building.

Wings: For the purposes of this report, the wings connecting Areas B, D and D, and the toilet rooms contained therein, are considered under Area C.

The construction of these wings, where it is visible, is largely wooden, including the windows, soffits, casing trim and fascias. This suggests that the connecting wings may have been constructed independently of the steel framed and clad building areas to which they are attached. However an aerial photograph of Disch Field taken in the summer of 1948[21] proves that these wings were substantially contemporary with the original construction of the Naval and Marine Reserve Center. Similar wings exist at the Naval Reserve Center in Jackson Mississippi, substantiating that these peculiar features are both original to the building and components of a standard plan for similar facilities.[22]

The connecting wings presently contain dressing rooms (west of the theatre) and public toilet rooms (east of the theatre). These facilities do not comply with the Texas Accessibility Standards, as noted in the 1998 Condition Report. This report outlined incremental accessibility improvements to the toilet rooms, however such incremental improvements have largely rendered irrelevant by the progressive failure of the building envelope. In accordance with TAS 4.1.6(C), the extent of the rehabilitation that will be required to bring the Dougherty Arts Center building into compliance with applicable codes under LDC §25-11-33 will require full accessibility of restrooms and toilet rooms, independent of any other code requirements. It does not appear that under these circumstances an economic justification would exist for preserving any component of the existing dressing rooms or toilet rooms in the context of a comprehensive rehabilitation project.

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[21] http://texashistory.unt.edu/ark:/67531/metapth18971.

[22] It is likely that the idiosyncratic plan of the Dougherty Arts Center resulted from a desire on the part of the Navy to utilize building elements made redundant by the end of the war. It is known, for example, that the Butler Manufacturing Company produced more than 21,000,000 sf of rigid-frame steel buildings (such as the projecting wings of the Dougherty Arts Center) for allied military forces (including the US Navy) during the second World War, and that vast stockpiles of building components ordered under wartime contracts were on hand at the cessation of hostilities. The Mississippi Heritage Trust maintain that the projecting wings of the Naval Reserve Center in Jackson were Butler buildings, a reasonable assumption given that this firm produced the great majority of the rigid frame buildings used by the United States military during the war (for example 90% of the prefabricated steel aircraft hangers, by the firm's estimates).

Special Construction and Demolition (Hazardous Materials): Portions of Area C were included in a 1990 asbestos abatement project, which identified the removal of "ACM overspay" from this area. The closeout documents associated with this project indicate the presence of "ACM piping under walkway too small for access" in the vicinity of the wing connecting Areas C and D. No documentation was provided by the City of Austin confirming whether or not this material was ever abated.

The theatre was included in the scope of an asbestos abatement project completed in 1993.

The wings between Areas B and C and C and D are clad with the same shingles used to clad the north wall of Area A. These shingles were identified in the 1998 Condition Report as being transite.

Documentation provided by the City of Austin from precious abatement projects suggest the presence of lead based coatings throughout the existing building.

Special Construction and Demolition (LEED): LEED opportunities for Area C are substantially similar to the those cited for Area B, above.

Replacement of the existing plumbing fixtures in area C may result in significant improvements in water efficiency.

Building Area:	D (single story metal building, historically identified as east wing, spline)
Gross Building Area:	~4,400 sf
Date of Construction:	1947
Prior Occupancy (2003 IBC):	A-1 Presumed (Assembly)
Proposed Occupancy (2003 IBC):	A-1 Presumed (Assembly)

Programmatic Considerations: The existing Building Area D was designed, in terms of building area, clear heights, orientation, and configuration, as a component of the 1947 Naval and Marine Reserve Center.

Building Area D is presently used as classrooms. Of these, only one (Room 12E) is appropriately sized for its programmed use as a classroom/studio for fifteen students. Otherwise the existing configuration of Area D, like that of Area B, is inadequate to meet the present or future requirements of the Dougherty Arts Center.

Code Compliance: Code compliance issues for Area D are generally as per those discussed for Area B (above).

Shell: The condition of the exterior of Area D is comparable to that described under Area B, above.

The windows in Area D are comparable to those in Area B.

The windows and wall panels on the east side of Area D (those facing Dawson Road) have been painted relatively recently, and hence afforded a modicum of protection from the elements. Those on the west side of Area D (facing the courtyard) are in generally execrable condition.

Evidence of differential slab movement was evident in several locations in Area D.

Interiors: The interiors of Area D consist of a variety of differing finishes of differing age and provenance. As noted for Area B, the reconstruction work necessary to replace the failed building skin and to bring the project into compliance with current code (specifically in this context compliance with IBC 801.1.3, as described under REVIEW OF FLOODPLAIN CONSIDERATIONS, below) will require the removal and replacement of the preponderance of the interior construction.

Evidence of water infiltration was evident throughout Area D. A mold report has not been provided by the City of Austin.

Special Construction and Demolition (Hazardous Materials): Portions of Area D were included in a 1990 asbestos abatement project, which identified the removal of

"ACM wrapped steam pipe and ACM debris" from this area. Room 12E was included in the scope of an asbestos abatement project completed in 1993.

The wainscot in portions of Area D is known to consist of asbestos-containing transite panels.

Documentation provided by the City of Austin from precious abatement projects suggest the presence of lead based coatings throughout the existing building.

Special Construction and Demolition (LEED): LEED opportunities for Area D are substantially similar to the those cited for Area B, above.

Building Area:	E (single story metal building, historically identified as north wing)
Gross Building Area:	~6,000 sf
Date of Construction:	1947
Prior Occupancy (2003 IBC):	A-1 Presumed (Assembly)
Proposed Occupancy (2003 IBC):	A-1 Presumed (Assembly)

Programmatic Considerations: The existing Building Area E was designed, in terms of building area, clear heights, orientation, and configuration, as a component of the 1947 Naval and Marine Reserve Center.

Building Area E is presently used as classrooms. None of the classrooms existing in this area are consistent with the present or future programmatic requirements of the Dougherty Arts Center.

Code Compliance: Code compliance issues for Area E are generally as per those discussed for Area B (above).

Shell: Area E is known to have been constructed at the same time as the remainder of the building. The structural system of this Area appears to be generally consistent with that of Area A. Most of the exterior of Area E is faced with cement plaster, although the backing materials are unknown. The use of wood as a framing and furring material is visible in several locations, as is the presence of site-cast concrete.

The windows in Area E are comparable to those in Area B.

Evidence of differential slab movement is evident in several locations in Area E.

Interiors: The interiors of Area E consist of a variety of differing finishes of differing age and provenance. As noted for Area B, the reconstruction work necessary to replace the failed building skin and to bring the project into compliance with current code (specifically in this context compliance with IBC 801.1.3, as described under REVIEW OF FLOODPLAIN CONSIDERATIONS, below) will require the removal and replacement of the preponderance of the interior construction.

Evidence of water infiltration was evident throughout Area E. A mold report has not been provided by the City of Austin. Insofar as the modified bitumen membrane roof of Area E was rehabilitated with an elastomeric coating that appears to remain in serviceable condition (refer to the attached *Roof Covering Survey* prepared by Amtech Building Sciences), it appears that the visible water damage may pertain to leaks that are not currently active.

Special Construction and Demolition (Hazardous Materials): Documentation provided by the City of Austin from precious abatement projects suggest the presence of lead based coatings throughout the existing building.

Special Construction and Demolition (LEED): LEED opportunities for Area E are substantially similar to the those cited for Area A, above.

REVIEW OF APPLICABLE CODES

The code evaluations cited in this assessment are based on the laws, codes, and ordinances in force as of 15 September 2010, the nominal date of this report. These evaluations consider the letter of the applicable codes. Their application to an actual building project will be subject to both the discretion and the interpretation of the relevant building officials. Although general consideration has been given to the adoption of the 2009 International Building Code by the City of Austin 1 October 2010, it must be recognized that no firm precedents regarding the interpretation and implementation of the 2009 IBC in Austin have yet been established, and that the interpretation of this code (or any code subsequently adopted) in future may influence the Dougherty Arts Center in ways not anticipated in the present assessment.

In accordance with IBC 102.6: "The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Property Maintenance Code* or the *International Fire Code*, or as is deemed necessary by the building official for the general safety and welfare of the occupants and the public."

With respect to the *International Property Maintenance Code*, which will be enforceable in the City of Austin 1 January 2011 in accordance with Ordinance 20100408-052, the existing condition of the Dougherty Arts Center would technically be deemed unsafe under local amendments to IPMC 305.1.1 which defines as "unsafe conditions" all "structures or components thereof [that] have reached their limit state". The definition of limit state provided in IBC 1602.1 includes any "condition beyond which a structure or member becomes unfit for service and is judged to be no longer useful for its intended function (serviceability limit state)". As described in this assessment, many components of the existing Dougherty Arts Center building have indisputably reached a serviceability limit state, including specifically the original metal building panels and windows and the majority of the roof membranes. As noted above, the enforcement of Ordinance 20100408-052 is subject to the discretion and interpretation of the building official. Conversations with the Building Plan Review Department[23] confirmed the inclination of the building official to adopt a pragmatic interpretation of requirements such as IPMC 305.1.1 by addressing discrete unsafe conditions individually and on a case by case basis.

At present, the existing building must also comply with the requirements of §10-5 of the Austin City code, defining Miscellaneous Public Health Regulations. Of particular concern are §10-5-21(A), requiring the maintenance of a property "in a safe, sanitary condition" and §10-5-51 requiring the maintenance of (certain) buildings built before December 23, 1968 in "a rat-free, rat-proof condition". This assessment notes several explicit (if incidental) existing violations of §10-5-51, such as the presence of weeds or grass more

[23] E.g. telephone conversation with Ron Menard, 1 September 2010.

than 48" tall,[24] a condition defined as an "an immediate danger to a person's health, life, or safety" by §10-5-26(B)(1); standing water resulting from the drainage of condensate from mechanical equipment or from improperly sloped roofs (ostensible violations of §10-5-51(C)); as well as indoor air quality (i.e. public health and safety) concerns resulting from the effects of pervasive roof leaks. Building occupants have also noted persistent problems with rats, suggesting the harboring of rodents per §10-5-51(A) (4) (b). This condition technically requires compliance with §10-5-51(A), a standard that the Dougherty Arts Center manifestly does not meet in light of the conspicuously poor integrity of the existing building skin. Consultation with the City of Austin Law Department has confirmed that the requirements of Title 10 do specifically apply to buildings,[25] although evidence indicates that these requirements are rarely literally enforced.

Regarding the rehabilitation of the existing building, in accordance with §25-11-33 of the Land Development Code of the City of Austin "a person shall comply with technical code requirements for new facilities when making an addition, alteration, or repair to a building or structure or to building service equipment". However this requirement is ostensibly contradicted by LDC §25-12-3 101.2(2) which amends the Building Code to state that "Existing buildings undergoing repair, alteration, additions, or a change of use shall be permitted to comply with Chapter 34 [Existing Structures] of this Code." IBC 3403.1 states that "additions or alterations to any building or structure shall conform with the requirements of the code for new construction", effectively reconciling this provision with LDC §25-11-33 *except* with respect to repairs. Under IBC 3403.3 "nonstructural alterations or repairs to an existing building or structure are permitted to be made of the same materials of which the building or structure is constructed". With respect to the Dougherty Arts Center, this section is superseded by the requirements of IBC 3403.1 stating that "for buildings and structures in flood hazard areas established in Section 1612.3, any additions, alterations or repairs that constitute substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design." For detailed consideration of floodplain impacts see REVIEW OF FLOODPLAIN CONSIDERATIONS below.

Per IBC 3407, none of these requirements are specifically applicable to historic buildings (see POTENTIAL HISTORIC DESIGNATION, below). IBC 3407.1 states that provisions of the code "relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard." This is substantially consistent with the *1994 Uniform Code*

[24] Individual weeds of this height were photographed on the property 2 April 2010 on the north side of the building between Areas B and C.
[25] As confirmed by Annette Bogusch, City of Austin Paralegal, in an email message received 3 September 2010.

for Building Conservation, also adopted by the City of Austin. However any waiver of code requirements (i.e. relaxation of current standards) would have to be discussed in detail with the building official, insofar as various existing conditions of the Dougherty Arts Center, considered either independently or in concert in the context of a rehabilitation project, could clearly be considered both to constitute a hazard and to exceed the jurisdictional limits of either IBC Chapter 34 or the *Uniform Code for Building Conservation*.

Notwithstanding the potential waiver of individual provisions of the Building Code, it is clearly the intent of the City of Austin to require that a rehabilitation project of the scope anticipated for the Dougherty Arts Center to be substantially consistent with current code(s), including explicitly those provisions of the code applicable to public health and safety. Code requirements pertaining to construction types, fire protection, emergency egress, and numbers and distribution of plumbing fixtures will be particularly relevant to the project, as they would to any new construction. In the case of the Dougherty Arts Center fire protection and plumbing modifications that require installation of new sub grade piping must comply with restrictions applicable to disturbance of the existing landfill: see REVIEW OF LANDFILL CONSIDERATIONS below.

Any rehabilitation of the Dougherty Arts Center will also have to comply with the applicable requirements of the *Texas Accessibility Standards*. Although under certain circumstances existing non-complying conditions could be allowed to remain, the International Building Code requirements relative to the project, considered in conjunction with TAS 4.1.6.(2)[26], will effectively mandate that full compliance with the *Texas Accessibility Standards* will be obligatory for the rehabilitation project.

REVIEW OF FLOODPLAIN CONSIDERATIONS

The Dougherty Arts Center site is entirely within a FEMA-designated floodplain of West Bouldin Creek. The existing finish floor elevation of the building is 448.77 at the main entry doors. According to the current City of Austin fully-developed floodplain model for West Bouldin Creek, the 25- and 100-year flood elevations at the building location are approximately 451 and 452, respectively. This indicates a 25-year flood depth just beneath the sills of the ground floor windows. It should be noted that the existing building was not inundated in the aftermath of Tropical Storm Hermine, which occurred during the preparation of this assessment, although facility staff have observed past flooding of the building consistent with the projected flood elevations.

[26] Stating: "in addition to the requirements of 4.1.6(1), an alteration that affects or could affect the usability of or access to an area containing a primary function shall be made so as to ensure that the *accessible route* to the altered area and the *parking,* restrooms, telephones, and drinking fountains serving the altered area, are readily accessible to and usable by individuals with disabilities".

The 2003 IBC contains a number of regulations applicable to buildings located within a floodplain, identified as a "flood hazard area" per IBC 1612.3 (as amended by City of Austin Ordinance 20051215-106), as follows:

> "1. the flood hazard areas identified by the Federal Emergency Management Administration in a scientific and engineering report entitled, "The Flood Insurance Study for Austin, Texas," dated January 19, 2000, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps (FIRM and FBFM) and related supporting data along with any amendments or revisions thereto are hereby adopted by reference and declared to be a part of this section; and
>
> 2. the 100-year and 25-year floodplains based on projected full development as specified in the Austin City Code and the Drainage Criteria Manual are adopted by reference and declared to be part of this section."

The site is located within a FEMA and City of Austin designated 25-year floodplain, as incorporated by reference into the applicable building code.

Per IBC 109.3.4 (as amended by City of Austin Ordinance 20051215-106): "In flood hazard areas, upon placement of the lowest floor, including the basement, and prior to further vertical construction, the elevation certification required in Section 1612.5 (*flood hazard documentation*) shall be submitted to the building official." Among the requirements of IBC 1612.5 for construction in a flood hazard area are provision either for the automatic entry and exit of flood waters from the building envelope or for the equalization of hydrostatic flood forces (per Section 2.6.1.2, ASCE 24).

Per IBC 801.1.3: "For buildings in flood hazard areas as established in Section 1612.3, interior finishes, trim and decorative materials below the design flood elevation shall be flood-damage-resistant materials." As outlined in *FEMA Technical Bulletin 2/August 2008; Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program,* standard building materials that would be prohibited on the ground floor of the Dougherty Arts Center would include paper-faced gypsum board, greenboard, fiberboard, oriented-strand board, plywood (other than marine grade, treated, or exterior grade/exposure 1 board), millwork, carpet, wood doors, fiberglass or cellulose insulation, linoleum, fabric, wallpaper, and wood floor coverings. Materials approved for use below the flood elevation would generally be limited to masonry, metals, ceramics, rubber and plastic materials (with limitations on the permissible adhesives), and like products "capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage"[27].

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[27] *FEMA Technical Bulletin 2/August 2008; Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program.*

Per IBC 1403.6: "For buildings in flood hazard areas as established in Section 1612.3, exterior walls extending below the design flood elevation shall be resistant to water damage. Wood shall be pressure-preservative treated in accordance with AWPAC1, C2, C3, C4, C9, C15, C18, C22, C23, C24, C28, P1, P2 and P3, or decay-resistant heartwood of redwood, black locust or cedar." Acceptable exterior and structural materials would also be subject to *FEMA Technical Bulletin 2/August 2008; Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program*. The existing steel framing and masonry cladding materials of the exterior walls of the Dougherty Arts Center are generally consistent with the table of approved materials contained in the *Technical Bulletin*. Those exterior walls with wood framing (e.g. the transverse wings connecting Areas B and C and C and D and the north wall of Area A) likely do not comply.

As noted under REVIEW OF APPLICABLE CODES above, any substantially improved existing building must be brought into compliance with code requirements pertaining to flood loads. Per IBC 1612.2 (as amended by City of Austin Ordinance 20051215-106, which in this context is more restrictive than the national standard), Substantial Improvement is defined as:

> "Any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the current market value of the building or structure before the improvement or repair is started, or if the structure has been damaged and is being restored, before the damage occurred. The cost used in the substantial improvement determination shall be cumulative of all previous additions or improvements for a specific building or structure occurring during the immediate 10-year period. Is the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:
>
> 1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum *necessary to assure safe living* conditions.
>
> 2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.
>
> 3. An aesthetic improvement if the value of the improvement does not exceed 10 percent of the current market value of the building or structure."

Per IBC 1612.1 (as amended by City of Austin Ordinance 20051215-106), "Within flood hazard areas as established in Section 1612.3 (*Establishment of flood hazard areas*), all new construction of buildings, and alterations to buildings and structures, structures and portions of buildings and structures, (sic) including substantial improvements and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads."

IBC 1612.4 (as amended by City of Austin Ordinance 20051215-106) establishes requirements for "additions and alterations to buildings and structures located in flood hazard areas" including the requirement in 1612.4.1 that "a minimum freeboard of one (1) foot shall be added where the design flood elevation or other elevation requirements are specified" and in 1612.4.3 that "Normal access to the building shall be by direct connection with an area that is a minimum of one (1) foot above the design flood elevation, unless otherwise approved by the building official." In speaking with Building Plan Review,[28] it was determined that the provisions of these local amendments to the Building Code would only be triggered by "substantial improvement" to the existing building.

Per IBC 3047.2 compliance with 1612 is expressly waived for buildings that are "listed or preliminarily determined to be eligible for listing in the National Register of Historic Places".

According to LDC §25-7-92(A) "Except as provided in Section 25-7-96 (*Exceptions In The 25-Year Floodplain*), a site plan may not be approved if a proposed building or parking area encroaches on the 25-year floodplain". The existing building does not comply with the variance criteria listed in §25-7-92(C)(1), precluding issuance of a site development permit for any rehabilitation work. This essentially mandates the negotiation of Site Plan exemption for any work at the Dougherty Arts Center site, even though such work will not comply with the criteria listed under LDC §25-5-2 , for which a political (if not technical) argument could certainly be made.

This requirement effectively establishes that work at the Dougherty Arts Center must be limited to such a scope as could be approved under a Site Plan exemption. For any work that would require a Site Plan, including specifically the demolition and replacement of the existing building, compliance with the following provisions of §25-7-92(C)(1) would be required:

(a) the finished floor elevation of a proposed building is at least two feet above the 100-year floodplain;

(b) normal access to a proposed building is by direct connection with an area above the regulatory flood datum, as prescribed by Chapter 25-12, Article 1 (*Uniform Building Code*);

(c) a proposed building complies with the requirements in Chapter 25-12, Article 1, Appendix Chapter 58 (*Flood Damage Prevention*) and Appendix Chapter 59 (*Floodplain Regulations*);

(d) the development compensates for the floodplain volume displaced by the development;

[28] Telephone conversation with Ron Menard, 1 September 2010.

(e) the development improves the drainage system by exceeding the requirements of Section 25-7-61 (*Criteria for Approval of Plats, Construction Plans, and Site Plans*), as demonstrated by a report provided by the applicant and certified by an engineer registered in Texas;

(f) the variance is required by unique site conditions; and

(g) development permitted by the variance does not result in additional adverse flooding of other property.

These requirements are, however, amended by the provisions of §25-7-94, granting the following exceptions within the central business area, defined as "the area bounded by Interstate Highway 35, Riverside Drive, Barton Springs Road, Lamar Boulevard, and 15th Street".

(C) A site plan with a proposed building or parking area that encroaches on the 100-year flood plain may be approved if:

(1) the floor slab of a proposed building is at least two feet above the 100-year floodplain;

(2) normal access to that building is by direct connection with an area above the regulatory flood datum, as defined by Chapter 25-12, Article 1 *(Uniform Building Code)*;

(3) development associated with construction of the building compensates for any floodplain volume displaced by that construction; and

(4) the applicant demonstrates by means of a study certified by a Texas registered professional engineer that the construction of the building and development activities associated with that building improves the drainage system by exceeding the minimum requirements of Sections 25-7-2 *(Obstruction Of Waterways Prohibited)*, 25-7-3 *(Duty To Maintain Unobstructed Waterways)*, and 25-7-4 *(Standing Water Declared A Nuisance)*.

(D) The director may waive a requirement of Subsection (C) if:

(1) the applicant submits:

(a) a written request identifying the requirement to be waived; and

(b) a justification for the waiver prepared by a Texas registered engineer certifying that waiving the requirement will not result in additional adverse flooding of other property; and

(2) the director determines that:

(a) the waiver is required by unique site conditions;

(b) the waiver is a minimum departure from the requirements of Subsection (C); and

(c) waiving the requirement will not result in additional adverse flooding of other property.

(E) A site plan that may be approved under this section must comply with the flood proofing requirements of Chapter 25-12, Article 1 *(Uniform Building Code)*.

Insofar as the existing site cannot comply with the requirements of §25-7-92(C)(1)(a) or §25-7-92(C)(1)(b) or the exceptions outlined by §25-7-94(C) or the administrative waiver provisions of §25-7-94(D), obtaining a site development permit for the rehabilitation of the Dougherty Arts Center is not a feasible alternative, unless Council-approved variances from these provisions could be secured. It is worth noting that projects approved under General Permits have, in the past, occasionally been inadvertently exempted from otherwise applicable requirements of the LDC, including specifically, requirements relating to existing floodplains.

According to LDC §25-12-3, G105.6, a Council-approved variance from the provisions of LDC §25-7-92(C)(1)(a) and §25-7-92(C)(1)(b) shall be based on the following ten considerations:

1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage;
2. The danger to life and property due to flooding or erosion damage;
3. The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners;
4. The importance of the services provided by the proposed development to the community;
5. The availability of alternate locations for the proposed development that are not subject to flooding or erosion;
6. The compatibility of the proposed development with existing and anticipated development;
7. The relationship of the proposed development to the comprehensive plan and flood plain management program for that area;
8. The safety of access to the property in times of flood for ordinary and emergency vehicles;
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and

10. The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

Further, according to LDC §25-12-3, G105.7, Council-approved variances shall only be issued upon the following five conditions:

1. A technical showing of good and sufficient cause based on the unique characteristics of the size, configuration or topography of the site;
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable;
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws or ordinances;
4. A determination that the variance is the minimum necessary, considering the flood hazard, to afford relief; and
5. Notification to the applicant in writing over the signature of the building official that the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance, and that such construction below the base flood level increases risks to life and property.

G105.7 does not explicitly define how the referenced determinations are to me made, or by whom. Conditions 1, 2 and 4 are ostensibly straightforward. Conditions 3 and 5, with their references to public life and safety, are more complex for a project where the City of Austin would be in the position of both applying for and granting the relevant variance. There are a number of legal questions associated with these conditions: it should not be presumed without further research by the City of Austin that the City Council would be willing to approve a variance for the Dougherty Arts Center, particularly since this process could theoretically be avoided for a rehabilitation project that did not require a new Site Development Permit.

An alternate approach to flood-resistant construction or improvements for a structure within a floodplain is to modify the site conditions such that the structure is no longer within the floodplain. This is known as the Letter of Map Revision (LOMR) process, and involves an application to FEMA justifying the removal of the structure from the floodplain, supported by hydraulic modeling and technical justifications. Such justifications may include improved available topography for model input, refinements to the model, or site conditions that are different than those represented in the current model. Because the current City of Austin models were recently reviewed and updated based on current topographic data, it is reasonable to assume that the models are sufficiently reliable. Accordingly the removal of the Dougherty Arts Center from the

floodplain would necessitate modifications to the watershed resulting in corresponding reductions to the 25 and 100-year flood elevations.

A modified approach to the LOMR is the Conditional Letter of Map Revision (CLOMR), in which the applicant proposes improvements to the site to remove the structure from the floodplain, and obtains prior FEMA approval of the modifications such improvements would make to the floodplain model. For the study site, this approach would require raising the site to an elevation above 452 (establishing a finish floor elevation for the building above 454, per §25-7-92(C)(1), or 5' higher than the present elevation), necessitating the demolition and replacement of the existing building. The disturbance associated with this demolition, and with the subsequent earthwork, would invariably disturb the improvised cap over the existing landfill, requiring this to be brought into compliance with current regulations as part of this process.

Although such solutions are ostensibly technically feasible, given the number of developed properties impacted by the floodplain of West Bouldin Creek (as well as the intersection of Lamar Boulevard and Barton Springs Road) it would be unreasonable to consider localized modifications to the flood elevations in the vicinity of the Dougherty Arts Center or to the grading of 1110 Barton Springs Road except in the context of a comprehensive floodplain revision project. Watershed Engineering Department staff have indicated that no such project is presently under consideration by the City of Austin.

A meeting with Watershed Engineering Division staff[29] 10 August 2010 confirmed the findings of this assessment. Staff agreed that it would be technically feasible to rehabilitate the Dougherty Arts Center building, through the judicious limitation of the project scope, on the basis of the unique conditions pertaining to the existing facility. They cautioned, however, that due to the potential precedents established by such a rehabilitation project, they would advocate the rigorous enforcement of the principal objectives of the applicable regulations, specifically that the existing building not be enlarged, embellished, or otherwise enhanced in any way that could not be classified as a repair, rehabilitation, or replacement in kind (with the sole exception pertaining to upgrades intended to correct outstanding code deficiencies), and moreover that the impact of the existing building on the floodplain not be in any way exacerbated (i.e. that the building perimeter remain essentially unchanged). These provisions, incidentally, will effectively constrain the Dougherty Arts Center to the same limitations that would apply were the building to receive an historic designation (see below): any rehabilitation in place of the existing building must substantially preserve its present composition and configuration.

[29] Meeting with Jameson Courtney, David Marquez, and Ray Windsor held 10 August 2010 at One Texas Center, attended by Amelia Lopez, W. Owen Harrod, and Brian Wells representing the assessment team.

These restrictions have a particular relevance to the requirements of IBC 1612, regarding the flood resistance of the building. If the existing building does not receive an historic designation, any rehabilitation project will require either the modification of the building structure and skin to resist flood loads (as described above), a requirement that the City of Austin has previously addressed by requiring, among other improvements, that the building envelope can be rendered watertight by the addition of seals at all penetrations of the building skin including the provision of removable bulkheads at building doors, or the modification of the building envelope to permit the relative equalization of water pressures on the building interior and exterior (effectively permitting the building to rapidly fill with water in a flood event). The equalization of water pressure effectively requires the sacrifice of the building contents in a flood event. The potential cost of such a loss would need to be considered in the projected operation and maintenance expenses for any building rehabilitation that adopted this flood resistance strategy. In addition, this solution would need to be evaluated in the context of LDC §25-12-3, G105.6.[30]

Local amendments to IBC 1612 will have to be carefully considered in the context of any rehabilitation project. These are contingent upon the definition of "Substantial Improvement" established by City of Austin Ordinance 20051215-106, which is tied to "current market value". Being a public building, the value of the existing Dougherty Arts Center is recorded as $0.00 by the Travis County Tax Appraisal District as of the date of this assessment. Due to the conditions described in this report, the ostensible commercial value (current market value) of the Dougherty Arts Center building can be presumed to be correspondingly negligible. Since the permissible scope of rehabilitation will be legally constrained by the valuation of the property, it will be imperative that any rehabilitation project be predicated upon an interdepartmental agreement concerning a nominal current value derived in part from intangible considerations such as the community significance of the existing facility, and a similar agreement concerning the extent of work to be considered exempt under IBC 1612.2.1 (which determination is to be delegated to the building official).

POTENTIAL HISTORIC DESIGNATION

The Dougherty Arts Center building should be considered eligible for consideration for the National Register of Historic Places in accordance with Criterion C: embodiment of the "distinctive characteristics of a type, period, or method of construction" as well as Criterion A: association with "events that have made a significant contribution to the

[30] It is worth noting that if the Dougherty Arts Center were rehabilitated exactly as it was originally built, for example without the addition of flood vents or modifications to the structural system (as would be permissible under an historic designation), the entire building would remain at risk of total loss through catastrophic structural failure in a future flood event.

broad patterns of our history".[31] In 2010, the building was 63 years old. Although modified internally, the exterior of the building, and particularly the façade facing Barton Springs Road (notwithstanding the repairs completed in 1991), remains substantially as it did in 1948. The fabric of the Naval and Marine Reserve Center remains fundamentally intact, including many of the fittings and fixtures original to its construction (including such unique items as a naval bulkhead door and hardware presumably installed as a training aid). This façade is fine example of mid-century modernism (specifically a variant often referred to as WPA Moderne, for the 1935-1943 Works Progress Administration), a style that is relatively rare in Austin public buildings, particularly in the substantially original condition (at least with respect to principal frontage) of the Dougherty Arts Center. The apparent preservation, within the existing footprint, of three Second World War Butler buildings is another condition of potential historical interest. In addition, the former Naval and Marine Reserve Center remains as an isolated surviving reminder of the civic development along Barton Springs Road in the years following the war, a condition heightened by the loss of buildings such as Disch Field, the Austin City Coliseum, the Palmer Auditorium, and the former National Guard Armory subsequently utilized as the Armadillo World Headquarters.

The original Naval and Marine Reserve Center was one of a number of post-war buildings of substantially similar configuration, comparatively few of which have been preserved intact. The Naval Reserve Center in Jackson Mississippi is a conspicuous example. This building possesses a plan almost identical to that of the present Dougherty Arts Center and is, as of the date of this report, the subject of a particularly controversial rehabilitation project. According the Mississippi Heritage Trust "post-World War II reserve centers are becoming increasingly rare".

According to the City of Austin historic preservation officer, the Dougherty Arts Center has not (as of 20 July 2010) been included in a survey of historic structures or been determined by the historic preservation officer to have potential for designation as a historic landmark: either of which would accompany any consideration for listing on the NRHP by the City of Austin. Either such occurrence would subject the facility to compliance with LDC §25-12 Article 4. This article would impose specific obligations on the City regarding the preservation and maintenance of the exterior of the existing building. In addition, listing would (effectively) mandate that any future project at the Dougherty Arts Center that involved federal funding comply with the requirements of 36 CFR Part 800 (Protection of Historic Properties), in general obligating the City of Austin to "undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an

[31] In this instance the "events" including the repatriation and demobilization (or, in the case of the Reserves, partial demobilization) of military personnel following the Second World War, largely uncelebrated occurrences that exerted a profound influence on the American experience during the second half of the twentieth century.

undertaking"[32] and more specifically imposing comprehensive administrative obligations on any such project.

REVIEW OF LANDFILL CONSIDERATIONS

During the construction of Town Lake Park in April 2006, the City of Austin discovered evidence of an undocumented landfill to the east of and extending beneath the Dougherty Arts Center buildings.

Following this discovery, the City of Austin prepared an Application for Subchapter T Registration of Enclosed Structures Over a Closed Municipal Solid Waste Landfill under 30 TAC §330.959.

Any construction at the Dougherty Arts Center will have to comply with the requirements of this Section. Per §330.957, "Alterations of existing structures" are exempt from a number of specific construction requirements, including the mandatory installation of a geomembrane of low gas permeability between a slab and subgrade and mandatory installation of a landfill gas venting system. "Alteration" is defined by §330.951 as "minor changes and standard redesign activities common in residential and commercial structures, such as moving walls and doors, that will not affect the foundation or increase the horizontal extent of the foundation." Any repair work that impacts the foundation of the Dougherty Arts Center would technically not be considered exempt under §330.957 and would be subject to full compliance under Subchapter T. When asked about the potential impact of the rehabilitation of an (unnamed) existing arts center on a landfill, Richard C. Carmichael PhD, PE of the Texas Commission on Environmental Quality indicated that his agency would not "impose insurmountable obstacles" to the renovation of such a building, noting that ostensibly similar projects had recently been approved in Dallas and Waco.[33] He did note that consultation with TCEQ would be advisable early in the design process, insofar as the potential impact of a specific construction program on the existing landfill would need to be reviewed and approved by the Commission, and would need to demonstrate (either through the restriction of the scope of work or the through the incorporation of mitigative measures) that no potential harm to public health or environmental quality would result.

Other requirements of 30 TAC 330 will need to be met regardless, including continuous monitoring (as initiated under the Subchapter T Registration) and the use of double-containment conduits for new on-site wet utilities, per 30 TAC §330.961.

The presence of the undocumented landfill beneath the Dougherty Arts Center undeniably constitutes a liability. Although the documentation accompanying the January 2008 Application for Subchapter T Registration of Enclosed Structures Over a Closed Municipal Solid Waste Landfill does not suggest an eminent threat to public

[32] 36 CFR § 800.10
[33] Telephone conversation with Richard Carmichael PhD, PE occurring 25 August 2010.

health or safety[34], the scope of this documentation was limited to consideration of the continued operation of the existing facility. Additional study will be required to determine the potential impact on the landfill of bringing the existing foundation system up to current code, as well as to permit the evaluation of alternative strategies (e.g. piers versus spread footings).

LEED CONSIDERATIONS

The City of Austin has identified LEED Certification as a programmatic requirement for the rehabilitation of the Dougherty Arts Center.

The scope of improvements to the existing building necessary to comply with the City of Austin's stated programmatic requirements will exceed the limitations applicable to LEED for Existing Buildings.[35] Accordingly LEED registration of the rehabilitation will be subject to the standards applicable to New Construction and Major Renovations.

Although a significant number of LEED credits could be secured by the rehabilitation of the existing building in accordance with the standards of contemporary architectural practice, it must be recognized that the regulatory restrictions imposed upon this project will make the formal Certification of the project a disproportionately expensive proposition. As noted in this assessment, the location of the existing building within a floodplain and above an abandoned landfill will severely limit opportunities for fundamental changes to the conspicuously inefficient building envelope or to the existing site layout. It must also be recognized in this context that LEED prerequisite 2 for Sustainable Sites mandates that "school sites that are contaminated by past use as a landfill are ineligible for LEED Certification". Although the particular circumstances of the Dougherty Arts Center may permit a certain degree of flexibility in the interpretation of this prerequisite, which is intended specifically for use with the LEED for Schools rating system,[36] the use of an un-remediated former landfill site for educational purposes is fundamentally inconsistent with the objectives of the Green Building Council.

At the present time the City of Austin has not codified the precedence of regulations with respect to the LEED requirements for public projects and the mandates of the Watershed Engineering Division. There are inherent conflicts, for example, between the code requirements for flood resistance of buildings in flood hazard areas and LEED requirements for energy and atmosphere and indoor environmental quality. Moreover it has not been established whether the expensive and sensitive building systems associated with the measurement, verification, and controllability objectives of the LEED

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[34] Per the Application, "considering that approximately 60 years have passed since waste was last deposited in the landfill, and the nature of the waste (i.e., minimal organic material), the methane gas generation rate is expected to be low."
[35] LEED for Existing Buildings: Operation and Maintenance, September 2008.
[36] Clarification from USGBC on Case 00276987, received by email 24 August 2010.

standards would be classified as code required modifications or as improvements to the existing building effectively prohibited below the flood elevation under IBC 1612.

Regardless, a preliminary review of the likely project scope confirms that LEED Certification of the rehabilitation of the Dougherty Arts Center is a technically feasible objective, so long as the project is not subject to the LEED-Schools rating system. However it should be noted that such certification will result largely from "invisible" credits (e.g. construction waste management, material origins, commissioning, low-emitting materials, etc.) resulting in increased construction costs without an obvious commensurable return in visual or didactic impact. It should also be noted that the cost-benefit models generally applicable to building systems and components of increased nominal efficiency will not be directly relevant to the Dougherty Arts Center, given the potential destruction of such systems by the flooding of the building before any economic return has been realized for their installation.

In light of these constraints, due consideration should be given to whether or not there is a tangible public benefit to the formal LEED registration of the rehabilitation of the existing Dougherty Arts Center building (specifically in the context of Sustainable Sites prerequisite 2), and if the public interest might not be better served by an approach specific to the unique requirements of this individual building, particularly regarding coordination of sustainability objectives with the requirements of IBC 1612.

CONCLUSIONS

The existing fabric and building systems of the Dougherty Arts Center presently exist in an advanced stage of progressive failure. The fabric and systems, almost without exception, have reached a serviceability limit state, meaning that they have exceeded their nominal service lives and reached a stage at which ever increasing costs for operation (i.e. differential operational costs relative to those associated with new construction), maintenance, and repairs, and for rehabilitation of damage resulting from the poor performance of building components, will exceed the ostensible replacement costs of the components and systems in question.

Recommendations made to the City of Austin in 1998 concluded that the demolition and replacement of the existing building would "prove to not only be more functional, but would be less in overall cost" than a comprehensive rehabilitation. Although the building has remained in use over the subsequent 12 years without such a comprehensive rehabilitation, such use has been achieved at the expense of the further decomposition of the building infrastructure, particularly those components most subject to continuous deterioration, including the metal cladding and the supporting framework. The review of the existing building fabric contained in this report confirms the salient finding of the 1998 study, specifically that for a normative standard of building performance (e.g. full compliance with applicable current codes, LEED Certification, and a 30-year service life)

it would be more time consuming and expensive to rehabilitate the existing Dougherty Arts Center than it would be to construct an identical new building on a different site.[37]

The continuing deterioration of the existing building has resulted in an untenable situation wherein the ostensibly localized failure of an individual component of the Dougherty Arts Center could render the entire building uninhabitable due to the parlous condition of multiple interconnected building elements and the interrelationship of the regulatory requirements applicable to any necessary repair project. For an existing building in such poor condition, the sort of localized repair work that could ordinarily be accomplished under the provisions of IBC 105.2.2 (which defines permitting exemptions applicable to typical maintenance and repairs) is often infeasible, triggering full compliance with current code for all building elements impacted by the repair. In the case of the Dougherty Arts Center, there are any number of scenarios associated with relatively simple (and anticipatable) localized failures of building components that could have catastrophic consequences for the use of the facility. Such potential scenarios include failures of the roofing and underlying structural members at the points of connection of Areas B, C or D to Area A (areas of structural discontinuity resulting from the improvised connection of the three Butler buildings to the two-story headhouse) precipitating the disintegration and dispersal of fragments of the weathered asbestos shingles on the north wall of Area A; failure of underslab plumbing necessitating cutting of the slab and exposure and repair of the impacted line, resulting in disturbance of the covering of the landfill underlying the building and requiring full compliance with 30 TAC §330; localized failure of the building roofing or skin at a location impacting the mechanical and/or electrical infrastructure of the building; or a 25-year flood event resulting in structural damage to the existing building. Though it is theoretically possible to continue the present use of the building, at ever increasing operating and maintenance expenses, such continued use would only be possible until the occurrence of a component failure that cannot economically be corrected without its comprehensive rehabilitation. Although the timing of such a component failure cannot be predicted (in part due to the continuing potential for preventative maintenance to defer such an occurrence), such a failure is statistically inevitable. Building systems and components that have exceeded their design service lives will invariably fail.

It must be acknowledged that certain types of anticipatable failures, those that would result in the fragmentation and dispersal of asbestos containing materials or those impacting gas and electric infrastructure with a potential for explosion or fire, have eminent consequences for public health and safety. Mitigation of the potential for such failures should be of paramount concern. This can only be conclusively accomplished through a comprehensive rehabilitation of the Dougherty Arts Center building (again as a consequence of the interrelationship of codes and ordinances impacting the work). Insofar as such a comprehensive rehabilitation would be the consequence of any number

[37] Although ostensibly counterintuitive, this conclusion is indisputably substantiated by bid data from recent projects of comparable scope. Rehabilitation work is inherently more expensive, on a unit price basis, than comparable new construction.

of potential failures of building components (even those with little or no immediate impact on the safety of building occupants) such rehabilitation appears to be unavoidable if the facility is to remain in use. The principal variable would be whether such rehabilitation were budgeted and scheduled, or dealt with on an emergency basis. Under either circumstance, all operations of the Dougherty Arts Center would have to be suspended (or relocated) while the work was accomplished.

Since the continuous uninterrupted use of the existing Dougherty Arts Center building is not a feasible alternative (i.e. since it would be neither technically nor economically practicable to stage the rehabilitation of the existing facility in such a way that the rehabilitation work could proceed while portions of the building remain safely in use), the fundamental question to be addressed is whether or not the rehabilitation of the existing building could produce in a facility consistent with the City of Austin's stated objectives. A comparison of these objectives (specifically the *Dougherty Arts Center Building Program Needs* provided by facility staff) with the configuration of the present building confirms that the present Dougherty Arts Center building does not meet the programmatic objectives established for the facility. The existing building is too small, in terms of gross building area, to accommodate the published needs. The existing building is too severely compromised, by virtue of the retention of the idiosyncratic plan of the 1947 Naval and Marine Reserve Center, to pragmatically accommodate even half of the facilities outlined in the published needs. And the building is too inefficient, again in terms of its orientation and peculiar plan (which entails a disproportionate ratio of exterior surface to interior volume), to provide a level of thermal and energy performance commensurable with the City's LEED objectives. Under many circumstances, such deficiencies could be mitigated through the adaptive reuse of an existing building, incorporating modifications to the building plan as necessary to accommodate programmatic requirements and alterations to the building envelope as necessary to improve thermal and energy performance. The location of the Dougherty Arts Center within a 25-year floodplain and on top of an abandoned municipal landfill effectively precludes the implementation of any such strategies. The regulatory constraints associated with these conditions establish, beyond any doubt, that it would be less expensive to build an exact reproduction of the Dougherty Arts Center on a site 500 feet to the northwest (the former location of Disch Field, above the level of the 25-year flood) than it would be to comprehensively rehabilitate the building at its present location. In economic terms, the ostensible value of those portions of the existing building that might be suitable for retention in a LEED certified facility with a 30-year projected service life (essentially only portions of the existing slab, masonry elements of Area A, and certain mechanical and electrical components) is less than the reasonably anticipatable cost of complying with regulations applicable to the floodplain and the landfill.

The projected cost of rehabilitating the Dougherty Arts Center building, on the basis of an objective assessment of prevailing construction costs, would total on the order of $6,900,000. This sum reflects bringing the building into compliance with current codes, ordinance requirements, and, insofar as is practicable, the City's stated programmatic

objectives. The same economic model predicts a cost of $6,600,000 for an otherwise substantially identical new building on a different site,[38] demonstrating that the findings of the 1998 report regarding replacement of the facility remain valid. Given the project objectives provided by the City of Austin, the only feasible solution for accommodating the future programmatic needs for the Dougherty Arts Center in accordance with the City's stated sustainability and life-cycle objectives, and in compliance with current laws, codes, and ordinances, will be to construct a new building for the facility on a different site.

In the context of cost projections, it should be noted that the significant expenses may be incurred by the City of Austin in the decommissioning of the existing structure, irrespective of any future plans for the building and site. Although certain building systems and components remain in serviceable condition, and hence retain some economic value, the building as a whole is fully depreciated, in the sense not only of a nominal book value, but of actual monetary worth. As described in this report, the majority of building components are no longer serviceable (i.e. no longer fit for practical use) and hence retain only material (salvage) value. Although some of these components can be economically recycled, many cannot. Those building elements originally protected with lead-based paint or composed of asbestos containing materials will cost more to remove and dispose of than the ostensible material value of the individual components.

Under ideal circumstances, the existing Dougherty Arts Center could remain in use while a new facility is constructed. Given the state of the existing building, the duration of its continued use should be minimized, with all non-essential uses of the existing building terminated or relocated at the first opportunity. In light of the number of environmental hazards noted or referenced in past reports provided to the City of Austin, a comprehensive environmental assessment of the existing building should be commissioned immediately. Such an assessment will not only establish such remediation efforts as are immediately justified, but also the scope of work associated with the final disposition of the existing building (i.e. the actual costs associated with the permanent abatement of the hazardous materials). In addition to salient environmental hazards, the most egregious life safety concerns in the existing building should also be addressed immediately under the code exemptions granted for emergency repairs (or the *Uniform Code for Building Conservation*, as appropriate) to safeguard building occupants during the relocation of the facility.[39] It should be noted that the longer such final relocation is postponed, the greater the scope of environmental and life safety improvements warranted, as well as the greater potential of an unplanned closure of the existing building prior to the completion of a successful relocation.

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[38] Consideration of relocation costs, including land costs and comparison of existing buildings and new construction, was not included in the scope of the present study. An assessment of relocation alternatives should be a first priority.

[39] Obvious priorities should include restoring the integrity of the building envelope.

Consideration of a new Dougherty Arts Center building is beyond the scope of the present assessment. Such consideration will necessitate the preparation of a detailed project program outlining and prioritizing stakeholder objectives for the new facility. A program of this kind would facilitate the evaluation of alternative sites for the Dougherty Arts Center and the comparison of the potential adaptation of various existing buildings and entirely new construction.

Future use of the existing Dougherty Arts Center building, following the relocation of the present occupants, will be contingent upon the identification of a potential justification for its preservation. As noted above, the building is effectively constrained to its original configuration. Nevertheless there are certainly hypothetical uses that could better be reconciled with this original configuration (a small two-story office block with three projecting metal warehouse wings) than could the present arts center. Due consideration should be given, however, the potential impact of LDC §25-12 Article 4 to the future use of the building. It is worth noting the present condition of the building does not comply with the requirements of LDC §25-11-216 Duty to Preserve and Repair, to which it would be subject should the former Naval and Marine Reserve Center receive a landmark designation. It is certainly possible that only a portion of the existing building could be preserved, specifically the two-story office block (Area A) that constitutes the principal façade. It is also possible that the salvable portions of this office block could be physically relocated to a different site. Although such a relocated building element would not (typically) be eligible for inclusion in the National Register, the Naval and Marine Reserve Center might be accepted under Criteria Consideration b, specifically in light of the mitigating circumstance that the preservation of the building in its original location within the 25-year floodplain cannot be assured.

RECOMMENDATIONS

The findings of this assessment may be concisely summarized as follows:

1. The existing Dougherty Arts Center building has exceeded its serviceable life, and is in the process of progressive failure that will inevitably render the building uninhabitable.
2. Any future investment in the existing Dougherty Arts Center building, considered as improvement of the present facility, will require comprehensive rehabilitation of the existing fabric and building systems.
3. Regulatory constraints applicable to the Dougherty Arts Center building effectively proscribe its expansion or substantial modification.
4. The Dougherty Arts Center building does not presently satisfy the programmatic objectives provided by the City of Austin for the facility.

Based on the project information provided by the City of Austin the programmatic requirements for the Dougherty Arts Center cannot be accommodated in the existing building,[40] therefore alternative facilities should be considered.

Given the conspicuously poor condition of this existing building, discontinuation of the present use of this facility should be a high priority.

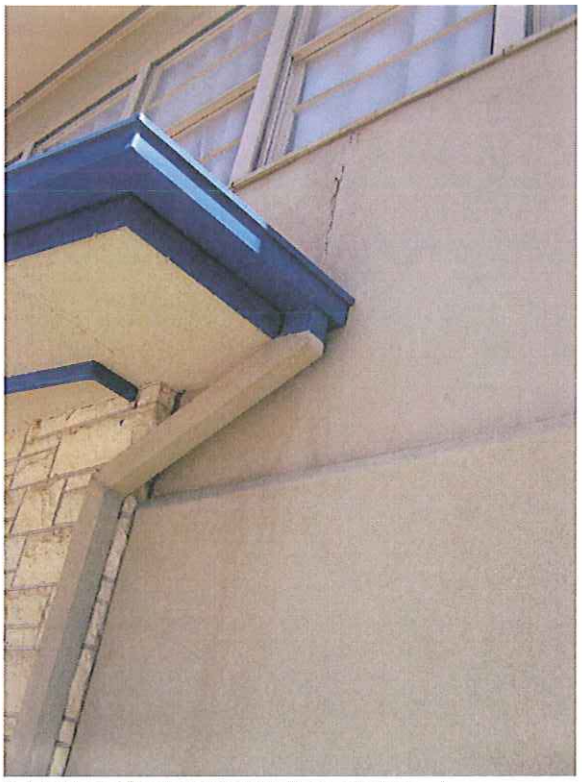
The continuation of the current use of the existing building, as an interim solution, must be supported by a program of emergency repairs to address health and safety concerns arising from the deterioration of the building systems and fabric. Due to the limitations imposed by local amendments to the International Building Code, the budgeting and planning of such a program of repairs will be predicated upon an agreement with the building official regarding both the "current market value" of the building and the extent of "existing health, sanitary or safety code violations" that must be corrected.

The ultimate disposition of the existing building should be addressed by a coherent plan and budgeted accordingly. The projected cost of the comprehensive rehabilitation of the existing building is on the order of $6,900,000. This same sum would be sufficient to construct, on a different site, a new and emphatically more efficient building for the Dougherty Arts Center that better accommodates the City of Austin's programmatic requirements without the liabilities associated with the present site.

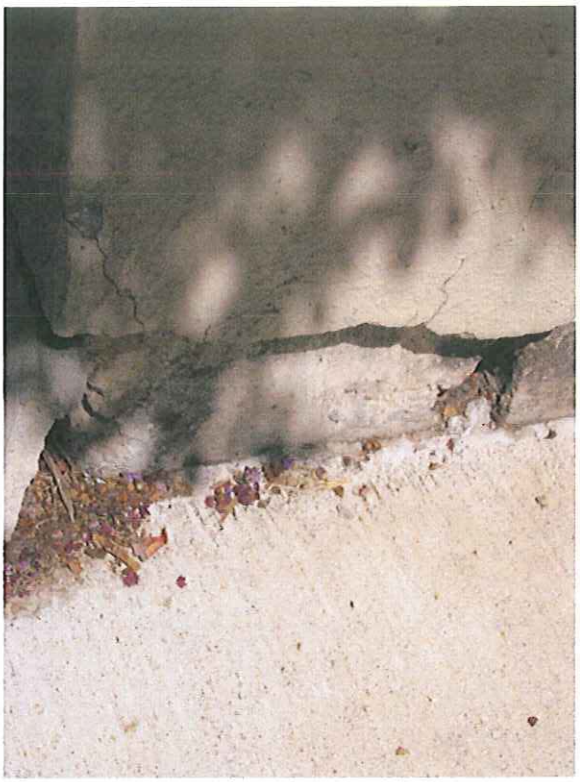
[40] Discounting amendments to the program such as substantially reducing the projected requirements for the facility or dispersal of the present functions of the Dougherty Arts Center to two or more different locations.

1. South façade of the Dougherty Arts Center, facing Barton Springs Road. In general, this façade preserves the original appearance of the 1947 Naval and Marine Reserve Center.

2. The Julia C. Butridge Gallery on the ground floor of Area A: combined vestibule, lobby, corridor, and exhibition space.



3.Failing plaster installation at Area A.



4. Delaminating plaster at Area A.

5. Conspicuous gap at staircase and 2nd floor corridor west side of Area A

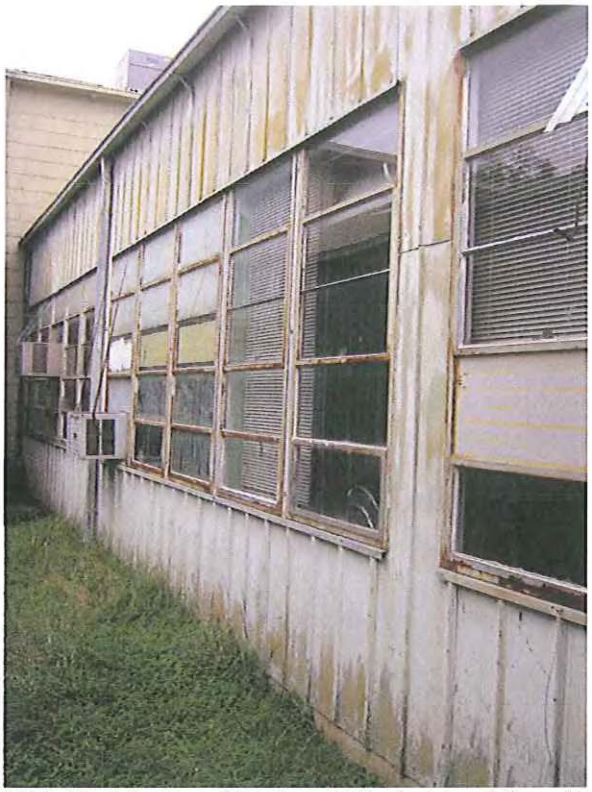
6. Tile condition at connection between Areas A & B.

7. Evidence of raccoon infestation in Area A (202W).

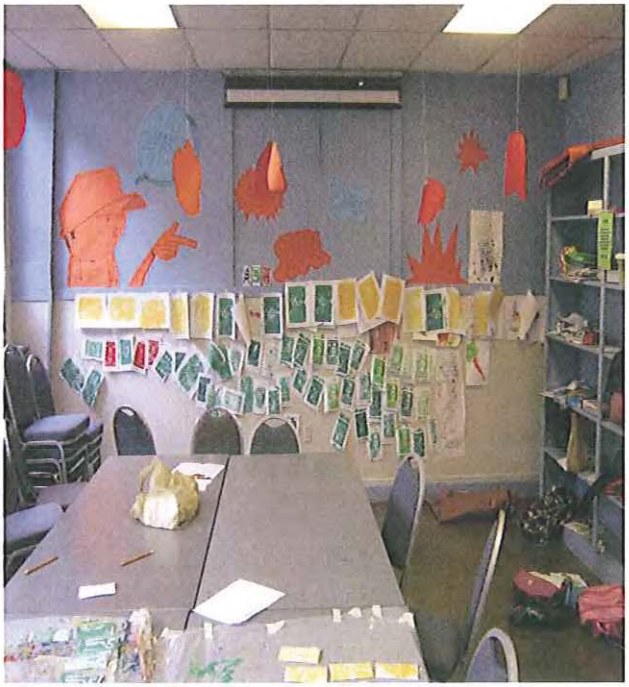
8. Ceiling/roof condition in Area B (5W).

9. Evidence of roof membrane failure in Area B (4W).

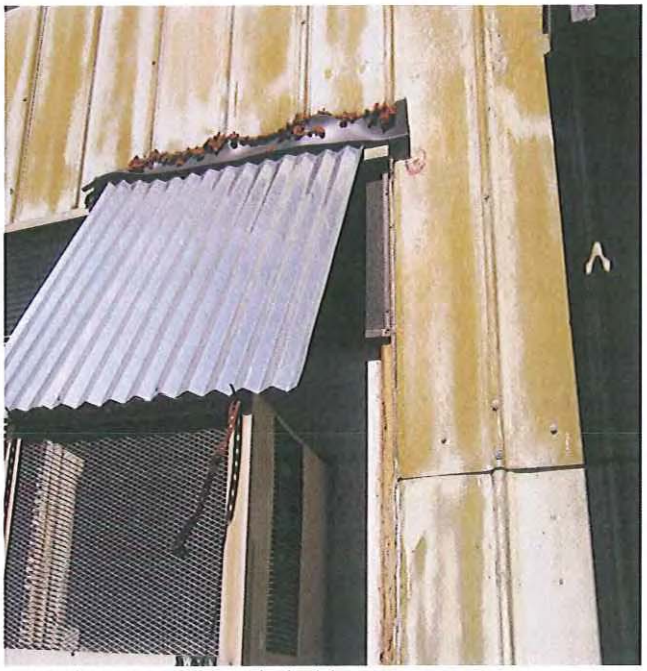
10. Evidence of roof membrane failure and potential mold growth in Area B (2W).



11 A/B. Exterior of East and West side of Area B. Presumed original metal windows and wall panels installed in 1947.

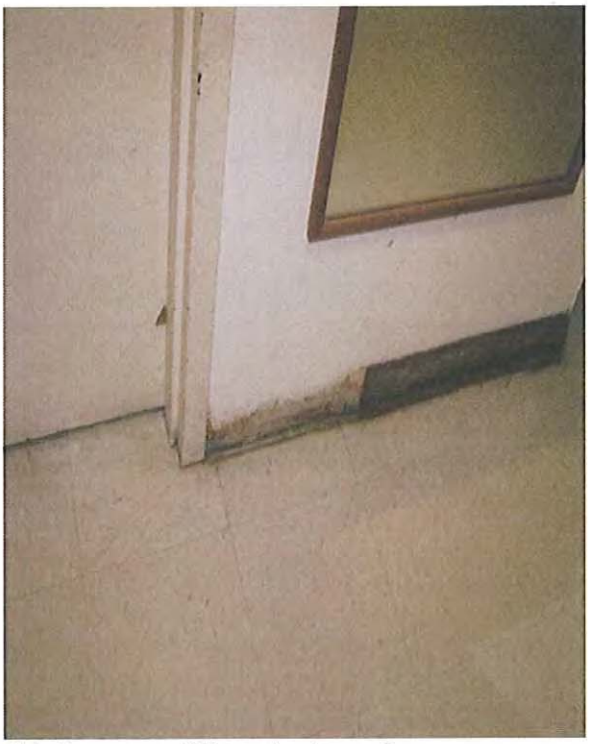


12. Typical asbestos wainscoting in Area B.

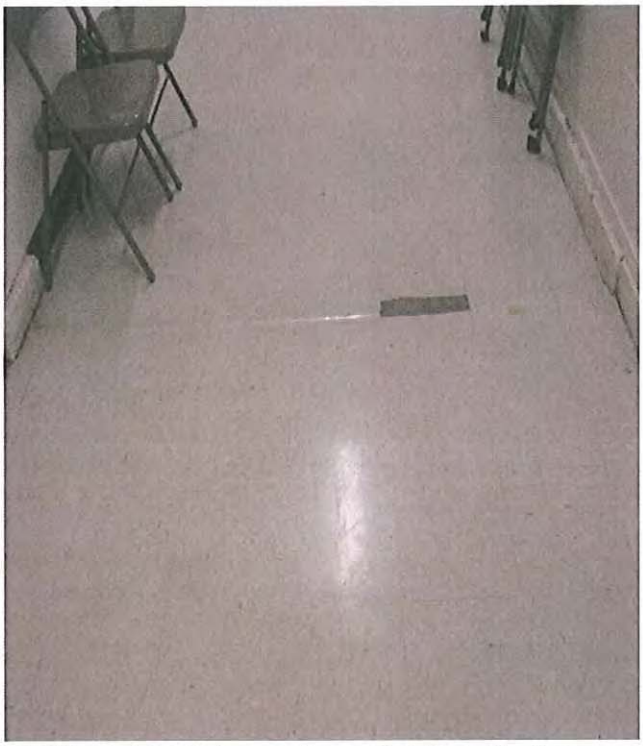


13. Failing metal panel cladding in Area C.

14. Exterior condition of Area C, emphasizing distinction between original and replacement wall panels.



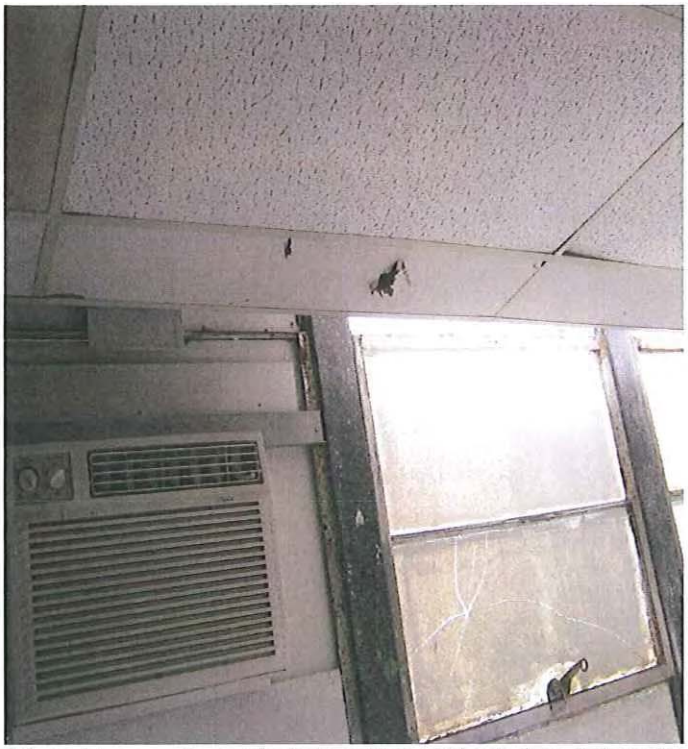
15. Base conditions in Area C.



16. Tile at joint between Areas C & D, indicating evidence of differential slab movement.

17. Joint between Areas A & D.

18. Evidence of past concrete repairs in Area D (8E).

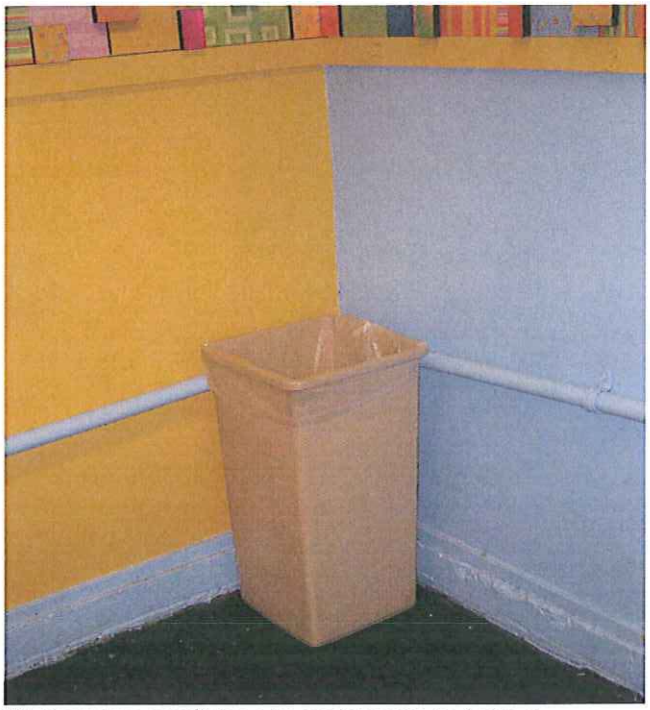


19. Evidence of vermin infestation and window failure in Area D (10E).

20. Slab and tile conditions in Area E (13N).

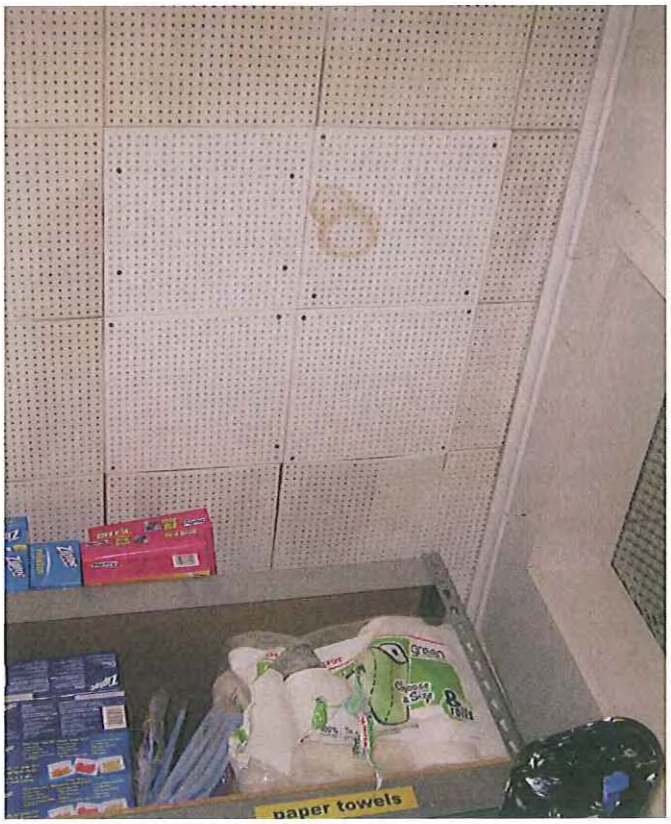
21. Evidence of roof leak in Area E (13N).

22. Interior conditions in Area E.



23. Interior conditions in restrooms in Area E.

24. Evidence of roof leaks in Area E: typical corridor.



25. Evidence of roof leaks in Area E.

26. Evidence of roof leaks in Area E.

27. Evidence of roof leaks and pervasive water damage in Area E.

28. Typical tile conditions throughout Area E

29. Typical exterior conditions of Area E.

30. Typical exterior conditions of Area E.

Appendix A
STRUCTURAL ASSESSMENT

DOUGHERTY ARTS CENTER

GENERAL STRUCTURAL ASSESSMENT

PRESENTED BY

STRUCTURES PE, LLP
1018 W. 11TH STREET SUITE 100
AUSTIN, TEXAS 78703
TEL: 512-499-0919 FAX: 512-320-8521

Table of Contents

DOUGHERTY ARTS CENTER
GENERAL STRUCTURAL ASSESSMENT

Dougherty Arts Center

Introduction

The Dougherty Arts Center, located on 1110 Barton Springs Rd in Austin, Texas, is a post-war steel frame building constructed in 1947. The building was occupied by the Naval and Marine Reserve Center in 1947 and was dedicated to the city of Austin in 1978 in which its current name was adopted. The building has had several remodels and repairs through its course of history, one significant event being the fire on the second floor in 1991. For purposes of this report, the face of the building located along Barton Springs is taken to be the south side, furthermore, refer to Plan 1 for the area designations.

The building is primarily comprised of single level structures with gable roofs with the exception to the south end of the building, area A, which is a two-story structure with a flat roof. The existing foundation appears to be a poured-in-place soil supported system. The superstructure of area A is anticipated to be a steel frame with infill wood frame members for the walls and floor, with the exception of the staircase structures located on the east and west end of this area which are constructed of concrete masonry units (CMU). The superstructures of areas B, C, and D are comprised of rigid tapered steel frames spaced approximately 20 feet on center with light gauge metal roof, light gauge roof purlins, and partial height wood framed walls. Area E is a single level structure with a flat roof, and is anticipated to have been constructed similar to area A.

The focus of this report is to provide a structural assessment of the existing building and to relate the structure with the current building code, International Building Code (IBC) 2003, and current standard construction practices along with code compliance to the American Institute of Steel Construction (AISC) 13th Edition, National Design Specifications (NDS) for Wood Construction 2005 Edition, American Iron and Steel Institute (AISI) 2002 Edition, and the American Concrete Institute (ACI) 318-05. It should also be noted that the building is in the 25 year flood plain and must comply with Section 1612 of the IBC 2003. The observations provided by this office were limited to non-invasive methods and we employed structural assumptions based on our extended experience with historical buildings and conservative assumptions of strength of existing building materials to provide a safe and conservative approach in our assessment.

Foundation

Observations

The foundation supporting the existing building, as observed, was found to be in a stable condition. Minimal cracks were noticed on exposed areas within area B. More severe cracks were noticed in area D. Other areas of the foundation were not visible due to the existing finishes. It appears that the perimeter of the foundation was poured as a perimeter grade beam independently from the slab, see photo 1. There is also a 4 inch tall concrete curb along the perimeter which appears to have been poured monolithically with the perimeter grade beam, see photo 2. The existing column locations are elevated with a 4" tall concrete plinth, see photo 3. Existing concrete beam depth and reinforcement are unknown.

Analysis and Rendered Opinion

A quantifiable analysis of the existing foundation is not possible due to the many unknown factors that can not be determined with non-invasive methods. Furthermore, the many unknown variables make it difficult to relate it to current code and practice.

Overall, the foundation appears to be adequately supporting the self weight of the building and the current occupancy loads. However, there are signs of dilapidation in areas A and D. Photo 1 is taken along the perimeter of the west side of area B, in which it depicts the expansion joint separation between the slab and the perimeter grade beam. This visible separation indicates movement of the foundation. Furthermore, the severe cracks visible in area D are more than normal temperature and shrinkage cracks, thus re-indicating the foundation has experienced movement. Elevations should be taken throughout the foundation to determine the amount of settlement. In addition, it should be noted that the structure may require to be re-leveled with the addition of piers along the perimeter of the building. It should also be noted that additional foundation work will be required to adequately support any required framing modifications as discussed in Superstructures (page 4).

It is the opinion of this office that the foundation will continue to function adequately in its current condition under equivalent loading; however, from the known history of the building and our experience with historical structures, it should be anticipated that the existing construction is not code compliant to the IBC 2003 or the ACI 318-05.

Superstructures

Observations

Area A is the two story structure with a flat roof. It is anticipated that this area is constructed with a steel frame along the perimeter with infill wood frame members for the wall and roof structure. The east and west ends of this area contain the staircases which are constructed of concrete masonry units (CMU). Cracks within the CMU wall were visible at the east end of area A, see photo 4. Overall, the perimeter of the building appeared to be in a good condition with exception to the east staircase. The second level floor structure seemed to have excessive deflection and vibration.

Area B, C, and D are single story structures with a gable roof. These areas are comprised of rigid tapered steel frames spaced at approximately 20 feet on center, with a light gauge metal roof, light gauge purlins, and partial height wood framed walls. Various cracks within the interior finishes were noted, see photos 5-7. The metal siding at the exterior of the building at these areas was also found in a dilapidated condition. The anchorage of the steel frame, as observed, was found to be minimal; however, in a stable condition with no signs of overstressing or dilapidation. Furthermore, there were no visible lateral braces.

Area E is a single story structure with a flat roof. It is anticipated that this area is constructed with a steel frame along the perimeter with infill wood frame members for the wall and roof structure. This area of the building had the most visible roof leaks, see photos 8-9.

Analysis and Rendered Opinion

Area A is in need of some repairs. A quantifiable analysis of the existing structure is difficult to determine due to our non-invasive methods of observation. It is the opinion of this office that the second floor requires additional joists or reinforcement of existing joists to be code compliant for the anticipated loads of an A-1 proposed occupancy load as described per the IBC 2003 and to satisfy the required strength capacities as described in the NDS 2005. Furthermore, the wall framing appears to be in good condition with no required modifications; however, assuming typical framing components for the wall does not satisfy the required structure to resist the anticipated flood loads per Section 1612 in the IBC 2003. The east staircase will require repointing the mortar joints between the CMU block to prevent further dilapidation that may be caused by further weathering and erosion.

Areas B, C, and D require the most amount of structural work in order to recondition the building to a code compliant structure. The existing members as analyzed are only adequate to support the dead load of the structure. These members include the existing "z" light gauge purlins and the tapered rigid steel frame. In order to achieve a code compliant structure per the anticipated roof loads per IBC 2003, the frames will have to be reinforced or spaced at a tighter spacing, as well as the existing purlins. From our analysis, it is assumed that the existing foundation may only be designed for the current anticipated dead loads; thus extensive foundation work will be required as well. Furthermore, additional members will be required for the lateral stability of the structure in order to satisfy the anticipated wind loads per Section 1609 in the IBC 2003. The corroded metal siding has created areas for direct water penetration to the wood framed members, which has led to the decay of these framing components. These items will have to be removed and repaired accordingly, but must also be designed to satisfy the anticipated flood loads. It is recommended that the complete removal and replacement of these areas be considered, as it may be the more economical choice.

Area E requires repairs primarily at the roof level; however, the structure at this area appears to require the least amount of work to achieve a code compliant building. Additional roof members may be required due to anticipated water damage. The largest scope of structural work for this area will be the required structure to resist the anticipated flood loads.

Code Compliance

Presently, the building is non code compliant; however, with extensive work, the building can satisfy current code requirements. The following is a summary of the repairs/recommendations required to bring the existing building up to code:

- The entire building will require modifications to the existing wall framing in order to satisfy current 25 year flood criteria.
    - The new wall design can consist of a "break-away" structure that is designed to break away during the anticipated flood loads
    - Or can consist of a wall designed to resist the flood loads, in which the CMU option should be considered along the perimeter of the building
- The steel framing at areas B, C, and D will need to be heavily reinforced with new steel members. Furthermore, the supporting foundation elements at these portions will require additional reinforcement as well.
    - The option of complete removal of these areas should

be considered, as it is believed to be the more economical choice.
    - Additional lateral bracing will be required to adequately support all lateral loads per IBC 2003.
- Areas A and E appear to require less work than areas B, C, and D, however, these areas were also the least exposed.
    - Known framing deficiencies in these buildings involve the floor framing at area A and the roof framing at area E which will have to be repaired and reinforced to adequately support the anticipated loads per IBC 2003.
- Elevations of the existing foundation should be taken to determine differential settlement.
    - Leveling and stabilization of the existing foundation appears to be currently required along the east end of the building.
    - A more accurate idea of the amount of leveling and stabilization required will be acquired from the collected data of the elevations.
- New footings will be required below column locations to adequately support the anticipated loads per IBC 2003.
    - In addition to the footings, the anchorage of the existing columns will also need to be re-designed and re-constructed to meet standard practice construction and current code compliance.
- It is recommended that moisture readings be taken at the slab on grade to verify the amount of moisture migrating from the soils below into the interior space.
    - It is anticipated that minimal or no vapor barrier was installed below the slab, thus migration of moisture is common in these situations, and should be considered.
- All masonry walls, brick and CMU, should be re-pointed as necessary to fill cracks, voids, and cavities within the wall. The following are some general guidelines for repointing mortar joints:
    - The new mortar must be as vapor permeable and as soft or softer (in compressive strength) than the historic mortar and masonry units.
    - It is assumed that a lime type mortar was used for the construction of the masonry walls. Testing the existing mortar is suggested to determine the composition in order to match the new mortar to be used for repointing. The new lime mortar should be in conformance with ASTM C 207.
    - Repointing an entire wall may be more cost effective in

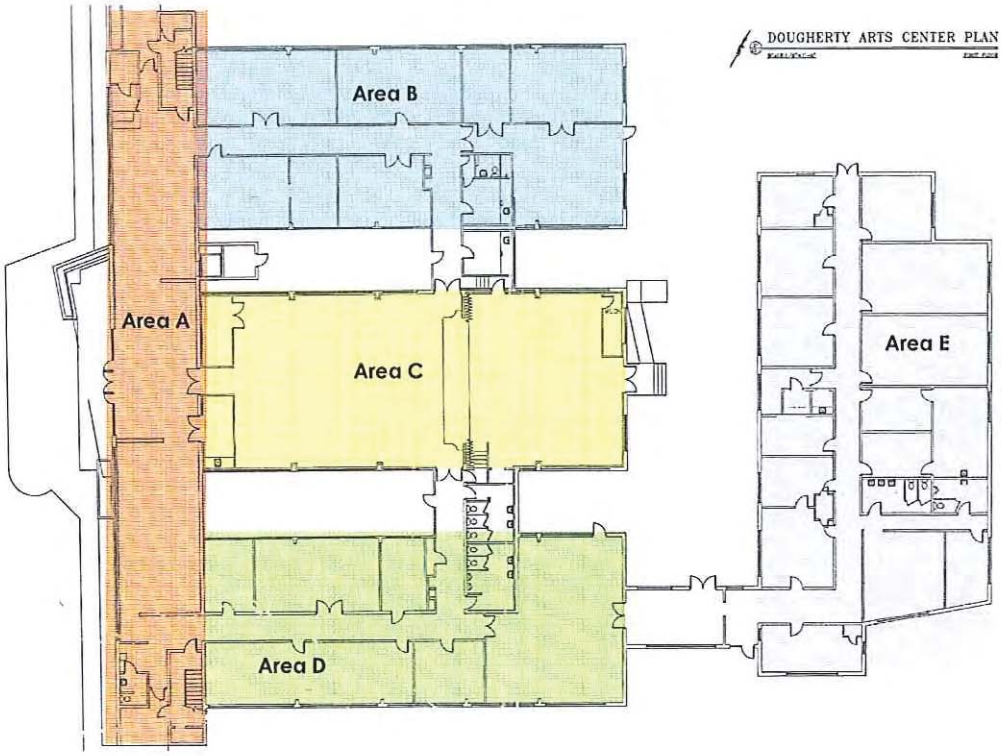
the event that 25 to 50 percent, or more, of a wall needs to be spot repointed.

- Old mortar should be removed to a minimum depth of 2 to 2 ½ times the width of the joint, estimated at 1 inch minimum.
- A moist burlap, or equivalent procedure, should be used for curing the walls after having been repointed.
- Staining new mortar is not recommended, as it may lead to efflorescence.
- Mortar should be fully hardened prior to cleaning. Depending on weather and exposure, thirty days is typically sufficient, and water at a low pressure of 100 psi max should be used along with stiff natural bristle or nylon brushes.
- Efflorescence may appear the first few months of repointing, but usually disappears through the normal process of weathering.

Conclusion of Structural Assessment

The building overall was currently found to be in a stable condition to support its self weight. Many modifications and reinforcements are required to satisfy current code criteria for the structural integrity of the building for the anticipated loads per IBC 2003. Further studies to perform a comprehensive strength evaluation of this building may be required in the event the building or its use is modified. However, due to the inability to adequately determine size, grade, type, spacing and placement of the reinforcing steel within the concrete members, a strength evaluation of the existing structure may not be quantifiable based on measurements and analysis alone. Load testing of the structure may be required to determine its adequacy to support the new code compliant superimposed loads. Additional work will be required to determine a strength evaluation plan, load testing procedure, and evaluation of the existing structure that is satisfactory to all parties concerned should the building or its use be significantly modified. Such work is presently beyond the scope of this office's general structural assessment of this building.

Building Drawings



Plan 1: Dougherty Arts Center Plan

Building Photographs

Photo 1: Expansion joint between perimeter grade beam and slab

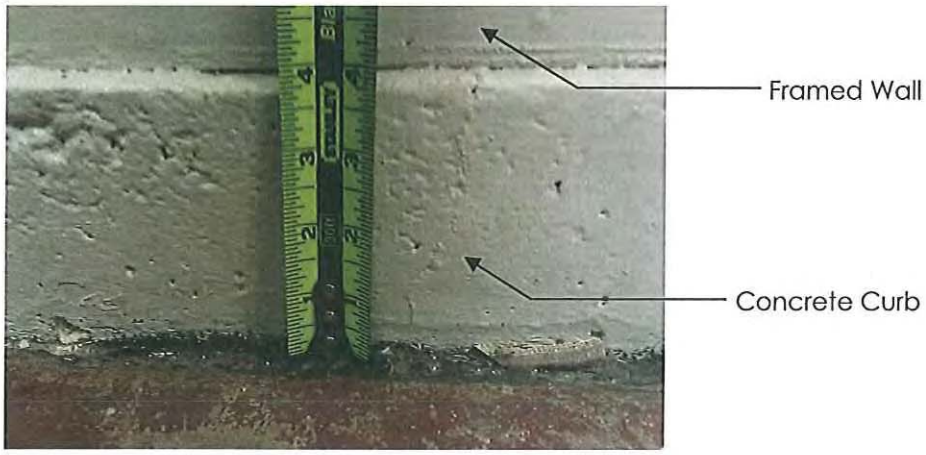


Photo 2: Perimeter grade beam below existing masonry wall of main building

Photo 3: Concrete plinth below column

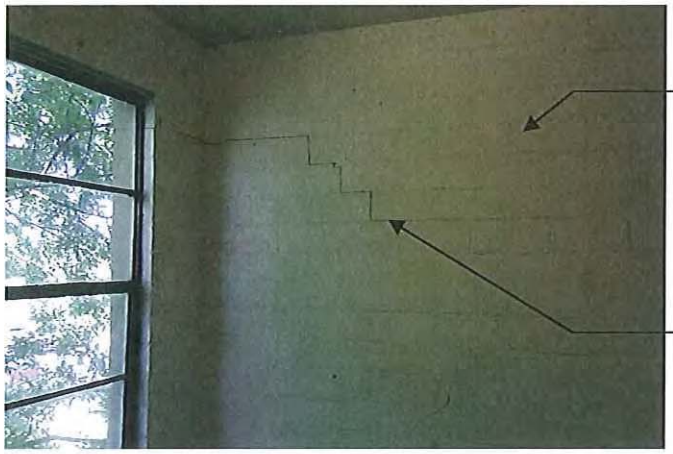


Photo 4: Cracks in CMU wall at east staircase

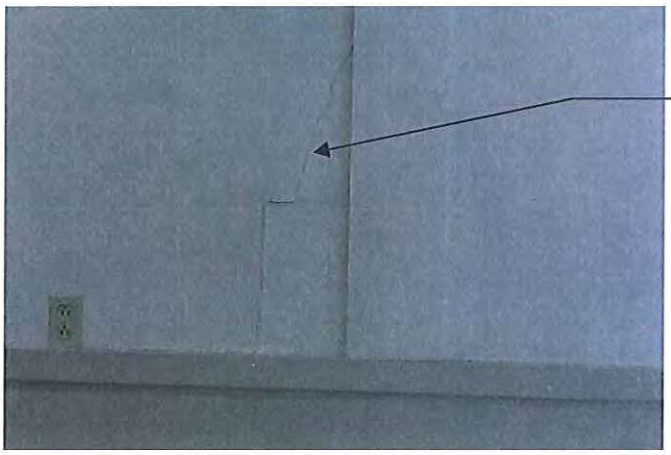


Photo 5: Cracks in gypsum board

Photo 6: Cracks in gypsum board

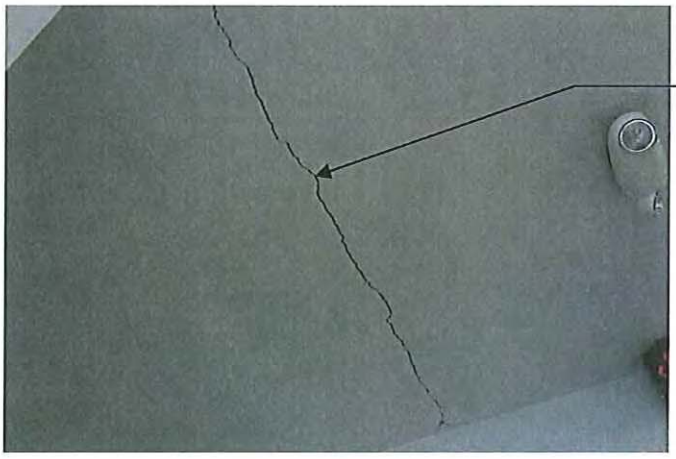


Photo 7: Cracks in gypsum board

Photo 8: Water damage in ceiling

Photo 9: Water damage in ceiling

Appendix B
MECHANICAL, ELECTRICAL AND PLUMBING ASSESSMENT

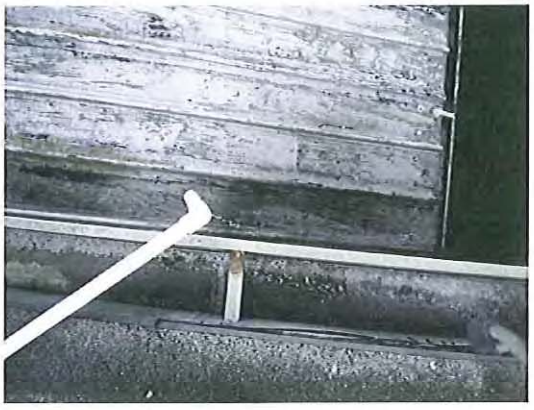
MECHANICAL, ELECTRICAL AND PLUMBING ASSESSMENT CITY OF AUSTIN DOUGHERTY ARTS CENTER

The following is a summary assessment of the existing Dougherty Arts Center, organized according to mechanical, electrical and plumbing systems.

I.) MECHANICAL

1.1 The mechanical systems are maintained based on an effort to minimize complaints from the customers who use this space. The front wing that faces Barton Springs Road was partially destroyed in a fire and rebuilt, and thus has packaged HVAC units on the roof dating from the 1991 remodel.

1.2 The condensate drainage from the rooftop units on the 1991 front remodel drains over the edge of the roof onto the ground, ponding in a corner. This is in violation of current code requirements and makes a problem on the ground, with standing water.



1.3 The auditorium units are several years old but in working condition. The large units serving the classroom areas are approximately 10 years old and appear to be in working condition.

1.4 Many of the offices and classrooms have through-the-wall units. The condensate drainage from these units doesn't meet current City of Austin ordinance requirements, and the units are of various ages.

1.5 In general all of the HVAC is in adequate condition for its current use. However, it does not appear that the quantity of outside air delivered is in compliance with current codes. Indeed, some of the split air handlers do not have outside air intakes at all.

1.6 Some of the heating is served by gas fired unit heaters. These have standard flues through the roof, but no dedicated provision for combustion air, instead obtaining their oxygen for combustion from the classroom space. This is a relatively dangerous setup. It is relieved somewhat by the large amount of leakage apparent from the 63 year old building.

1.7 The darkroom HVAC is a clever hodgepodge of available parts, but doesn't meet curtain code requirements for ventilation and exhaust air.

1.8 It should be noted that the typical service life of direct-expansion type refrigerant based air conditioning systems is 10 to 20 years. Most of the HVAC systems in this building are of this age or older. There may be an advantage to retaining the use of one or two of the systems, but not in a facility expecting to be finished as "new". In addition, a full renovation would likely require such a level of demolition that removal of existing HVAC systems and replacement with new would be less expensive overall.

II.) ELECTRICAL

2.1 Some of the original electrical panels, installed in 1947, remain, but none are in use. It appears that much of the electrical systems were replaced in the 1980s

2.2 The front wing was remodeled in 1991 and the electrical gear in that area dates from that time.

2.3 As might be expected from a continually-used building from 1947, the light fixtures are a mixture of types and efficiencies. The stage lighting appears to be in good condition and have adequate controls.

2.4 If this building is remodeled, then the gear serving the 1991 remodel appears to be in good condition. The gear serving the rest of the building is in working condition, but is nearing the end of its useful life, which can lead to dangerous conditions. It should be replaced.

2.5 It is typically not cost-effective to try and re-use light fixtures in a remodel project. It costs more to take down, clean, re-lamp, store and re-install a light fixture than to just provide new, more efficient fixtures.

2.6 The stage lighting can be re-used, in our opinion, at this building or at a new facility. It is designed to be easily disassembled and relocated, so this should be cost-effective.

III.) PLUMBING

3.1 The plumbing fixtures appear to mostly be original, except for the 1991 remodel. There are very few ADA-compatible drinking fountains in the building.

3.2 There are newer types of plumbing fixtures that use less water than even the fixtures available in 1991, so it would be our recommendation to replace all plumbing fixtures in a full remodel project.

3.3 The plumbing water lines and sanitary waste piping is in working condition, but requires much maintenance and sometimes fairly extensive repairs and replacement. Our recommendation is to replace all of the plumbing throughout the building, without exception.

3.4 The gas meter location is too close to operable windows, so it doesn't meet the gas utility's requirements.

IV.) APPLICABLE CODES

Currently (August 2010)

International Building Code 2006

Uniform Mechanical Code 2006

Uniform Plumbing Code 2006

National Electrical Code 2008

IECC International Energy Conservation Code 2006

International Fire Code2006

As of October 1, 2010

International Building Code 2009

Uniform Mechanical Code 2009

Uniform Plumbing Code 2009

National Electrical Code 2008

IECC 2009

International Fire Code 2009

Appendix C
ROOF ASSESSMENT

January 15, 2010

W. Owen Harrod PhD, AIA
Project Manager
MWM DesignGroup
305 East Huntland Drive
Suite 200
Austin, Texas 78752

Re: Dougherty Arts Center
1110 Barton Springs Road,
Austin, TX 78704

Dear Mr. Harrod,

At your request, Amtech Building Sciences, Inc. has performed a survey of the roof covering the Dougherty Arts Center. Our services were to include comprehensive site visits, roof condition evaluations and recommendations for repair and/or replacement of the existing roof assemblies. The roof area designations referred to in this report are shown on the attached roof plan.

The Building has 18 roof areas. All areas are in various states of disrepair, though some are far worse off than others. A few still have some serviceable life left, but others outlived their serviceable life years ago and require replacement as soon as possible.

EXISTING ROOF ASSEMBLY

SECTION A

Roof Area A1
Wood Deck
Underlayment
4-ply Built-Up roof in Coal Tar Pitch
2- ply Modified Bitumen Cap Membrane

Roof Area A2
Wood Deck
Underlayment
4-ply Built-Up roof in Coal Tar Pitch
2- ply Modified Bitumen Cap Membrane

Roof Area A3
Wood Deck
Underlayment
4-ply Built-Up roof in Coal Tar Pitch
2- ply Modified Bitumen Cap Membrane

Roof Area A4
Wood Deck
Underlayment
4-ply Built-Up roof in Coal Tar Pitch

Roof Area A5
Wood Deck
2" Perlite Insulation
2-ply Modified Bitumen Membrane

Roof Area A6
Wood Deck
2" Perlite Insulation
2-ply Modified Bitumen Membrane

SECTION B

Roof Area B1
Wood Deck
Underlayment
Metal Roof Panels

Roof Area B2
Wood Framing
Metal Roof Panels

Roof Area B3
Wood Deck
Underlayment
4-ply Built-Up Roof in Coal Tar Pitch
Flood Coat and Gravel

SECTION C

Roof Area C1
Wood Deck
Underlayment
Metal Roof Panels

Roof Area C2
Wood Framing
Metal Roof Panels

Roof Area C3
Wood Deck
Underlayment
4-ply Built-Up Roof in Coal Tar Pitch
2-ply Modified Bitumen Cap Membrane

SECTION D

Roof Area D1
Wood Deck
Underlayment
Metal Roof Panels

Roof Area D2
Wood Deck
Underlayment
2-ply Modified Bitumen Cap Membrane

SECTION E

Roof Area E1
Wood Deck
Underlayment
2-ply Modified Bitumen Cap Membrane

Roof Area E2
Wood Deck
Underlayment
4-ply Built-Up Roof in Coal Tar Pitch
2-ply Modified Bitumen Cap Membrane
Topcoat of Elastomeric Roof Sealant

Roof Area E3
Metal Framing
Metal Roof Panels

Roof Area E4
Metal Framing
Metal Roof Panels

EXECUTIVE SUMMARY

Damage to the roof covering was observed in multiple locations across Section A of the building. Water is ponding in multiple locations along the north edges of Roof Areas A1, A2 and A3 due to inadequate roof slope along this edge. The roofing on these sections is 15 years old, and therefore technically has some service life left, but due to the inadequate slope it has already begun to fail. Based on core cuts, it does not appear that water has yet breached the roof surface, but it is only a matter of time before leaks develop.

Roof Areas A5 and A6 are two of the more recently roofed sections that still reasonably have five to ten years of serviceable life left.

Roof Areas B1, C1 and D1 are metal, and were installed with the original building in 1947. They have been patched and repaired many times, and have long outlived their serviceable life. The panels themselves are close to being rusted through in a number of places, and the patches that have been installed over the years have degraded to the point where multiple leaks are developing on all three of these roof areas.

Roof Areas B2 and C2 are simple wood frame canopies, with metal panels built to provide rain protection from those leaving through rear doors. These areas are worn and are in need of repairs, but are still serving their purpose. They should be replaced before they begin to fail.

Roof Areas B3 and C3 are both in reasonable condition, also having between five and ten years of serviceable life remaining, but should be replaced before they begin to fail.

Roof Area D2's membrane cap is completely degraded, with multiple tears all the way through the membrane, requiring immediate replacement.

Roof Areas E1 and E2 have received an elastomeric top coat over the modified bitumen roof. This has extended the life of this roof, and it still has the potential of lasting another five to ten years, but inadequate slope has led to ponding that could advance the wear on these areas.

Roof Areas E3 and E4 are a small shed and a metal canopy, respectively. Both are reasonably new and do not require replacement.

SITE OBSERVATIONS

SECTION A

Roof Area A1:

Slope:	Due to a lack of positive drainage in the existing system, evidence of ponding water was observed.
Membrane:	The roof covering consists of 4 plies of built-up roof in coal tar pitch that has been covered with 2 plies of modified bitumen. Excess ponding has caused molding to occur in a few locations, and this modified bitumen cap has begun to degrade in multiple locations.
Wall Flashing:	Mold has developed at the wall flashings from improper drainage, and most likely from lack of the necessary through-wall flashings.
Roof Edge:	Edge flashing is 30+ years old and will be replaced when this section is re-roofed.

Roof Area A2:

Slope:	Due to a lack of positive drainage in the existing system, large areas of ponding water were observed.
Membrane:	The roof covering consists of 4 plies of built-up roof in coal tar pitch that has been covered with 2 plies of modified bitumen. Excess ponding has caused molding to occur in a few locations, and this modified bitumen cap has begun to degrade in multiple locations.
Roof Edge:	Edge flashing is 30+ years old and will be replaced when this section is re-roofed.

Roof Area A3:

Slope:	Due to a lack of positive drainage in the existing system, large areas of ponding water were observed.
Membrane:	The roof covering consists of 4 plies of built-up roof in coal tar pitch that has been covered with 2 plies of modified bitumen. Excess ponding has caused molding to occur in a few locations, and this modified bitumen cap has begun to degrade in multiple locations.
Wall Flashings:	Improper drainage has caused the flashing between Roof Areas A2 and A3 to degrade. It will require replacement.
Roof Edge:	Edge flashing is 30+ years old and will be replaced when this section is re-roofed.

Roof Area A4:

Slope:	This area contained minor evidence of ponding water due to inadequate slope.
Membrane:	The coal tar bitumen membrane has begun to degrade due to improper drainage, but still has some serviceable life. This area has also experienced some gravel loss.
Wall Flashing:	Wall flashings have begun to break down and are due for replacement.
Roof Edge:	The gutter at the roof edge was in reasonable shape and is still serving its purpose.

Roof Area A5:

Slope:	This area is sloped adequately and shows no evidence of ponding water.
Membrane:	The membrane is in good shape and has not begun to degrade.
Roof Edge:	The edge flashings are worn but still serving their purpose. They could stand to be scraped, primed and painted.

Roof Area A6:

Slope:	This area is sloped adequately and shows no evidence of ponding water.
Membrane:	The membrane is in good shape and has not begun to degrade.
Roof Edge:	The edge flashings are worn but still serving their purpose. At minimum, they should be scraped, primed and painted.

SECTION B

Roof Area B1:

Slope:	N/A
Metal Panels:	The metal panels are no longer serving to keep this area watertight. They have been patched many times, but now even the patches are extremely degraded. These panels require immediate replacement.
Wall Flashing:	The wall flashings at the south end are in poor shape and require replacement.
Roof Edge:	The gutters are in serious disrepair and require immediate replacement.

Roof Area B2:

Slope:	N/A
Metal Panels:	Simple corrugated panels have begun to rust and should be replaced, but they are still currently serviceable.
Wall Flashing:	The wall flashings are still functional, but could stand to be replaced.

Roof Area B3:

Slope:	Slope is adequate, no evidence of ponding was found.
Membrane:	The roof covering consists of 4 plies of built-up roofing in coal tar pitch, with a flood coat and gravel. The surface has lost some of its gravel, but is still serviceable. Based on its age, it should be replaced because it likely has approximately five years of serviceable life left.
Wall Flashing:	Wall flashings are aged and in need of replacement.
Roof Edge:	Flashings are aged, but are still serving their purpose.

SECTION C

Roof Area C1:

Slope:	N/A
Metal Panels:	The metal panels are no longer serving to keep this area watertight. They have been patched many times, but now even the patches are extremely degraded. These panels require immediate replacement.
Wall Flashing:	The wall flashings at the south end are in poor shape and require replacement.
Roof Edge:	The gutters are in serious disrepair and require immediate replacement.

Roof Area C2:

Slope: N/A

Metal Roof Panels: Simple corrugated panels have begun to rust and should be replaced, but they are currently still serviceable.

Wall Flashing: The wall flashings are still functional, but should be replaced.

Roof Area C3:

Slope: Slope is adequate; no evidence of ponding was found.

Membrane: The modified bitumen membrane is in reasonable shape, with minor evidence of degradation. The membrane still has a serviceable life of five to ten years.

Wall Flashing: Flashing is aged, but still functional.

Roof Edge: Flashings are aged, but still functional. They should be scraped, primed and painted.

SECTION D

Roof Area D1:

Slope: N/A

Metal Roof Panels: The metal panels are no longer serving to keep this area watertight. They have been patched many times, but now even the patches are extremely degraded. These panels require immediate replacement.

Wall Flashing: The wall flashings at the south end are in poor shape and require replacement.

Roof Edge: The gutters are in serious disrepair and require immediate replacement.

Roof Area D2:

Slope: The slope on this area is adequate.

Membrane: The membrane is completely degraded and has no serviceable life left.

Roof Edge: Edge metal should be replaced along with the roof surface.

SECTION E

Roof Area E1:

Slope:	Due to a lack of positive drainage in the existing system, evidence of minor ponding water was observed.
Membrane:	The modified bitumen membrane has been covered with an elastomeric coating, prolonging its serviceable life. This area may have another five to ten years of serviceable life if minor ponding water does not further degrade the membrane.
Roof Edge:	Edge metal should be scraped, primed and painted.

Roof Area E2:

Slope:	Slope appeared adequate, no evidence of ponding water found.
Membrane:	The modified bitumen membrane has been covered with an elastomeric coating, prolonging its serviceable life. This area may have another five to ten years of serviceable life.
Roof Edge:	Edge metal should be scraped, primed and painted.

Roof Area E3:

Slope:	N/A
Metal Panels:	Metal panels are reasonably new and do not require replacement.

Roof Area E4:

Slope:	N/A
Metal Panels:	Metal panels are reasonably new and do not require replacement.

CONCLUSIONS

SECTION A

Roof Area A1:
The roof surface is degraded and extensive mold has developed along wall flashings. This area requires replacement.

Roof Area A2:
Due to inadequate slope, ponding water has begun to degrade the roof surface. This area requires replacement and improved slope, using tapered insulation.

Roof Area A3:
Due to inadequate slope, ponding water has begun to degrade the roof surface. This area requires replacement and improved slope, using tapered insulation.

Roof Area A4:
Due to the gravel loss and evidence of ponding water, this area should be replaced. Modified bitumen and tapered insulation should be installed.

Roof Area A5:
The membrane on this area is in reasonable shape and does not require immediate replacement. Edge metal should be scraped, primed and painted.

Roof Area A6:
The membrane on this area is in reasonable shape and does not require immediate replacement. Edge metal should be scraped, primed and painted.

SECTION B

Roof Area B1:
The metal panels are degraded far beyond any serviceable life and require immediate replacement.

Roof Area B2:
This small metal canopy is in poor shape and could stand to be rebuilt to ensure a longer life, but currently still has approx. 5 years of serviceable life.

Roof Area B3:
Coal tar surfacing has begun to degrade due to age and gravel loss. It still has a serviceable life of five to ten years, but could stand to be replaced before failures begin to occur.

SECTION C

Roof Area C1:
The metal panels are degraded far beyond any serviceable life and require immediate replacement.

Roof Area C2:
This small metal canopy is in poor shape and could stand to be rebuilt to ensure a longer life, but currently still has approx. 5 years of serviceable life.

Roof Area C3:
The membrane and edge metal have both seen reasonable wear, but still have a serviceable life of five to ten years, but could stand to be replaced before failures occur.

SECTION D

Roof Area D1:
The metal panels are degraded far beyond any serviceable life and require immediate replacement.

Roof Area D2:
The Modified Bitumen membrane is degraded far beyond any serviceable life and requires immediate replacement.

SECTION E

Roof Area E1:
The elastomeric coating on this roof has extended its serviceable life, which stands at approximately ten years as long as minor ponding does not increase and degrade the surface. This area does not need immediate replacement.

Roof Area E2:
The elastomeric coating on this roof has extended its serviceable life, which stands at approximately ten years. This area does not need immediate replacement.

Roof Area E3:
This small shed is reasonably new and does not require replacement.

Roof Area E4:
This metal canopy is reasonably new and does not require replacement.

RECOMMENDED ROOF REPLACEMENT ASSEMBLY

SECTION A

Roof Area A1
Remove roof to wood deck
Install new underlayment
1/8"/ft. tapered polyisocyanurate insulation, w/ 3" starting thickness, adhered in low rise adhesive
1/2" glass-faced gypsum roof board adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

Roof Area A2
Remove roof to wood deck
Install new underlayment
1/8"/ft. tapered polyisocyanurate insulation, w/ 3" starting thickness, adhered in low rise adhesive
1/2" glass-faced gypsum roof board adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

Roof Area A3
Remove roof to wood deck
Install new underlayment
1/8"/ft. tapered polyisocyanurate insulation, w/ 3" starting thickness, adhered in low rise adhesive
1/2" glass-faced gypsum roof board adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

Roof Area A4
Remove roof to wood deck
Install new underlayment
1/8"/ft. tapered polyisocyanurate insulation, w/ 3" starting thickness, adhered in low rise adhesive
1/2" glass-faced gypsum roof board adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

SECTION B

Roof Area B1
Remove roof to wood deck
Install new underlayment
Install new standing seam metal roof panels

Roof Area B2
Remove roof to wood framing
Install new plywood decking
Install new underlayment
Install new standing seam metal roof panels

Roof Area B3
Remove roof to wood deck
Install new underlayment
3" polyisocyanurate insulation, adhered in low rise adhesive
1/2" glass-faced gypsum roof board, adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

SECTION C

Roof Area C1
Remove roof to wood deck
Install new underlayment
Install new standing seam metal roof panels.

Roof Area C2
Remove roof to wood framing
Install new plywood decking
Install new underlayment
Install new standing seam metal roof panels.

Roof Area C3
Remove roof to wood deck
Install new underlayment
3" polyisocyanurate insulation, adhered in low rise adhesive
1/2" glass-faced gypsum roof board, adhered in low rise adhesive
2-ply modified bitumen membrane, torch-applied

SECTION D

Roof Area D1
Remove roof to wood deck
Install new underlayment
Install new standing seam metal roof panels.

Roof Area D2
Remove roof to wood Deck
Install new underlayment
3" polyisocyanurate insulation adhered in low rise adhesive
1/2" glass-faced gypsum roof board adhered in low rise adhesive
2-ply modified bitumen membrane torch applied

ESTIMATED COST OF CONSTRUCTION

The following estimates include all work required to perform the replacement of the existing roof assemblies including the following:

- Demolition - Removal and disposal of existing roofing and flashing down to existing deck.
- New sheet metal flashings - copings, counterflashings, gutters, etc.
- New roof penetration flashings - mechanical, electrical, equipment screen supports, etc.
- Mechanical and electrical work - disconnecting and reconnecting HVAC units and other mechanical equipment as needed.
- Site visits during the construction process twice a week to ensure proper assembly.

Roof Area A1	90 sf	x	$15.00/sf	=	$	1,350.00
Roof Area A2	1,221 sf	x	$15.00/sf	=	$	18,315.00
Roof Area A3	2,534 sf	x	$15.00/sf	=	$	38,010.00
Roof Area A4	334 sf	x	$15.00/sf	=	$	5,010.00
Roof Area B1	4,450 sf	x	$12.00/sf	=	$	53,400.00
Roof Area B2	78 sf	x	$12.00/sf	=	$	936.00
Roof Area B3	349 sf	x	$15.00/sf	=	$	5,235.00
Roof Area C1	4,450 sf	x	$12.00/sf	=	$	53,400.00
Roof Area C2	78 sf	x	$12.00/sf	=	$	936.00
Roof Area C3	349 sf	x	$15.00/sf	=	$	5,235.00
Roof Area D1	4,450 sf	x	$12.00/sf	=	$	53,400.00
Roof Area D2	51 sf	x	$15.00/sf	=	$	765.00

Total Estimated Cost of Construction	**$235,992.00**
Estimated Consultant Fees: 7.5% of the overall cost of construction	$ 17,699.40
Total Construction Budget	**$253,691.40**

(Evaluation Photos Attached)

PHOTOS – ROOF AREA A1

Photo A-1.1 Mold at wall flashing.

Photo A-1.2 Looking west. Damage at roof edge.

PHOTOS – ROOF AREA A2

Photo A-2.1 Roof edge w/ weathered fascia.

Photo A-2.2 Looking west, ponding at roof edge

Photo A-2.3 Evidence of ponding in NW corner.

Photo A-2.4 Evidence of ponding near RTU.

PHOTOS – ROOF AREA A3

Photo A-3.1 NW corner w/ evidence of ponding.

Photo A-3.2 Ponding along North edge.

Photo A-3.3 Membrane decay at RTU.

Photo A-3.4 Ponding at NE corner.

PHOTOS – ROOF AREA A4

Photo A-4.1 West end of A4, gravel loss noted.

Photo A-4.2 East end of A4, gravel loss noted.

PHOTOS – ROOF AREA A5, A6

Photo A-5.1 Flashing weathered, but functional.

Photo A-6.1 Membrane aged, but serviceable.

PHOTOS – ROOF AREA B1

Photo B-1.1 Looking North.

Photo B-1.2 Decayed roof patching.

Photo B-1.3 Rusted panels, worn ridge sealing.

Photo B-1.4 Patchwork gutters – some sections are still serviceable; others are failed.

PHOTOS – ROOF AREA B3

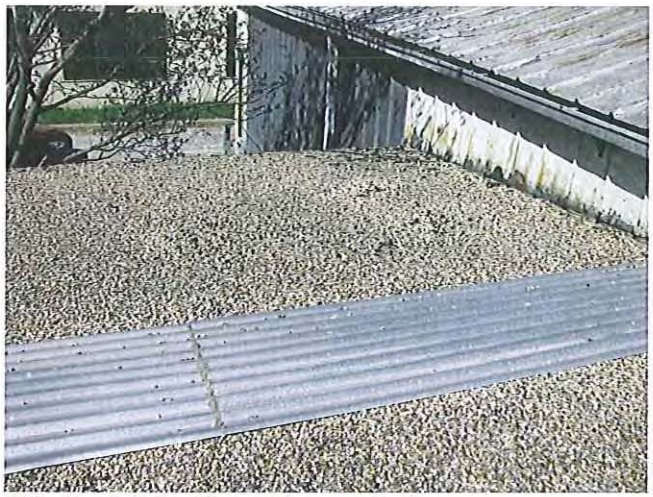


Photo B-3.1 Gravel loss noted.

PHOTOS – ROOF AREA C1

Photo C-1.1 Looking North.

Photo C-1.2 Seal at lap joints not watertight.

Photo C-1.3 Failing ridge patch.

Photo C-1.4 Failing wall flashing.

PHOTOS – ROOF AREA D1

Photo D-1.1 Looking north.

Photo D-1.2 Degradation at roof edge.

PHOTOS – ROOF AREA D2

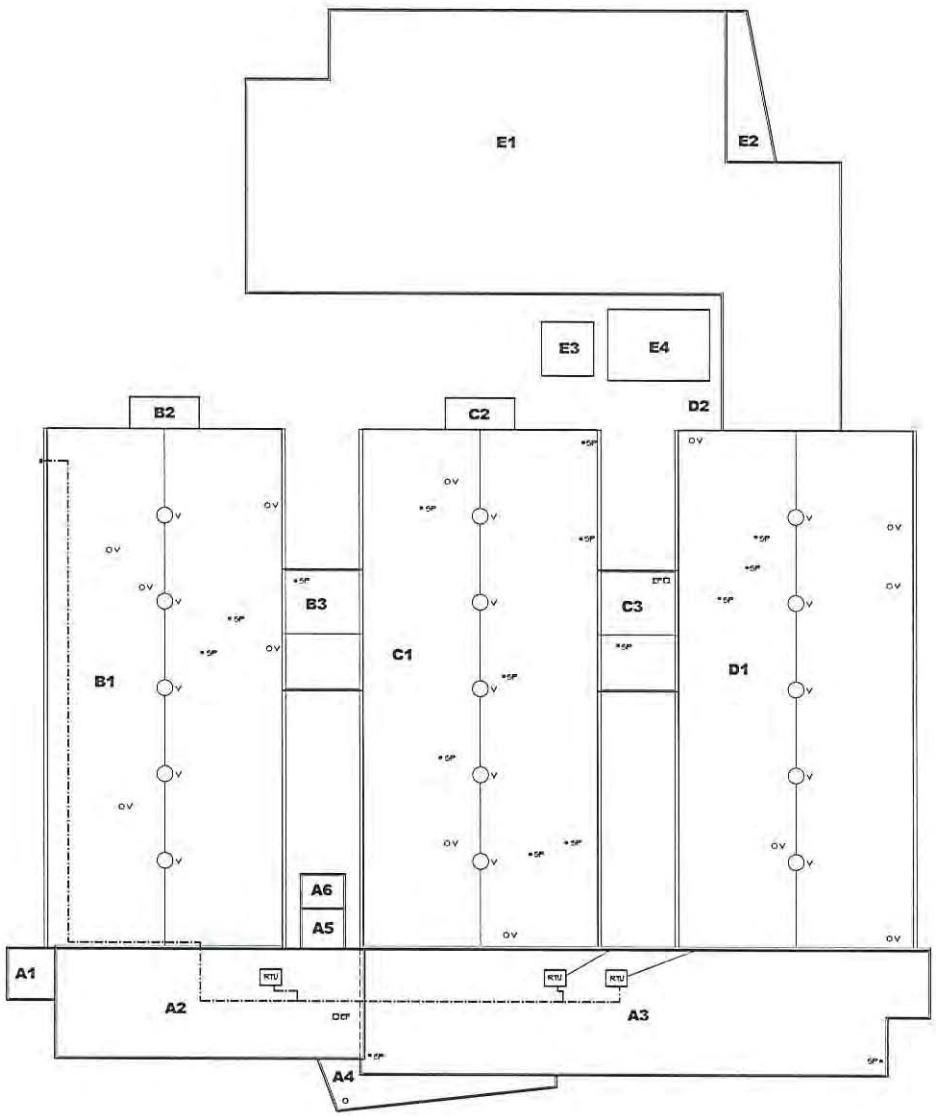
Photo D-2.1 Failed Membrane.

Thank you for the opportunity to assist in assessing the condition of this property. Please do not hesitate to contact us with any questions or if we can be of further assistance.

Sincerely:

Elijah Johnston-Heck
Design/Project Manager
Amtech Building Sciences, Inc.

Roof Plan Attached



ROOF PLAN - DOUGHERTY ARTS CENTER

SCALE: 3/32" = 1'-0"

PLAN NORTH

FIELD MEASUREMENTS ARE REQUIRED FOR BIDDING PURPOSES

DOCUMENT FOR REVIEW ONLY. NOT INTENDED FOR BIDDING, PERMIT OR CONSTRUCTION PURPOSES

PAUL C. CREHS, JR. AIA, CSI REGISTRATION NO. 4041

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ROOF PLAN

DRAWN BY: AH

APPROVED BY: EJH

PROJECT NO: 10-050

DATE: August 9, 2010

SCALE: SEE DRAWING

SHEET: R1 OF