



June 4, 2018

Erik Skogquist
President, Windego Park Historical Society
1815 3rd Ave
Anoka, MN 55303

WINDEGO AMPHITHEATER CONDITION REVIEW

The condition assessment observations of the Windego Amphitheater located in Anoka, MN were completed by Structural Engineer Stephen Hearn, PE, LEED AP on May 24, 2018. We conducted our assessment in accordance with the recommendations contained in ASCE's Guideline for Structural Condition Assessment of Existing Buildings, (SEI/ASCE 11-99). The scope of work was limited to the following:

- Review of original construction documents
- Review of prior reports and assessments
 - Collaborative Design Group 2006
 - Kimley-Horn 2017
- Visual inspection of the amphitheater concrete
- Preliminary condition evaluation and recommendations

The conclusions and recommendations found within this report are based on visual observations only; no testing or invasive investigation was undertaken. There are no guarantees direct or implied within this report.

The amphitheater was constructed circa 1914. It is constructed with approximately 3" thick concrete cast directly on grade. The concrete is unreinforced. Based on exposed soil areas it appears the subgrade is primarily sand.

Overall the concrete is in very poor condition. All the exposed concrete surfaces are heavily weathered. The northern most quarter of the amphitheater is completely overgrown. What portions of concrete that are visible in this area are extensively broken and jumbled. Paul Pierce of the Windego Park Historical Society advised that the entire site was overgrown and that they removed vegetation from the southern two thirds of the amphitheater in approximately 1980. Selective repairs were made to the concrete in approximately 1990.

The concrete where it is not overgrown is extensively cracked with significant areas of heaving and spalling. Stair risers and treads are bowing, misaligned, and otherwise displaced. The cracking has allowed water to infiltrate to the subgrade which led to significant freeze thaw action. This combined with vegetation that has grown over the years has led to the significant deterioration that is now evident. Previous repairs that appear to consist of concrete patches over cracked and spalled areas have failed and it is evident there has been significant additional deterioration since these repairs were completed.

Concrete stair steps on top of the main treads and risers appear to have been cast separately. They are not attached to the concrete below. Many of the steps are displaced or missing making ascending or descending the amphitheater difficult.

The walls surrounding the orchestra pit are bowing inwards and are unstable. The concrete is heavily cracked and with significant spalling of the surfaces.

The amount of displacement and movement of the concrete indicates failure of the subgrade below the concrete. This is due to the freeze-thaw action of ice and water and heaving of the soil subgrade below. Where concrete is displaced or lifted we would expect to find large voids under the concrete.

In our opinion the concrete cannot be repaired or salvaged. To restore the amphitheater, the existing concrete would need to be removed so the subgrade can be repaired and provisions for proper drainage of the soils are provided. Then all new properly designed concrete matching the original profile of the amphitheater installed. Selective repairs that involve patching or filling cracks will not hold up due to the very poor condition of the existing concrete. Additionally, without repairing the subgrade the existing subgrade and concrete will continue to move over time creating further deterioration.

Because of the extent of loose, broken and spalled concrete, combined with the missing stair steps, we feel that the amphitheater in its current condition poses a danger to the public. We recommend that until it is restored that access to the area should be restricted.

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed engineer under the laws of the State of Minnesota.

LHB



STEPHEN W. HEARN, P.E.
STRUCTURAL ENGINEER
MN License # 25409

c: Lisa LaCasse, City of Anoka
LHB File # 180068.00



To: City of Anoka
2015 First Avenue North
Anoka, MN

Attn: Lisa LaCasse

From: Neil A. Groom, PE
Kimley-Horn and Associates, Inc.

Date: November 21, 2017

Subject: Condition Assessment – Anoka Amphitheatre, Anoka, MN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the State of Minnesota.

Neil A. Groom

Date: 11-21-17
Minnesota Registration No. 44774

To Whom It May Concern:

The purpose of this letter is to report the findings of a structural engineering review of the distressed cast-in-place concrete amphitheater along the Rum River in Anoka, Minnesota.

ASSIGNMENT

Kimley-Horn has been retained to provide a structural engineering assessment of the distressed cast-in-place concrete amphitheater along the Rum River in Anoka, Minnesota, as directed by Lisa LaCasse from the City of Anoka.

BACKGROUND

The above referenced amphitheater was built in 1914, complete with a sound wall and ticket booth at the top and back of the amphitheater, a steel post and cable supported canvas awning, and dressing and storage rooms below the upper seats of the north section. It was used for amateur plays, historical pageants, operettas, recitals, concerts, and other forms of live entertainment, as well as community meetings, church services, ceremonies and other public events until the late 1930's. In 1940 it is our understanding that the metal work for the awning was torn down and sent to the scrap metal yard for the war effort. The amphitheater apparently went unused or minimally used for the next 40 years. During this time the back wall and ticket booth and many of the handrails were removed, the dressing and storage rooms filled in and sealed off, the concrete seating started to deteriorate, and light vegetation started to grow in cracks in the concrete. In 1979 a planning study was done by a University of Minnesota landscape architect student for the amphitheater and surrounding area to potentially renovate the theater. It was listed on the National Register of Historic Places in 1980, without the approval of the Anoka City Commission. In 1984, there was an effort by the Anoka City Manager to remove the amphitheater from the National Register, but the request was denied by the Minnesota Historical Society. The amphitheater continued to deteriorate through the end of the 1900's and into the 2000's. In 2005 a condition assessment and report was completed by Collaborative Design Group, but none of the recommended repairs were completed due to economic and political constraints. The City of Anoka is requesting that an independent structural engineer assess the condition of the amphitheater,

comment on the current structural condition, and provide repair suggestions for the existing structure.

DESCRIPTION

The amphitheater consists of cast-in-place concrete stairs and seating, constructed into the side of a hill, located along the west bank of the Rum river south of the Main Street Bridge, directly adjacent to Highway 169 in Anoka, MN. There are four sections to the amphitheater, separated by aisles of intermediate steps between each seating row. For this report the south section will be considered area A and the north section will be considered area D, with the middle sections B and C, respectively. Sections A and D have 17 rows of seats, and the middle two sections B and C have 20 rows, including the orchestra pit. The orchestra pit lies directly in front of a grass stage. The amphitheater had a reported capacity of approximately 1600 people.

OBSERVATION AND COMMENTS

1. The following information was obtained through site visits on October 16, October 23, and November 9, 2017 by Neil Groom, PE of Kimley-Horn:
 - a. The site visits included visual observations of the concrete amphitheater and orchestra pit. No destructive or invasive testing was completed.
 - b. There are five rows of intermediate concrete steps. Two line the north and south edges of the amphitheater and three that separate the amphitheater into four sections. Many of these intermediate concrete steps are missing.
 - c. In Section A, every row of seating had moderate to severe concrete spalls and cracks and most of the rows had one or more surface offset from the adjacent surface at a crack or joint.
 - d. In Section B, every row of seating had severe concrete spalls and cracks, almost all the rows had one or more surface offset from the adjacent surface at a crack or joint, and about half of the rows had moderate to severe outward leaning of the vertical riser of the seating.
 - e. In Section C, every row of seating had severe concrete spalls and cracks, offset surfaces at cracks and joints, and severe outward leaning of the vertical riser of the seating. Some rows were deteriorated so severely that large pieces of the concrete were missing and the exposed soil was washing out.
 - f. In Section D, every row of seating was severely cracked, spalled, offset, and leaning, and deteriorated so badly that mature vegetation had taken over almost the entire section.
 - g. The orchestra pit floor and walls were severely cracked and spalled. The walls had concrete delamination of the exposed surface. The top of the east wall had a severe horizontal crack that allowed the wall to separate from the concrete walk at grade above the wall. The floor drain in the southeast corner of the orchestra pit was noted to be in poor condition, cracked and eroded and can't provide support for the floor drain grating.

- h. No steel reinforcement was found in any part of the concrete construction.
 - i. The horizontal surface runs of the concrete seating were measured to be approximately 3" thick as measured from the area of missing concrete and soil erosion in section C.
 - j. The vertical risers of the concrete seating were measured to be approximately 4" – 6 ½" thick as measured from the area of missing concrete and soil erosion in section C.
 - k. The orchestra pit walls appear to be approximately 10" thick. The concrete walk at grade at the top of the orchestra pit wall was measured to be approximately 4" thick.
 - l. There were some handrail posts that were cut off near the concrete surface which showed the handrail posts were embedded in the horizontal surface runs of the concrete seating.
 - m. The concrete walls along the north side of Section D were severely cracked and in extremely poor condition.
 - n. Many cracks in the amphitheater seating and orchestra pit walls were epoxy patched sometime in the past, but all the cracks have since reflected through and opened up.
 - o. It appears there may have been a 3/4-inch repair or maintenance layer of concrete applied over the original concrete throughout the amphitheater. It is unknown when this layer was applied.
2. The following information is noted in regard to the above observed conditions:
- a. The current condition of the cast-in-place concrete amphitheater is beyond repair and not suited for occupant loading.
 - b. The measured thickness of the horizontal surface runs of the seating is too thin and most likely not strong enough to anchor new handrail posts to it. New drilled piers would have to be installed for new handrail posts to anchor to.
 - c. Many cracks have already been epoxied in the past, but the cracks reflected through and opened up. Repatching and epoxying the cracks would take a tremendous effort to complete and this type of repair is only good to keep water out of the cracks and prevent freeze/thaw cycles. Epoxying cracks does not bring structural integrity back as this repair method is not a structural fix.
 - d. The bearing capacity of the soils have been compromised with all the water intrusion through the cracks throughout the structure. Soil erosion is likely to have occurred.
 - e. Aesthetically, patching all the spalls and epoxying all the cracks would not look very nice and this doesn't repair the offset surfaces or the leaning risers.
 - f. Section D, the majority of section C, and the concrete walls along the north edge of section D are in such severe condition and are structurally unstable that these areas absolutely have to be removed and replaced.

PROFESSIONAL OPINION

3. It is our professional engineering opinion that the existing cast-in-place concrete amphitheater is not structurally capable of performing its intended functions and there are no reasonable or practical repair and maintenance options available that would restore the structural integrity of the amphitheater such that it can be fully used and occupied. The cost of any repair option is considered too high relative to the desired design improvement attained with complete replacement.

Cost Estimate

4. With this report, we have also included a cost estimate for the construction costs associated with a complete reconstruction of the amphitheater. A detailed list of our estimated costs can be found at the end of this report.

GENERAL

5. The observations and opinions expressed in this report are based on our professional engineering judgment and professional practice, as well as limited visual observations of exposed materials only. No testing or removal of materials was performed to determine physical condition and state of structural components, nor compliance with the present Building Code.
6. This document pertains to the general structural assessment and condition of the exposed existing concrete elements of the amphitheater only and no destructive testing was conducted or requested. Structural design and verification of Code compliance is not part of this report. A cost estimate for the schematic design of a new/rebuilt cast-in-place concrete amphitheater is provided for this project. No other engineering was performed or requested for this project.
7. The conclusions are based on preliminary and limited examination and analysis. We reserve the right to supplement and/or amend these findings and/or opinions should new information become available. Concealed discrepancies and/or defects limit the accuracy and scope of this report. No warranty, either expressed or implied, for any portion of the structure is given.



Area A



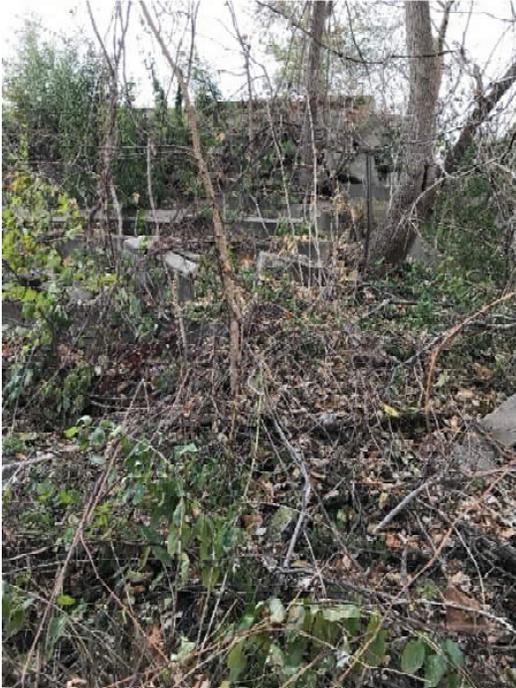
Area B



Area C



Orchestra Pit



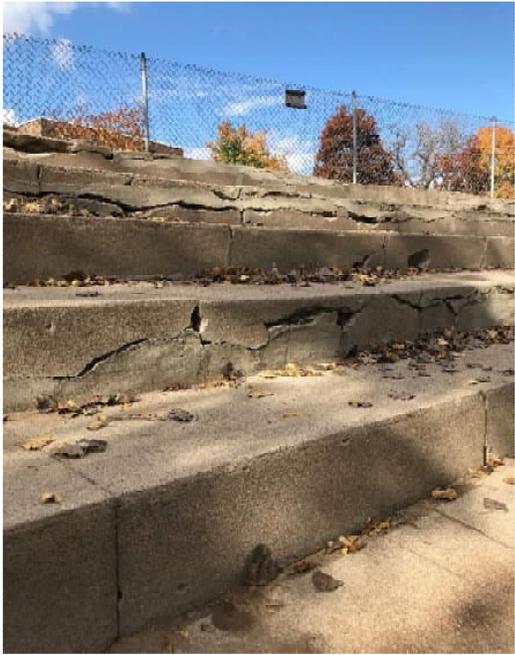
Area D and North Wall Failure



Area D Unstable Seating



Area C Seating Failure (typical other areas)



Typical Cracking and Spalling (all areas)

Anoka Amphitheatre---Preliminary Cost Estimate

	Scope Detail	Units	Number	Unit Cost	Extension	Notes	
Site Prep	Reinf. Concrete, demo	LS	1	\$ 170,000	\$ 170,000		
	Remove & Replace soils	CY	4000	\$ 55	\$ 220,000		
	misc. soil stabilization materials	LS	1	\$ 1,500	\$ 1,500		
	Utilites	LS	\$ 1	\$ 25,000	\$ 25,000		
	Protection	LS	1	\$ 20,000	\$ 20,000		
Masonry Work	Concrete seating & Risers to match existing (structural flatwork). Revised to meet ADA	CY	1300	\$ 650	\$ 845,000		
	Orchestra floor and walls	CY	162	\$ 325	\$ 52,650		
	Site concrete walk--flatwork	SF	1500	\$ 10	\$ 15,000		
	Access Drive--6" concrete	SF	1800	\$ 13	\$ 22,500		
	Deck Construction--Cantilevered reinforced conc. Deck w/ hand rails	CY	200	\$ 700	\$ 140,000		
	Sound Wall--Plaster on WM & CMU	SF	2400	\$ 40	\$ 96,000		
	Restroom Buildout	SF	210	\$ 225	\$ 47,250		
	Male--(1)urinal,(2) WC, (2) lavs	EA	5	\$ 2,500	\$ 12,500		
	Female--(3) WC, (2) lavs	EA	5	\$ 2,500	\$ 12,500		
	Dressing Rooms---New CMU construction 200SF. Walls, framed ceiling,skylight, HM door Fr & hdwe.	SF	200	\$ 250	\$ 50,000		
	Storage	SF	150	\$ 220	\$ 33,000		
	Misc.	Canopy---fabric cloth, steel cable, stl frame	SF	\$ 17,600	\$ 30	\$ 528,000	
		handrails on all risers per ADA	LF	480	\$ 80	\$ 38,400	
	Technology					\$ -	
Stage lighting & portable sound		LS	1	\$ 8,500	\$ 8,500		
Theatre power		LS	1	\$ 20,000	\$ 20,000		
Communications/SECURITY (comm portion), sound		LS	1	\$ 15,000	\$ 15,000		
Seating lighting		LS	1	\$ 12,000	\$ 12,000		
Security		LS	1	\$ 1,000	\$ 1,000		
Moisture Control					\$ -		
	Calking all joints	LS	1	\$ 15,000	\$ 15,000		
Site Development					\$ -		
	Path	SF	2000	\$ 10	\$ 20,000		
	Benches, Flagpoles	LS	1	\$ 40,000	\$ 40,000		
	upgraded flat surfaces	LS	3500	\$ 4	\$ 14,000		
	Landscaping	SF	26000	\$ 15	\$ 390,000		
	River bank restoration	LS	1	\$ 600,000	\$ 600,000		
Signage	Site lighting	LS	1	\$ 120,000	\$ 120,000		
					\$ -		
	Wayfinding, regulatory, Marquee,	LS	1	\$ 5,000	\$ 5,000		
					\$ -		
	Subtotal				\$ 3,589,800		
Fees	Permits	LS	0.01	\$ 261,660	\$ 3,948,780		
	Overhead & Profits		0.1	\$ 394,878	\$ 4,343,658		
	General Conditions		0.1	\$ 434,366	\$ 4,778,024		
	Contingency		0.3	\$ 1,433,407	\$ 6,211,431		
					\$ 6,211,431		
Consultant/Construction	Architect/Engineer		0.12	\$ 745,372	\$ 6,956,803		
	Construction Administration		0.1	\$ 695,680	\$ 7,652,483		
	Mid point Jan 2019		0.1	\$ 765,248	\$ 8,417,731		
					\$ 8,417,731		