Duluth Entertainment Convention Center

PREDESIGN REPORT

I hereby certify that this survey, plan, 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.

Signed Aaron D. Kelly

Date: 3/27/2024
License No.: 50685

LHB

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PART 1: SUMMARY

1A PROJECT SUMMARY STATEMENT

Scope

The project is to support key infrastructure repairs and improvements to extend the life of the facilities for the next generation. Repairs are needed for asset preservation and will result in improved energy efficiency, reduce operational costs and extend the life of the facility. Scope includes multiple repairs and improvements across the building complex including:

- Replace original 1966 electrical transformer
- Replace original 1976 chiller/air conditioning serving Pioneer Hall and City Side Convention center
- Add dehumidification for Amsoil arena
- Replace roof over 1966 arena, auditorium and ticket lobby areas.
- Parking structure repairs
- Replace original 1966 air handler serving Paulucci Hall, DECC Arena and Symphony Hall

The legislative language states:

For a grant to the Duluth Entertainment and Convention Center Authority to predesign, design, construct, furnish and equip capital improvements and renovations to the Duluth Entertainment and Convention Center Facility. This appropriation includes money for replacement of improvements to mechanical, electrical, heating, ventilating, and air conditioning systems; life safety improvements; and improvements to the building's exterior envelope.

Costs

Total Estimated Construction Cost: $4,420,559

Total Estimated Project Cost: $5,000,374

Funding Sources

State appropriation: $5,000,000

Operating Costs

This project will result in a reduction of operating costs due to improved efficiencies.

Schedule

Funding: 2023 State legislative bonding awarded.

Predesign: January 2024-April 2024

Design: May 2024 – September 2024 (5 months)

Preconstruction Activities including bidding: August 2024 to April 2025 (9 months)

Construction: May 2025 – November 2025 (7 months)

Completion: November 2025

1B PROJECT DATA SHEET – NEW BUILDING- NOT APPLICABLE

1C BUILDING AUDIT SHEET – EXISTING BUILDING DATA

Name of Project: **DECC Asset preservation and Energy Improvements**

Agency/Organization: Duluth Entertainment Convention center (DECC)

Building Location: 350 Harbor Drive, Duluth, MN

Building Occupancy type (existing): Mixed, Assembly, areas including Group A-1, A-2

Primary Space Types: Assembly and support spaces including toilets, dressing rooms, storage, mechanical.

Type of Construction: IIB non-combustible

Building Size: 980,000 sq. ft total

- The original building was constructed in 1966 and included the arena and auditorium (symphony hall).
- In 1976 Pioneer Hall was added with space for the Duluth Curling club and its rinks.
- In 1990 The City side convention center was added to host conventions, business and social events within its ballroom and meeting rooms.
- In 2001 the Harbor side convention center was added.
- 2010 added the Amsoil arena.

Site Size: approximately 19 acres

Parking: Original Ramp structure constructed in 1999, consisting of 4 levels, 209,600 sf and 585 parking stalls. Expansion to parking structure constructed in 2009, with 5 parking levels, 166,000 sf and 476 parking stalls.

Roofing Type and Condition: built up roof and EPDM.

- The roof area over Symphony Hall is a built-up roof of unknown age, but at least 25 years old. It was reported to be in satisfactory condition in 2021 report, but with repairs needed.
- Roof areas over the Ticket office include built up roof system and EPDM of unknown age. The BUR was reported to be in satisfactory condition in 2021 and the EPDM in poor condition.
- Roof over the DECC Arena is a built-up roof membrane, approximately 28 years old. It has surpassed its serviceable life and has multiple, large deficiencies that would require extensive repair. Roof report in 2021 indicated condition was poor and there was active leaking reported throughout the roof area and along the stucco walls.

Exterior Wall Types and Condition: Concrete, concrete block, curtain wall

Interior Wall Types and Condition: various non-combustible

Structural Systems Types and Condition: concrete, steel frame, beams & open web joists

Hazardous Material Removal & Cost: there is the possibility of hazardous materials being encountered during demolition of original 1966 equipment and piping. An allowance of $8,000 has been included for abatement if required.

Mechanical Systems Type and Condition:

Pioneer Hall and the Convention Center.

- The original chiller providing cooling to these public spaces was part of the 1976 Pioneer Hall construction. This system was very energy intensive and failed, leaving these areas without dedicated cooling. The DECC has been utilizing cooling from the ice system in Amsoil Arena to provide cooling.in these areas.
- Heating for the DECC Complex is served from Duluth Energy Systems (DES), which is routed adjacent to railroad street, under the street and under the parking lot between Pioneer Hall and the William Irving. There is a heat exchanger in the boiler room to isolate the heating system from the DES system.

DECC Arena, Paulucci Hall, Symphony Hall:

- The 1966 building is served by the original Air Handling Units. One unit serves Paulucci Hall, three serve Symphony Hall and 12 serve the DECC Area.

Amsoil Arena:

Is served by multiple Air Handling Units which have heating and cooling coils, but no method of dehumidification presently. It has no dehumidification system; humidity has been problematic in Amsoil Arena since it was opened. This has resulted in moldy conditions throughout the facility. Mold sampling was done in 2023 confirming the presence in multiple locations. Report by Twin Ports Testing is attached in Appendix 8.

Paulucci Hall and the Auditorium.

- The Air Handling Units serving Paulucci Hall, the original arena and the Auditorium are original to the 1966 building and have outlived their anticipated as well as useful life at nearly 60 years old.

Fire Protection Type and Condition:

The DECC complex is provided with full fire protection sprinklers except for the Auditorium seating area and a number of the older mechanical/electrical rooms.

Electrical Systems Type and Condition:

The original 1966 transformer serves the original 1966 construction including the DECC area, Paulucci Hall and Symphony Hall. The power company has indicated to the DECC staff that it is failing and should be replaced.

Technology Systems Type and Condition: not applicable. No technology work is in the scope or work.

Costs: Refer to Appendix 6a Project Cost Form

Total Project Cost: $5,000,374
Predesign Cost: $24,500
Design Cost: $349,965
Site Acquisition Cost: N/A
Site Improvements Cost: N/A
Parking Structure Cost: repair only included in overall construction cost
Building Cost: repair only included in overall construction cost
Hazardous Materials Abatement Cost: $8,000
Surface Parking Cost: N/A
State Funding Amount: $5,000,000
Furniture, Fixtures, Equipment, Signate: N/A
Relocation Cost: N/A

Phasing cost: N/A
Technology Cost: N/A
Commissioning: $25,000

Note: Cost estimates are based upon the information above.

PART 2: BACKGROUND

2.A BASIS FOR NEED – PROJECT BACKGROUND NARRATIVE

Mission

We host events, create experiences and drive our regional economy. Our values include hospitality, entertainment, community, visionary and stewardship.

The Duluth Entertainment Convention center (DECC) is a collection of ten venues hosting conventions, meetings, sports, arts and entertainment adjacent to Lake Superior and the vibrant canal park area. The DECC is home to the Duluth Superior Symphony Orchestra, the Minnesota Ballet, UMD Men's and Women's' Bulldog Hockey, the Olympic gold-winning Duluth Curling Club and the William A. Irvin floating museum.

Strategic Plan

The DECC's 2023 Strategic plan includes five key priorities: Policies & procedures, Contract Management, Community Connection, Economic Impact and Capital Planning/Investment. Strategic themes include:

- Operational Excellence
- Productive workforce
- Community engagement
- Economic impact and innovation.

Operational Plan

- Ensure the DECC is following appropriate policies and procedures.
- Work through board-level policy review and updates.
- Manage key DECC contracts, updating them as needed, and building an overall strategy for key contracts up for renewal.
- Build outreach, engagement with, and input from the community and region.
- Work to measure the economic impact of DECC activities and communicate the impact with key stakeholders.
- Continue to address short-term and long-term capital investment needs.

Basis for Need:

Electrical Improvements: the original 1966 electrical transformer is beyond it's expected life and could fail at any time. Possible failure has life safety concerns. Parts are no longer readily available.

HVAC Improvements:

- Cooling for Pioneer Hall and City Side Convention Center:
  The original chiller providing cooling to these public spaces was part of the 1976 Pioneer Hall construction. This system was very energy intensive and failed, leaving these areas without dedicated cooling. The DECC has been utilizing cooling from the ice system in Amsoil Arena to provide cooling in these areas, which is inefficient and taxing on these systems. A dedicated system is needed to provide adequate cooling, reduce energy usage and bring down facility peak power threshold. Adequate cooling will allow expanded use during summer months.

- Air Handler Replacement for DECC Arena, Paulucci Hall, Symphony Hall:
  Original 1966 Air Handling Units are well beyond their useful life and in need of replacement. They could fail at any time. Replacement will result in energy efficiencies, energy recovery opportunities, variable airflow control and confirmed outside airflow rates which will result in less maintenance time and costs.

Humidity Improvements:

- AMSOIL area lacks dehumidification. Humidity has been problematic in Amsoil Arena since it was opened. Moldy conditions can be observed through the facility causing concern. Rusting of metal components and undue wear and tear on electrical/mechanical systems are also of concern. The scoreboard has been damaged by condensation and will need to be replaced. Current means to prevent condensation utilities heat and cooling at the same time which is very inefficient. The addition of dehumidification component will result in increased efficiency, a healthier environment and extend the life of the building materials and equipment.

Exterior Envelope Improvements:

- Roof Replacement: the roofs over the DECC Arena, Symphony Hall and Ticket office are all over 25 years old. The Arena BUR and Ticket office EPDM roofs are in particular poor condition with active leaking. These areas are of the highest priority. Replacement is needed to prevent further leaking and damage to other parts of the buildings.
- Parking Ramp structural Repairs: repairs are required to maintain the condition of the structure, extending its safe and useful life. 2019 structural conditions review recommended specific repairs in various areas of both sections of the ramp. Reference Structural Report, Appendix 3.

Alternative Analysis:

Not applicable. No new space is being added.

PART 3: AGENCY/ORGANIZATION PLANNING

Comprehensive/Master Plan: Not applicable. The site and all buildings are existing.

Site Selection: not applicable.

Historic Documentation: Not applicable. The facility is not located within a historic district, nor does it involve the disposal of any historic buildings.

Disposal of State-Owned Buildings: not applicable.

Stakeholders:

Dan Hartman	Executive Director, DECC	dhartman@DECC.org	218-310-5356	350 Harbor Drive Duluth, MN 55802
Steve Rankila	Director of Property Maintenance, DECC	srankila@DECC.org	218-623-1235	350 Harbor Drive Duluth, MN 55802
Ronni Murphy	Project Manager & Board Liaison	rmurphy@DECC.org	218-623-1215	350 Harbor Drive Duluth, MN 55802

IMPACTS:

Operations: improvements will reduce ongoing repair and maintenance preserve and extend the life of the facility. HVAC improvements will increase user thermal comfort and improve efficiency.

Operational Budget: increased energy efficiency will reduce operating costs and new equipment will reduce repair and maintenance costs.

Facility and Staff: reduction in repair needs will allow staff to focus on other maintenance needs.

PART 4: PROJECT DESCRIPTION

4.A ARCHITECTURAL/ENGINEERING PROGRAM

General:

Capital improvements and renovations to the DECC facility for replacement, improvements to mechanical, electrical, heating, ventilating and air conditioning (HVAC) systems, life safety improvements and improvements to the building exterior envelope. Specific areas of scope include the following

Electrical Improvements

Replace the original (circa1966) oil fed transformer along with associated wire and disconnect.

HVAC Improvements

- Provide replacement for the original (circa1976) chiller that served City side convention center and Pioneer Hall. The original Pioneer Hall cooling system failed.
- Replace the original (circa 1966) Air Handling Units serving DECC Arena, Paulucci Hall and Symphony Hall

Humidity Improvements:

Add dehumidification for the AMSOIL Arena.

Exterior Envelope Improvements:

- Replace the existing roof over the 1966 Arena, Auditorium and ticket lobby area.
- Parking ramp structural repairs

4.B PRECEDENT STUDIES

Not applicable.

4.C.1 TELECOMMUTING PLAN

Not applicable.

4.D SUSTAINABILITY, ENERGY CONSERVATION AND CARBON EMISSIONS

The State of Minnesota Sustainable Building Guidelines (B3) will be reviewed, and the Applicability form submitted to determine if the B3 Guidelines are applicable. The project does not include new construction and is not a major renovation. Regardless of B3 applicability, energy efficient equipment will be specified to meet current energy code standards. Specifications to include requirements for the contractor to submit a "Waste management and Recycling Plan".

4.E OPERATIONS AND MAINTENANCE REQUIREMENTS

The existing DECC maintenance staff will operate and maintain the new equipment. As this is replacement rather than additional equipment, no additional staff needs are required.

4.F STATUTE REQUIREMENTS

Refer to Appendix 4c Table for applicability of Statues. Project is under a Political Subdivision. Regarding the Statutes applicable to this project:

- 8a and 9: This is the Predesign as required.
- 10: Not applicable. MIINNCOR products are not within the scope of work of this project.
- 11. MN Energy Code will be addressed in design of project.
- 14, 15, 16 17 and 18 will be addressed in the specifications and procurement of the construction project.

4.G SPECIALTY REQUIREMENTS

Not Applicable

4.H PROJECT PROCUREMENT AND DELIVERY

The DECC intents to solicit for a Construction Manager at Risk. The CM will then solicit the A/E for design services. The CM delivery method will allow for early procurement of equipment with long lead times. Since the allocated funds may not cover all of the proposed repair work, the DECC has ordered the scope items in terms of highest to lowest priority. The construction documents will be structured to allow award of elements in order of priority until the available funds are used up.

4.I PROJECT DESIGN SERVICES AND ADDITIONAL OWNER COSTS

Refer to Appendix 6.

4.J QUALITY CONTROL PLAN

HVAC and Electrical commissioning will be applicable to the scope of this project. Cost has been included.

PART 5: SITE ANAYLSIS AND SELECTION

NOT APPLICABLE

PART 6: FINANCIAL INFORMATION

6.1 CAPITAL EXPENDITURES

Refer to Project Cost Form Appendix 6a and Construction Costs from Appendix 6b.

Existing facilities Analysis

Assessments addressing scope of this project include a roof report, parking ramp structural assessment and mold report. Reports are included in Appendix 8.

Hazardous Material

There is the possibility of hazardous materials being encountered during demolition of original 1966 equipment and piping. An allowance has been included for abatement if required.

Site Soils: Not applicable. The site will not be impacted by the scope of work.

6.2 ONGOING OPERATING EXPENDITURES

The scope of this project does not expand the facility. Neither operating expenses or staff will be increased due to the project. It is anticipated that operating and maintenance costs will be somewhat decreased with the new equipment and repairs as existing elements in poor and aged conditions require more extensive, ongoing maintenance and expenses to keep running. While the new units will require less maintenance than the current ones, current staffing levels will not allow for reduction given the size of the facility.

Per year Operating Costs for New Equipment:

- AHU: $2,500 per unit
- Chiller $3000
- Controls: $4000
- Dehumidification: $4000
- Transformer: $1000

6.3 LIFE EXPECTANCY

Mechanical and Electrical Equipment

Equipment to be replaced is well beyond its useful life. The life expectancy of new interior air handling units is 30 years, exterior chillers 20 years, and dehumidification system 20 years. Life expectancy of the new transformer is 35 years.

Roof

Existing roofing to be replaced is more than 25 years old and beyond its life expectancy. Life expectancy of both the built up and EPDM roof systems is 20 to 30 years.

6.4 COMPARATIVE FINANCIAL ANALYSIS – NOT APPLICABLE

Existing facility

No new space added. Not applicable

6.5 RISK MITIGATION

Identify risks and plan for mitigating

Potential for hazardous material in the existing equipment and piping. An allowance has been included to cover the unknown.

PART 7: SCHEDULE

7.1 SCHEDULE INFORMATION

Schedule Duration

Refer to Schedule, Appendix 7
Based on current lead times for equipment, the schedule assumes x9 months for preconstruction activities. This includes shop drawing submittal and review, ordering, production and delivery. This is to be followed by 7 months of construction. These timeframes will be re-evaluated when the CM is on board.

7.2 SCHEDULE INFORMATION REQUIREMENTS - MILESTONES

Summary of Milestones

Funding Received: December 2023

Construction Manager Selection: May 2024

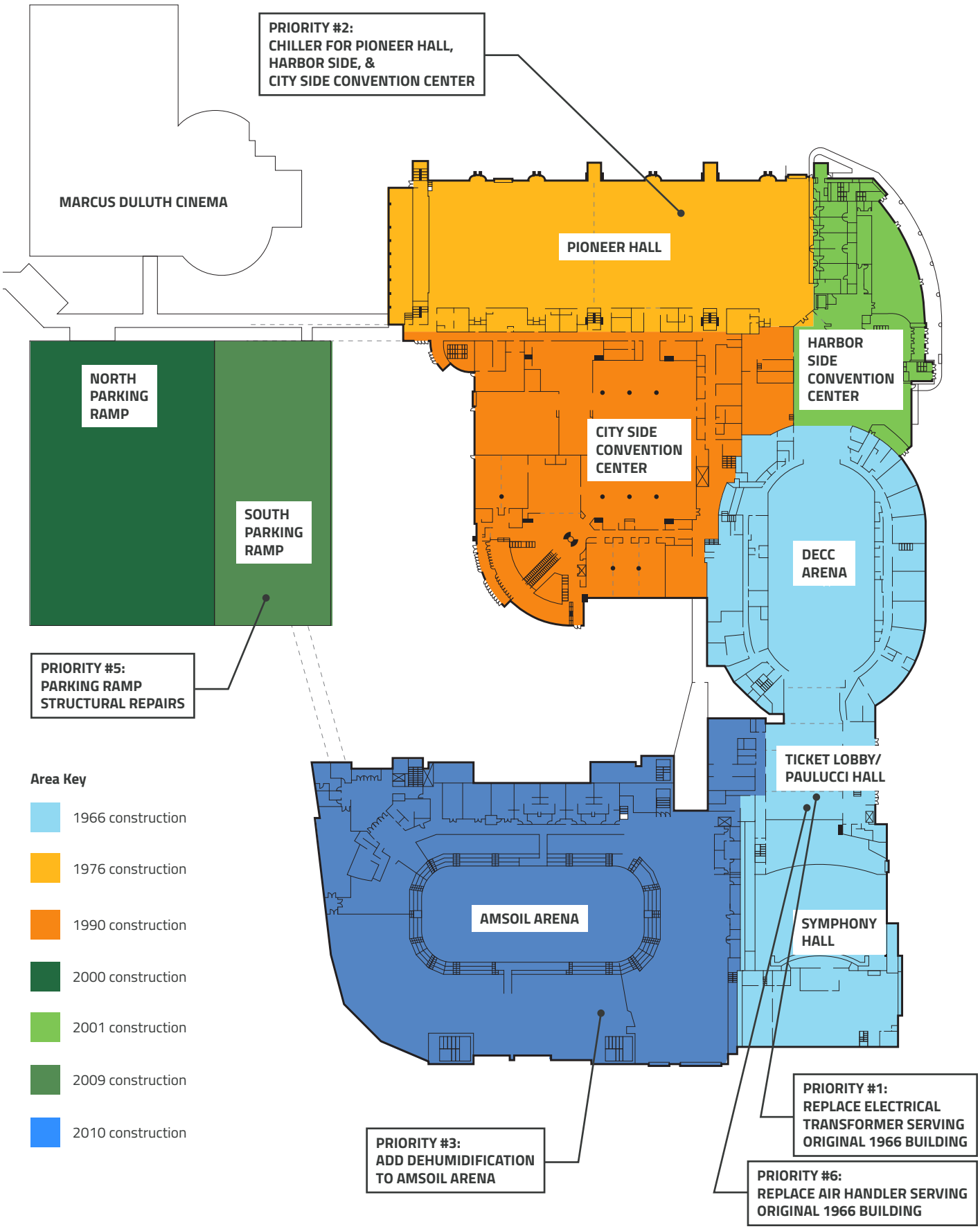
Design Completion Date: early procurement July 2024, Bidding Documents September 2024.

Midpoint of Construction: February 2025

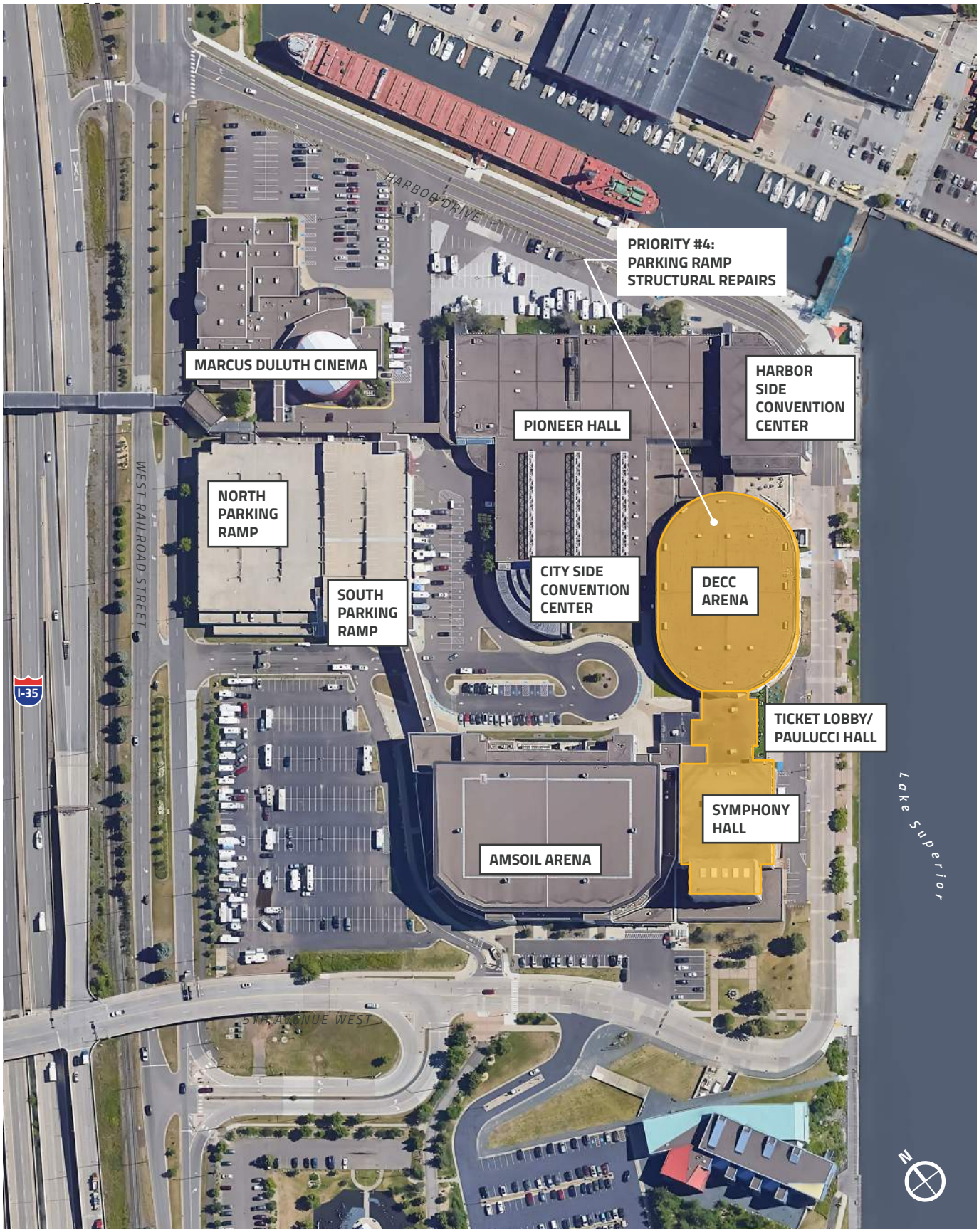
Construction Completion: November 2025

APPENDIX 1

DECC - SITE PLAN



DECC - GROUND FLOOR PLAN



DECC - ROOF PLAN

APPENDIX 4

APPLICABILITY OF STATUTES FOR PROJECTS RECEIVING STATE BOND FUNDING*

	State Agency	Higher Ed	Political Subdivisions
1. §16B.241 Coordinated Facility Planning	YES (required)	NO (not required)	NO (not required)
2. §16B.32, Subd 1 Alternative Energy Sources as needed to meet Sustainable Building 2030 energy performance standards	YES	As required to meet B3	As required to meet B3
3. §16B.32, Subd 1a Renewable Energy Sources – may not exceed 120 percent of the average annual electrical energy consumption	YES	Required if state building or facility	NO
5. §16B.325: §16B.325: Apply Sustainable Guidelines (B3-MSBG) (http://www.b3mn.org/guidelines/index.html §216B.241 Sustainable Building 2030 requirements Contact/support: https://www.b3mn.org/guidelines/3-0/	YES New Bldgs, Addns & Major Renovations	YES New Bldgs, Addns & Major Renovations	YES New Bldgs, Addns & Major Renovations
6. §16B.327 Recycle 50% of Construction & Demolition Waste (B3-MSBG requires 75%)	YES- comply with B3 75%	YES- comply with B3 75%	NO
7. §16B.33 State Designer Selection Board	YES	YES	NO
8. §16B.335, Subd 1, Predesign required Notification to House & Senate Committees	YES	YES	NO, but check Subd. 2 (Line 8a)
8a. §16B.335, Subd. 2, Predesign required, Other Projects	YES	YES	YES
9. §16B.335, Subd 3 Predesign Submittal See Statute for exempted projects	YES	YES	YES
10. §16B.335, Subd. 3c. Consider the use of MINNCOR products www.minncor.com	YES	YES	YES
11. §16B.335, Subd 4 Energy Conservation Standards (Energy Code - MN Rules 1322/1323 http://www.doli.state.mn.us/CCLD/Codes.asp	YES	YES	YES
12. §16B.335, Subd 5 & 6 Review & letter by MN.IT	YES	NO	NO
13. §16B.35 % for Art When considered in original legislative request & when construction is $500K or greater	YES	YES, if state building	NO
14. §177.42-44 Prevailing Wage Rates Contractor must pay prevailing wages https://www.revisor.mn.gov/statutes/?id=177	YES	YES	YES
15. §363A.44 Equal Pay Certificate required on contracts over $500K (prime and subs)agency of the state, the Metropolitan Council, or an agency subject to section 473.143, subdivision 1; $1M for political subdivisions	YES	YES	YES
16. §16C.285 Responsible Contractor	YES	YES	YES
179. §16C.16, Subd. 13 – Targeted Group Purchasing	YES	NO	YES
18. §16A.695 Bond financed property; Use/Grant Agreement	YES	YES	YES
19. Appropriation Language	See appropriation	See appropriation	See appropriation

*Other statutory requirements may apply to each individual organization

Last update: December 15, 2023

APPENDIX 6

SECTION 6 - APPENDIX 6

WORKSHEET FOR DESIGN AND OWNER COSTS

Item	Scope of Work	Fee/Cost
X	Basic Services -Architectural	$ 349,965
	Civil	included in above
	Landscape	included in above
X	Structural	included in above
X	MEP (Mechanical, Electrical, Plumbing)	included in above
	Hazardous Material survey, design, air monitoring, abatement	included in above
	Additional Services (See Section 4.J Quality Control Plan)	included in above
	1. Specialty Design: Food Service, Fire Protection	included in above
	2. Interior & Furniture, Fixtures & Equipment (FF&E) bid package(s)	
X	3. Minnesota Sustainable Building Guidelines & SB2030	included in Basic Services
X	4. Building Information Modeling (BIM)	included in Basic Services
	Moving costs	$ -
	6. Environmental Assessment Worksheet-Impact of selected site	
	7. Presentation model of building	
	8. Presentation Sketches of building	
	9. Presentations to Legislature, Agency Management, others	
	10. Exterior utility costs	
OWNER COSTS (See Section 4.J Quality Control Plan)		
	1. Owner's Project Representative (1 – 2% of construction)	
X	2. CM at Risk Preconstruction Fees (0.5% of construction)	$ 24,755
	3. Other County Project Management Costs (0.75% of construction)	$ -
	4. Construction costs auditor – (for CM-Risk & Design Build)	
X	5. Building Abatement Design and Removal (Renovation & Demo)	$ 8,000
	6. Topographic (ALTA) Survey of selected site	$ -
	7. Geotechnical Investigation of selected site	$ -
	8. Phase I and II Environmental Site Assessment (for contaminants)	$ -
	9. Environmental Assessment Worksheet-Impact Statement (if required)	
X	10. HVAC and Electrical Systems Commissioning (B3 Requirement)	$ 25,000
	11. Building Envelope Commissioning	
X	12. Construction Testing and curtainwall testing services	$ 3,000
	13. Permit Costs	
	14. Sewer Access Cost (SAC) and Water Access Cost (WAC)	
	15. Wetlands Delineation and (Design & Mitigation)	$ -
	16. Utility Service Upgrades (Water, sewer, gas, electric) & Const'n	
	17. Traffic Studies	$ -
	18. Historic Structures Report (Historic Preservation Consultant fee)	

SECTION 6 - APPENDIX 6a

PROJECT COST FORM

Fiscal Years 2024-28

Dollars in Thousands ($137,500 = $138 thousand)

TOTAL PROJECT COSTS All Years and All Funding Sources		Project Costs All Prior Years	Project Costs FY 2024-25	Project Costs FY 2025-26	Project Costs FY 2027-28	Project Costs All Years	Project Start (Month/ Year)	Project Finish (Month/ Year)
1. Property Acquisition								
Land acquisitions		$ -	$ -			$ -		
Site investigations		$ -	$ -			$ -		
Site contingencies		$ -	$ -			$ -		
	SUBTOTAL	**$ -**				**$ -**		
2. Predesign Fees	**SUBTOTAL**	**$ -**	**$ 24,500**			**$ 24,500**	Jan-24	Apr-24
3. Design Fees							May-24	September-24
Schematic		$ -	$ 34,997			$ 34,997		
Design Development		$ -	$ 69,993			$ 69,993		
Contract Documents		$ -	$ 139,986			$ 139,986		
Bidding			$ 17,498			$ 17,498		
Construction			$ 23,623	$ 63,869		$ 87,491		
Other Costs:			$ -			$ -		
	SUBTOTAL	**$ -**	**$ 286,096**	**$ 63,869**		**$ 349,965**		
4. Project Management						$ -		
State Staff Project Management			$ -	$ -		$ -		
Non-State Project Management		$ -	$ -	$ -		$ -		
Other Costs	CM at Risk	$ -	$ 8,664	$ 16,091		$ 24,755		
	SUBTOTAL	**$ -**	**$ 8,664**	**$ 16,091**		**$ 24,755**		
5. Construction Costs						$ -	October-24	November-25
Building Construction			$ 1,133,887	$ 3,065,693		$ 4,199,580		
Site			$ -			$ -		
Construction Testing				$ 3,000		$ 3,000		
Hazardous Material				$ 8,000		$ 8,000		
Construction Contingency		$ -	$ 56,694	$ 153,285		$ 209,979		
Other Costs						$ -		
	SUBTOTAL	**$ -**	**$ 1,190,581**	**$ 3,229,978**		**$ 4,420,559**		
6. Art	**SUBTOTAL**	**$ -**	**$ -**	**$ -**		**$ -**		
7. Occupancy								
FF&E, incl site amenities, AV Equip			$ -	$ -		$ -		
Telecommunications (voice & data)			$ -	$ -		$ -		
Security Equipment			$ -	$ -		$ -		
Signage & Wayfinding			$ -	$ -		$ -		
Commissioning			$ -	$ 25,000		$ 25,000		
Moving expense			$ -	$ -		$ -		
Contingency			$ -	$ -		$ -		
	SUBTOTAL		**$ -**	**$ 25,000**		**$ 25,000**		
8. Inflation								
Midpoint of Construction						$ -	Midpoint Date:	
Inflation Multiplier			3.5%	3.5%			February-25	
Inflation Cost	**SUBTOTAL**		**$ 41,670**	**$ 113,924**		**$ 155,595**		
9. Other	**SUBTOTAL**					**$ -**		
GRAND TOTAL		**$ -**	**$ 1,551,512**	**$ 3,448,862**		**$ 5,000,374**		

SECTION 6 - APPENDIX 6b

CAPITAL BUDGET REQUEST

CONSTRUCTION COSTS FORM

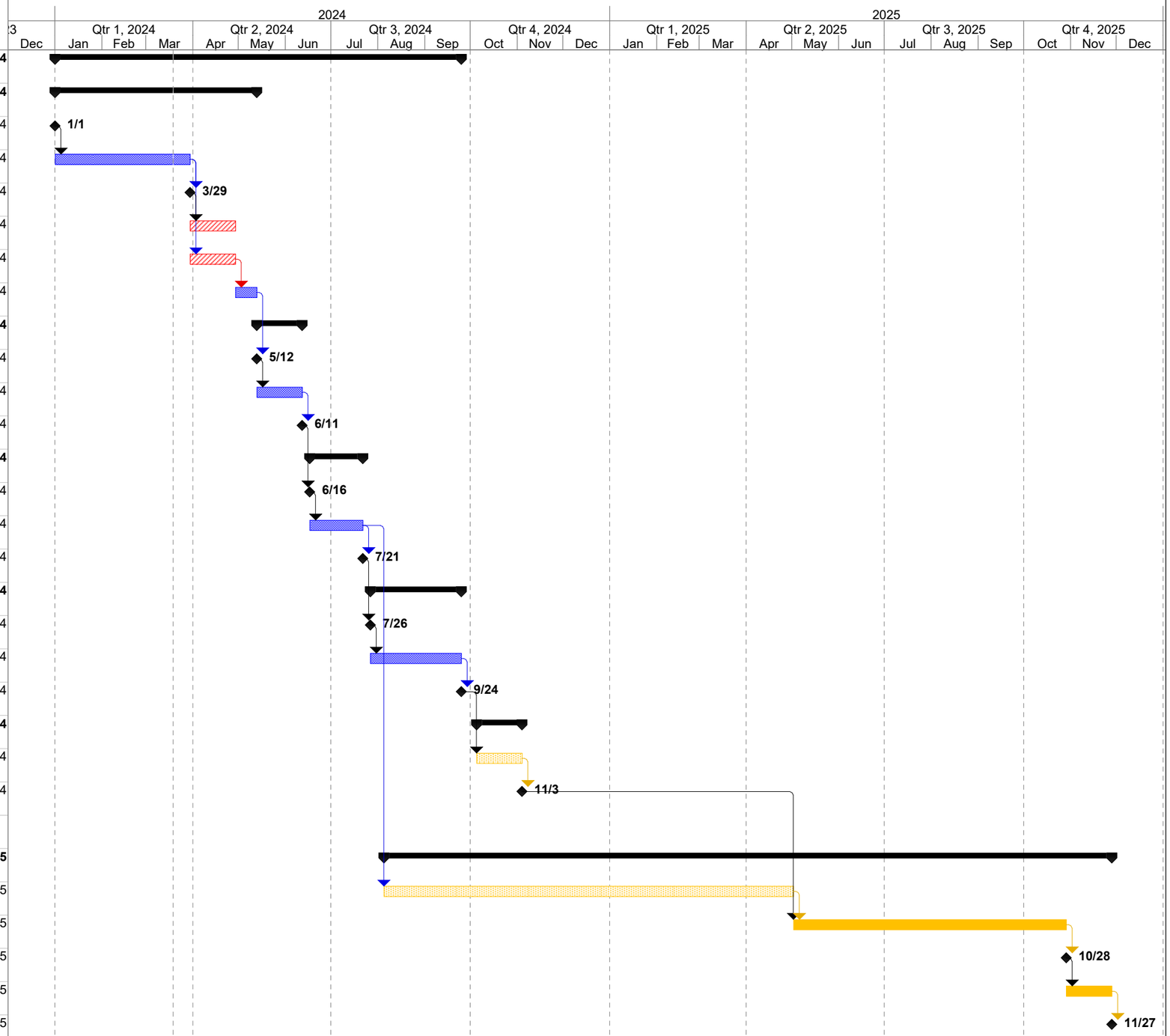
CONSTRUCTION TYPE OF SPACE	EXISTING	NEW CONSTRUCTION			REMODELED			RENEWAL (Asset Preservation)			TOTAL COST (in $000)
List Major Type of Space (Office, Lab, Ramp, etc.)	Gross Sq. Feet	Gross Sq. Feet	Cost Per Sq. Foot (in $)	Cost (in $000)	Gross Sq. Feet	Cost Per Sq. Foot (in $)	Cost (in $000)	Gross Sq. Feet	Cost Per Sq. Foot (in $)	Cost (in $000)	
Priority #1: Replace Electrical transformer										$ 135,000	$135,000
Priority #2: Chiller/AC for City side Convention Center & Pioneer Hall										$ 2,758,500	$2,758,500
Priority #3: Dehumidification - Amsoil Arena										$ 562,500	$562,500
Priority #4: Roof Replacement: Arena, Auditorium and ticket lobby										$ 2,362,500	$2,362,500
Priority #5: Parking Ramp Structural repairs										$ 112,500	$112,500
Priority #6: Air Handling Unit - Paulucci Hall, DECC Arena & Symphony Hall										$ 84,375	$84,375
TOTAL				**$0**			**$0**				**$6,015,375**

This Form is for Reporting and Analysis of *Construction Costs* only

No other cost items from the Project Cost Form should be included on this form.

APPENDIX 7

ID	Task Name	Duration	Start	Finish
1	**Design Services**	**268 days**	**Mon 1/1/24**	**Tue 9/24/24**
2	**Predesign**	**133 days**	**Mon 1/1/24**	**Sun 5/12/24**
3	Notice to Proceed	0 days	Mon 1/1/24	Mon 1/1/24
4	Predesign Preparation	89 days	Mon 1/1/24	Fri 3/29/24
5	Predesign Report Submitted	0 days	Fri 3/29/24	Fri 3/29/24
6	Government review & approval	30 days	Sat 3/30/24	Sun 4/28/24
7	Owner RFP & Award Construction Manager	30 days	Sat 3/30/24	Sun 4/28/24
8	CM start up/ selection of A/E	14 days	Mon 4/29/24	Sun 5/12/24
9	**Schematic Design**	**30 days**	**Sun 5/12/24**	**Tue 6/11/24**
10	A/E Notice to Proceed	0 days	Sun 5/12/24	Sun 5/12/24
11	Schematic design prep	30 days	Mon 5/13/24	Tue 6/11/24
12	SD Submittal	0 days	Tue 6/11/24	Tue 6/11/24
13	**Design Development**	**35 days**	**Sun 6/16/24**	**Sun 7/21/24**
14	Notice to Proceed	0 days	Sun 6/16/24	Sun 6/16/24
15	Design Development	35 days	Mon 6/17/24	Sun 7/21/24
16	DD Submittal	0 days	Sun 7/21/24	Sun 7/21/24
17	**Construction Documents**	**60 days**	**Fri 7/26/24**	**Tue 9/24/24**
18	Notice to Proceed	0 days	Fri 7/26/24	Fri 7/26/24
19	Prepare Documents	60 days	Sat 7/27/24	Tue 9/24/24
20	CD Submittal	0 days	Tue 9/24/24	Tue 9/24/24
21	**Bidding**	**30 days**	**Sat 10/5/24**	**Sun 11/3/24**
22	Bidding	30 days	Sat 10/5/24	Sun 11/3/24
23	Bids Due	0 days	Sun 11/3/24	Sun 11/3/24
24				
25	**Construction**	**480 days**	**Mon 8/5/24**	**Thu 11/27/25**
26	Preconstruction activities, early procurement	270 days	Mon 8/5/24	Thu 5/1/25
27	Construction	180 days	Fri 5/2/25	Tue 10/28/25
28	Substantial Completion	0 days	Tue 10/28/25	Tue 10/28/25
29	Punchlist, Testing, Training, Commissioning	30 days	Wed 10/29/25	Thu 11/27/25
30	Final Completion	0 days	Thu 11/27/25	Thu 11/27/25



APPENDIX 8

Twin Ports Testing
1301 N 3rd St. • Superior WI 54880 • 715-392-7114 • 1-800-373-2562 • F 715-392-7163 • www.twinportstesting.com

November 2, 2023 TPT#23A0306

Mr. Steve Rankila
Duluth Entertainment and Convention Center (DECC)
350 Harbor Drive
Duluth, MN 55802

RE: Mold Tape Lift Testing
DECC AMSOIL Arena
Duluth, Minnesota

Dear Mr. Rankila,

The following results summarize the mold tape lift sampling completed at the AMSOIL Arena in the DECC facility located at 350 Harbor Drive in Duluth, Minnesota. The sampling was conducted on October 23, 2023 after staining was observed on multiple surfaces throughout the arena.

Twin Ports Testing II, Inc. (TPT) collected six tape lift samples in the areas of concern. The following table lists the analytical results for the samples collected at the site:

Tape Lift Samples:

Sample Location	1 Under Scoreboard	2 Inside of Scoreboard	3 Fire Alarm on Scoreboard	4 Behind Plexiglas by side boards	5 Visiting Team Bench behind Plexiglass	6 Suicide Box Floor Level on side board
Spore Type						
Alternaria (Ulocladium)	-	-	*Medium*	-	Rare	-
Aspergillus/Penicillium	-	Medium	Low	-	-	-
Cladosporium	*High*	*High*	*High*	Rare	*High*	*High*
Rust	-	Rare	Rare	-	-	-
Acremonium	-	-	-	-	-	*Low*
Aspergillus	-	-	-	-	*Medium*	-
Nigrospora	-	Rare	Rare	-	-	-
Yeast	Medium	-	-	Low	Rare	Medium

** Sample contains fruiting structures and/or hyphae associated with the spores.*

The results of the tape lift samples collected indicate that surface mold is present and producing hyphae and/or fruiting structures in the facility in multiple locations. Surfaces with visible mold should be cleaned with a detergent/water mix or a microbial inhibiting cleanser to clear the areas of staining. If staining is hard to remove, the items can be removed and replaced. It was mentioned that a dehumidification unit is planned to be installed at the arena, this will reduce moisture in the facility helping to prevent mold growth.

TPT recommends collecting air samples throughout the facility where employees, players and the public are present to determine if there is potential mold exposure.

Twin Ports Testing II, Inc. would like to thank you for the opportunity to assist you with this project. If you have any questions or concerns regarding this report, please call me at 715-394-8802.

Sincerely,

Tracy Jacobs, CHMM
Industrial Hygiene Services Manager

EMSL Analytical, Inc.
3410 Winnetka Avenue North New Hope, MN 55427
Tel/Fax: (763) 449-4922 / (763) 449-4924
http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order: 352309547
Customer ID: TWNT42
Customer PO:
Project ID:

Attention: Tracy Jacobs, CHMM
Twin Ports Testing II, Inc.
1301 North Third Street
Superior, WI 54880

Phone: (715) 392-7114
Fax:
Collected Date: 10/23/2023
Received Date: 10/24/2023
Analyzed Date: 10/26/2023

Project: 23A0306/DECC Amsoil Arena Mold Sampling

Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Tape Samples (EMSL Method MICRO-SOP-200)

Lab Sample Number:	352309547-0001	352309547-0002	352309547-0003	352309547-0004	352309547-0005
Client Sample ID:	1	2	3	4	5
Sample Location:	Under Scoreboard	Inside of Scoreboard	Fire alarm on scoreboard	Behind plexyglass by side boards	Visiting Team Bench behind plexyglass
Spore Types	Category	Category	Category	Category	Category
Alternaria (Ulocladium)	-	-	*Medium*	-	Rare
Ascospores	-	-	-	-	-
Aspergillus/Penicillium	-	Medium	Low	-	-
Basidiospores	-	-	-	-	-
Bipolaris++	-	-	-	-	-
Chaetomium++	-	-	-	-	-
Cladosporium	*High*	*High*	*High*	Rare	*High*
Curvularia	-	-	-	-	-
Epicoccum	-	-	-	-	-
Fusarium++	-	-	-	-	-
Ganoderma	-	-	-	-	-
Myxomycetes++	-	-	-	-	-
Pithomyces++	-	-	-	-	-
Rust	-	Rare	Rare	-	-
Scopulariopsis/Microascus	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-
Zygomycetes	-	-	-	-	-
Acremonium++	-	-	-	-	-
Aspergillus	-	-	-	-	*Medium*
Nigrospora	-	Rare	Rare	-	-
Yeast	Medium	-	-	Low	Rare
Hyphal Fragment	-	-	-	-	-
Insect Fragment	-	-	-	-	-
Pollen	-	-	Rare	-	-
Fibrous Particulate	-	-	-	-	-

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

- Denotes Not Detected.
++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.
* = Sample contains fruiting structures and/or hyphae associated with the spores.

Jodie Bourgerie, Laboratory Manager
or other Approved Signatory

No discernable field blank was submitted with this group of samples.

Initial report from: 10/26/2023 11:30 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

3410 Winnetka Avenue North New Hope, MN 55427
Tel/Fax: (763) 449-4922 / (763) 449-4924
http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order: 352309547
Customer ID: TWNT42
Customer PO:
Project ID:

Attention: Tracy Jacobs, CHMM
Twin Ports Testing II, Inc.
1301 North Third Street
Superior, WI 54880

Phone: (715) 392-7114
Fax:
Collected Date: 10/23/2023
Received Date: 10/24/2023
Analyzed Date: 10/26/2023

Project: 23A0306/DECC Amsoil Arena Mold Sampling

Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Tape Samples (EMSL Method MICRO-SOP-200)

Lab Sample Number:	352309547-0006				
Client Sample ID:	6				
Sample Location:	Suicide Box Floor Level on side board				
Spore Types	Category				
Alternaria (Ulocladium)	-				
Ascospores	-				
Aspergillus/Penicillium	-				
Basidiospores	-				
Bipolaris++	-				
Chaetomium++	-				
Cladosporium	*High*				
Curvularia	-				
Epicoccum	-				
Fusarium++	-				
Ganoderma	-				
Myxomycetes++	-				
Pithomyces++	-				
Rust	-				
Scopulariopsis/Microascus	-				
Stachybotrys/Memnoniella	-				
Unidentifiable Spores	-				
Zygomycetes	-				
Acremonium++	*Low*				
Aspergillus	-				
Nigrospora	-				
Yeast	Medium				
Hyphal Fragment	-				
Insect Fragment	-				
Pollen	-				
Fibrous Particulate	-				

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

- Denotes Not Detected.
++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.
* = Sample contains fruiting structures and/or hyphae associated with the spores.

Jodie Bourgerie, Laboratory Manager
or other Approved Signatory

No discernable field blank was submitted with this group of samples.

Initial report from: 10/26/2023 11:30 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

352309547

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

HGHX-XYAD-8X2G

OrderID: 352309547

Client Information
Twin Ports Testing II, Inc.
Superior, WI
TWNT42

Project Overview

Client	
PO Number	
Project Name	DECC Amsoil Arena Mold Sampling
Project ID	23A0306
Bill To	TWNT42
Report To Contact	Tracy Jacobs
Report To Email	tjacobs@twinportstesting.com
Special Instructions	

Project Site

Building Type	Commercial
Address	DECC
City	
State	MN
Zip	

Testing Laboratory
Minneapolis
New Hope, MN 55427

Micro Tape

Sample ID	Location	Date/Time Collected	Test Method	TAT	Notes
1	Under Scoreboard	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	
2	Inside of Scoreboard	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	
3	Fire alarm on scoreboard	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	
4	Behind plexyglass by side boards	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	
5	Visiting Team Bench behind plexyglass	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	
6	Suicide Box Floor Level on side board	Oct 23, 2023 3:35 PM	Direct Exam Surface	48 Hour	

ZL

Oct 23, 2023

Sampled By / Date

ZL

Oct 23, 2023

Relinquished By / Date

10.24.23 10:20 FE:

Received (Lab) / Date

796094029 2847

2 of 6

Page 1 of 1

Page 1 Of 1

SEPTEMBER 1, 2021

REVIEW OF ROOF CONSTRUCTION

DULUTH ENTERTAINMENT CONVENTION CENTER (DECC)
350 HARBOR DRIVE
DULUTH, MN 55802

RSI PROJECT #21-10727-01

Prepared For:

Mr. Steve Rankila
DECC
350 Harbor Drive
Duluth, MN 55802

Email: srankila@decc.org

Prepared By:

Mr. Sean Gage
Senior Consultant
RRC, CDT, CEI, Associate AIA

Roof Spec, Inc.
2400 Prior Avenue North
St. Paul, MN 55113
Phone: (651) 639-0644
www.roofspec.com

I. INTRODUCTION:

On August 17, 2021, we were present at the above referenced facility to perform a review of the existing roof assemblies:

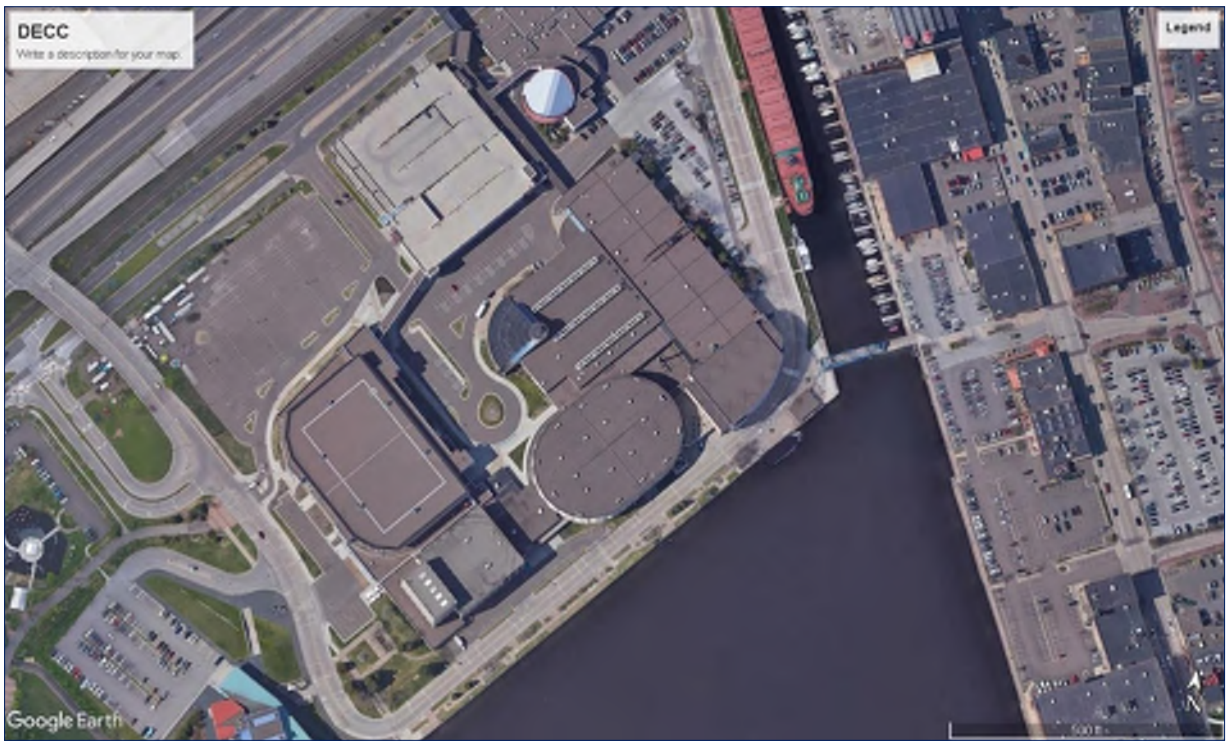
In general, our scope of work was as follows:

A. Review each of the various roof sections to identify any deficiencies;

B. Obtain photographs to substantiate our findings;

C. Based on the information obtained, develop a report as to the condition of the roof assembly with conclusions and recommendations for repair and/or replacement.

Our work was requested and authorized by Mr. Steve Rankila of Duluth Entertainment Convention Center (DECC).



II. FIELD OBSERVATIONS:

SYMPHONY HALL

Area A – The upper roof level of Symphony Hall is composed of a built-up roof membrane. While the age of the roof is unknown, the roof system appeared to be in satisfactory condition and performing as anticipated.
(Photo #1)

Roof Condition: Satisfactory

Photograph # 1

Area B – The lower roof level was installed in 2011 by The Jamar Company. No leaking was reported during our site visit and the roofing was performing adequately.
(Photo #2)

Roof Condition: Satisfactory

Photograph # 2

Area B – At one location, the existing modified bitumen base flashing has begun to blister, indicating trapped moisture and/or air within the flashing plies.
(Photo #3)

Photograph # 3

Area C – Overview of the existing built-up roofing installed throughout Area C of Symphony Hall. While the age of the roof is unknown, it appeared to be functioning as designed with minimal deficiencies observed.
(Photo #4)

Roof Condition: Satisfactory

Photograph # 4

Area C – In the western corner of the roof area, the underlying asphaltic flood coat has become exposed due to surface erosion.
(Photo #5)

Photograph # 5

Area C – A few of the existing sheet metal fasteners have backed out of the substrate due to movement caused by expansion and contraction.
(Photo #6)

Photograph # 6

Area C1 – Vegetative growth is occurring in multiple locations throughout Area C1 of Symphony Hall and should be removed. As the root system develops, it can cause additional damage to the BUR membrane.
(Photo #7)

Roof Condition: Satisfactory

Photograph # 7

Area C1 – At a few locations, the existing sealant is displaying signs of adhesive failure as it has lost adhesion to the substrate of the sheet metal counter flashing.
(Photo #8)

Photograph # 8

SYMPHONY HALL – CONCLUSIONS

Overall, the existing built-up roof (BUR) systems of Symphony Hall appear to be performing as anticipated and can be considered to be in satisfactory condition. Below is a review of repairs that can be conducted to extend the service life of the existing roof areas:

1. Using cold applied adhesive, embed new roof gravel at locations surface erosion has occurred.
2. Remove all backed out sheet metal fasteners and replace with new gasketed fasteners. Any voids in sheet metal to be covered with polyurethane sealant to match sheet metal.
3. Remove all vegetative growth.
4. Remove deteriorated sealant and replace with new polyurethane sealant to match sheet metal. Tool upon installation.

Estimated Repair Budget: $4,000.00

TICKET OFFICE

Area D – The main existing roof of the Ticket Office is composed of a BUR membrane; however, the age of the roofing is unknown. Additionally, a few deficiencies were observed during our walkthrough, including vegetative growth and blistered flashings.
(Photo #9)

Roof Condition: Satisfactory

Photograph # 9

Area D – Vegetative growth is occurring in multiple locations throughout the roof area and should be removed before damage is done to the roofing by the developing root system.
(Photo #10)

Photograph # 10

Area E – Overview of the built-up roof (BUR) membrane of the Ticket Office Area E. The existing roof membrane is performing adequately.
(Photo #11)

Roof Condition: Satisfactory

Photograph # 11

Area F – Overview of the fully adhered EPDM roof membrane installed throughout the Office area. Multiple issues with the existing roof membrane were noted during our walkthrough and continual leaking was also reported.
(Photo #12)

Roof Condition: Poor

Photograph # 12

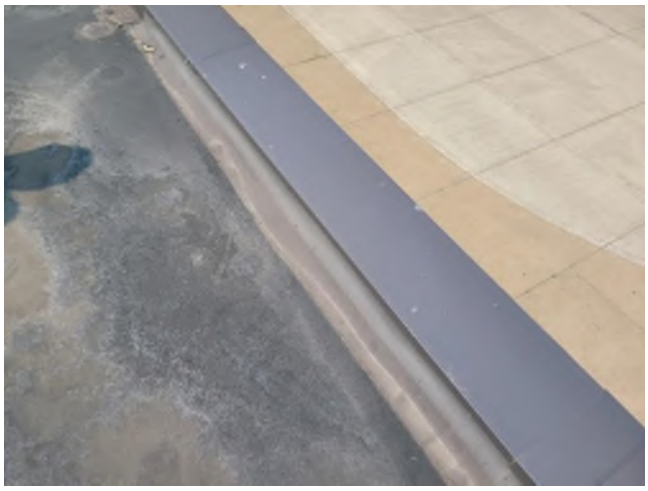
Area F - Due to the age of the roof, the original splice adhesive has begun to delaminate causing adjacent membrane sheets to lose adhesion to one another.
(Photo #13)

Photograph # 13

Area F – Additionally, multiple corner and field patches have also lost adhesion to the underlying substrate, creating a location for moisture entry.
(Photo #14)

Photograph # 14

Area F – As the EPDM roofing has contracted over time, the base flashings have begun to pull away from the wall substrate and creating an air void within the roof system.
(Photo #15)



Photograph # 15

TICKET OFFICE – CONCLUSIONS

Overall, while the existing built-up roof (BUR) systems of the Ticket Office still appear to have remaining service life; however, the EPDM roof should be replaced within the next 1-2 years as extensive repairs are required and continual leaking has been reported. Below is a review of repairs that can be conducted to extend the service life of the existing BUR roof areas as well as an estimated replacement budget for the EPDM roof:

1. Remove all vegetative growth.
2. Blistered base flashings to be completely removed and repaired in accordance with Manufacturer recommendations.

Estimated Repair Budget: $3,000.00

Estimated Replacement Budget (Area F): 2,114 sq. ft. x $18 per sq. ft. = $38,052.00

DECC ARENA

Area G - The main roof of the DECC Arena is approximately 25 years old and is composed of a BUR membrane over acoustical metal decking. Drainage is accomplished via structural slope to perimeter interior drains and overflow scuppers. Additionally, active leaking was reported throughout the roof area and along the exterior stucco walls, particularly at the southwestern columns.
(Photo #16)

Roof Condition: Poor

Photograph # 16

Area G - At multiple locations, the existing modified bitumen base flashings have begun to blister as the roofing material has lost adhesion to the underlying substrate.
(Photo #17)

Photograph # 17

Area G – At all locations along the perimeter edge of the roof area, surface erosion has occurred exposing the asphaltic flood coat.
(Photo #18)

Photograph # 18

Area G – Deterioration of the originally installed roofing cement has allowed the reinforcing fabric to become exposed to weather elements.
(Photo #19)

Photograph # 19

Area G – The flange of an existing soil stack appears to have lost adhesion to the substrate creating an air void within the roof system and a possible location for condensation and moisture.
(Photo #20)

Photograph # 20

Area G – At numerous locations throughout the roof area, the modified bitumen base flashings have deteriorated to the point where factory-applied granules have fallen off exposing the underlying mat.
(Photo #21)

Photograph # 21

Area G – Surface erosion has occurred throughout the field of the roof membrane due to multiple factors such as extreme weather and deterioration of the roofing. The extent of the erosion has exposed the waterproofing membrane which is susceptible to UV degradation.
(Photo #22)

Photograph # 22

Area G – The existing interior roof drains are installed using copper drain pans; however, the pans are no longer properly sealed, allowing for moisture infiltration.
(Photo #23)

Photograph # 23

Area G1 – The roof area is composed of a ballasted EPDM roof membrane. While no leaking was reported within the roof area, leaks are known to occur within the building envelope "skin," particularly at structural columns.
(Photo #24)

Roof Condition: Satisfactory

Photograph # 24

Area G1 – A target patch has lost adhesion to the underlying membrane sheet, allowing for possible moisture entry.
(Photo #25)

Photograph # 25

Area G1 – Although not roofing-related, the exterior stucco structure contains vertical cracking along the majority of existing vertical control joints, allowing for moisture entry and potential rot.
(Photo #26)

Photograph # 26

DECC ARENA – CONCLUSIONS

Overall, the ballasted EPDM roof membrane of the DECC Arena was found to be in satisfactory condition with only minor deficiencies observed; however, the built-up roof membrane should be considered for replacement as it appears the roof system has surpassed its serviceable life with multiple large deficiencies that would require extensive repairs. Additionally, continual leaking is occurring at various locations throughout the exterior stucco wall, particularly at structural columns. While multiple attempts have been made to eliminate these leaks, they are still occurring. It would be recommended that a water test be performed along the exterior wall to try and pinpoint locations of moisture entry.

Below is a list of repairs that can be performed on the ballasted roof to maintain its anticipated service life:

1. Remove all failed EPDM patches and replace with new as required by EPDM Manufacturer.

Estimated Repair Budget: $500.00

Estimated Replacement Budget (Area G): 51,557 sq. ft. x $20 per sq. ft. = $1,031,140.00

HARBOR SIDE

Area H – A built-up roof membrane is installed throughout the roof of Harbor Side with multiple interior roof drains used for drainage.

While the age of the existing built-up roof membrane is unknown, minimal deficiencies were observed during our walkthrough.
(Photo #27)

Roof Condition: Satisfactory

Photograph # 27

At the north end of the roof areas, one primary roof drain was missing the drain strainer which can allow debris to enter the drain leader and reduce the amount of positive drainage.
(Photo #28)

Photograph # 28

HARBOR SIDE – CONCLUSIONS

Overall, while the age of the existing built-up roof membrane is unknown, the roofing appeared to be in satisfactory condition and requires only minor repairs to address observed deficiencies. Below is list of repairs that are recommended to be made to maintain the anticipated service life of the existing roof system:

1. Replace missing drain strainer on north end of roof areas. Strainer shall be compatible with existing clamping ring.

Estimated Repair Budget: $750.00

PIONEER HALL

Areas I, I1 & I2 – The roof areas of Pioneer Hall are composed of a ballasted EPDM roof membrane that was installed in 2011 by The Jamar Company. Drainage is accomplished via both primary and overflow interior roof drains.

Minimal deficiencies were observed during our walkthrough.
(Photo #29)

Roof Condition: Good

Photograph # 29

Vegetative growth is occurring at the drain locations and should be removed as soon as possible. The growth can cause premature damage to the single-ply membrane and reduce positive drainage.
(Photo #30)

Photograph # 30

Cohesive failure of the existing sealant was observed at the wall transition between dissimilar materials, creating a location for possible moisture entry.
(Photo #31)

Photograph # 31

PIONEER HALL – CONCLUSIONS

The existing ballasted EPDM roof membranes of Pioneer Hall were installed in 2011 by The Jamar Company and appear to be in good overall condition as only minor deficiencies were observed during our walkthrough and the roof was functioning as intended. Below is a list of recommended repairs to maintain the anticipated service life of the ballasted roof membrane:

1. Remove and dispose of all vegetative growth.
2. At wall transition, remove existing failed sealant and replace with new polyurethane sealant to match existing. New sealant shall be tooled upon installation.

Estimated Repair Budget: $750.00 (Based on the age of the roof, repairs to the roofing should be completed under warranty)

DECC

Area J – The existing built-up roof membrane is approximately 10 years old with an installation date of 2011. While multiple deficiencies were observed, many of them can be considered as "minor" and can be repaired to maintain the anticipated service life of the existing roofing. (Photo #32)

Roof Condition: Satisfactory

Photograph # 32

Area J – Shrinkage of the stucco panels, likely caused by not allowing proper curing between coats, is causing vertical cracking along the control joints.
(Photo #33)

Photograph # 33

Area J – At a few locations, the existing sealant is displaying signs of adhesive failure as it is no longer properly adhered to the wall substrate, allowing for moisture infiltration.

Additionally, some of the sheet metal fasteners have begun to back out due to thermal movement. (Photo #34)

Photograph # 34

Area J – Multiple fully adhered EPDM roof membranes were also installed during 2011 which were all found to be in good condition as no deficiencies were observed.
(Photo #35)

Photograph # 35

Area J – Alternate view of the previously installed fully adhered EPDM roof membrane. The majority of the EPDM roof systems achieve drainage via perimeter scuppers that drain onto the main roof area.
(Photo #36)

Photograph # 36

Area J – The existing sealant at the control joint transition was thinly applied during original application and has deteriorated, causing a cohesive failure and a location for moisture entry.
(Photo #37)

Photograph # 37

Area J – At multiple locations, the existing drain strainer does not properly fit the clamping ring and is installed incorrectly.
(Photo #38)

Photograph # 38

Area J – Surface erosion has occurred at a few locations near the primary roof drains due to wind scour and water movement. The surface erosion has exposed the underlying asphalt flood coat to UV degradation.
(Photo #39)

Photograph # 39

Area J – At one location, ridging of the BUR membrane was observed, which likely has occurred due to trapped moisture and/or air.

Ridging, if not repaired, can lead to splitting of the membrane and extensive leaking.
(Photo #40)

Photograph # 40

Area J – A missing drain strainer at a primary roof drain can lead to debris entering the drain system and cause a reduction in positive drainage.
(Photo #41)

Photograph # 41

Area J – The originally installed pourable sealer is no longer properly adhered to the roof penetration, creating a point for moisture entry.

It is recommended the open joint be covered with polyurethane sealant and a rain collar be installed to prevent the pourable sealer from degrading.
(Photo #42)

Photograph # 42

Area J – Trees near the roof edge should be trimmed back to prevent the deposit of organic material at the roof drains, which can lead to vegetative growth and a blockage of the drainage system.
(Photo #43)

Photograph # 43

Area J1 – Overview of the existing built-up roof membrane installed throughout Area J1 of the DECC. The existing roof membrane is approximately 10 years old and leaking was not reported by onsite personnel.
(Photo #44)

Roof Condition: Satisfactory

Photograph # 44

Area J1 – One of the primary drains is missing a drain strainer which allows larger debris to enter the drain leader and possibly reduce the amount of positive drainage.
(Photo #45)

Photograph # 45

Area J1 – Pipe supports should be installed beneath the existing conduit at a rate of one support per 6 feet.
(Photo #46)

Photograph # 46

Area J1 – Some of the originally installed sealant is no longer properly adhered to the substrate due to adhesive failure.
(Photo #47)

Photograph # 47

DECC – CONCLUSIONS

While a number of deficiencies were observed during our walkthrough, the roof still appeared to be in satisfactory condition as the roofing deficiencies can be considered minor and should be easily repaired. Below is a list of recommended roof repairs to maintain the anticipated service life of the existing roof assemblies:

1. Remove all failed sealant and replace with new polyurethane sealant. Sealant to match color of existing substrate and shall be tooled upon installation.
2. Replace all missing or improperly sized drain strainers. New strainers shall be compatible with existing clamping ring.
3. Using cold application adhesive, embed roof gravel at locations of surface erosion.
4. Repair ridging of BUR membrane in accordance with Manufacturer requirements.
5. Apply new polyurethane sealant at open joints in pourable sealer, tool sealant upon installation. Once sealed, install new galvanized steel rain collars to completely cover pitch pan.
6. Trim back tree growth near roof edge.

Estimated Repair Budget: $3,000.00 (Based on the age of the roof, repairs should be completed under warranty)

CITY SIDE

Area K – The main roof area is composed of a ballasted EPDM roof membrane that was installed around 2011. Drainage is accomplished via interior roof drains.

Some minor repairs are required to maintain functionality of the existing roof system. (Photo #48)

Roof Condition: Satisfactory

Photograph # 48

Area K – At a few locations, the existing EPDM base flashings have lost adhesion to the edge substrate causing the membrane to bridge and create an air void beneath the membrane. (Photo #49)

Photograph # 49

Area K – A couple of the interior roof drains are missing their corresponding strainers, allowing for debris to enter the drainage system. (Photo #50)

Photograph # 50

Area K1 – Overview of the ballasted EPDM roof membrane that was installed in 2011 by The Jamar Company. The roof appeared to be in satisfactory condition and no leaking was reported.
(Photo #51)

Roof Condition: Satisfactory

Photograph # 51

Area L – The 10-year-old roof system is composed of a ballasted EPDM roof membrane over rigid roof insulation. While the roof appeared to be in satisfactory condition overall, some repairs are required.
(Photo #52)

Roof Condition: Satisfactory

Photograph # 52

Area L – Along the northern end of the roof area, multiple deficiencies were observed including bridging flashing and ridging roof insulation. The bridging is caused by the membrane shrinking and losing adhesion to the wall substrate while the ridging of the insulation is likely caused by moisture trapped within the insulation boards.
(Photo #53)

Photograph # 53

Area M – Overview of the fully adhered 60-mil EPDM roof membrane that was installed in 2017 by Commercial Roofing.
(Photo #54)

Roof Condition: Good

Photograph # 54

Area M6 – While the fully adhered 60-mil EPDM roof membrane appeared to be in good condition, some minor ponding is occurring and should be monitored annually.
(Photo #55)

Roof Condition: Good

Photograph # 55

Area M5 – At one location, a fastener has backed out of the wall substrate due to thermal movement. The fastener should be re-secured to prevent moisture from wicking into the wall assembly.
(Photo #56)

Roof Condition: Good

Photograph # 56

Area M7 – Overview of the fully adhered 60-mil EPDM roof membrane installed over mechanically fastened Dens Deck and isocyanurate insulation. The roof system is approximately 4 years old and installed by Commercial Roofing.
(Photo #57)

Roof Condition: Good

Photograph # 57

Area M8 – The fully adhered 60-mil EPDM roof membrane of the observation tower appeared to be in good condition as no deficiencies were observed and no issues were reported. The roofing was installed by Commercial Roofing in 2017.
(Photo #58)

Roof Condition: Good

Photograph # 58

CITY SIDE – CONCLUSIONS

The EPDM roof membranes appear to be in satisfactory to good condition overall as each are functioning adequately with only minor deficiencies. While all repairs should be made under warranty, below is a list of the recommended repairs to maintain the anticipated service life:

1. Remove all failed base flashings and repairs as required by the System Manufacturer.
2. Replace all missing drain strainers. New strainers shall be compatible with existing clamping ring.
3. Continue to monitor any ponding.
4. Re-secure any backed out fasteners.

Estimated Repair Budget: $3,000.00 (Based on the age of the roof, repairs should be completed under warranty)

SKYWAY

Area N1 – Overview of the fully adhered 60-mil EPDM roof membrane installed throughout Area N1 of the Skyway. The roofing was installed in 2019 by Commercial Roofing and appeared to be in good condition.

All other areas of the Skyway are composed of a 4-ply BUR membrane and appear to be in good condition as no deficiencies were found.
(Photo #59)

Roof Condition: Good

Photograph # 59

Area N1 – A small section of the existing field membrane appears to have not properly adhered to the cover board substrate, likely due to the adhesive not being able to fully flash off during installation.
(Photo #60)

Photograph # 60

SKYWAY – CONCLUSIONS

Overall, the 2-year-old EPDM and BUR membranes of the skyway appear to be in good condition as minimal deficiencies were observed during our walkthrough and no leaking was reported. While all repairs should be completed under warranty, below is a list of recommended roof repairs to maintain the anticipated service life:

1. Remove loose membrane and install field target patch in accordance with the system Manufacturer.

Estimated Repair Budget: $1,000.00 (Based on the age of the roof, repairs should be completed under warranty)

AMSOIL ARENA

Area Q – The main roof of Amsoil Arena is composed of a built-up roof membrane that was installed around 2011. Overall, the roofing appeared to be in good condition; however, some issues should be addressed.
(Photo #61)

Roof Condition: Good

Photograph # 61

Area Q – Throughout the modified bitumen base flashings, small fishmouths along the side laps of the cap sheet were present.
(Photo #62)

Photograph # 62

Area Q – Fasteners should be installed at 24” O.C. maximum along the sheet metal counter flashing of the existing roof curbs to prevent wind uplift. Currently, only one fastener is installed per side.
(Photo #63)

Photograph # 63

Area Q – Some of the existing base flashings are beginning to sag due to the height of the wall and the continual softening of the cap sheet membrane. (Photo #64)

Photograph # 64

Area Q – The originally installed roofing cement is displaying signs of UV degradation. It is recommended that new roof cement and reinforcing fabric be applied at the same location. (Photo #65)

Photograph # 65

Areas Q1 – Q3: The roof areas are composed of a built-up roof membrane that was installed around 2011. Overall, the roof assembly appeared to be in good condition with no issues observed. (Photo #66)

Roof Condition: Good

Photograph # 66

Area Q4 – Overview of the built-up roof membrane installed in 2011. The roofing appeared to be in good condition with minimal issues found during our walkthrough.
(Photo #67)

Roof Condition: Good

Photograph # 67

Area Q4 – Some minor vegetative growth was found and should be removed as soon as possible. The vegetative root system as it grows and develops can cause additional damage to the roof membrane.
(Photo #68)

Photograph # 68

Area Q5 – The 10-year-old built-up roof system was found to be in good condition and no leaking was reported.

Vegetative growth should be removed before it is allowed to develop and cause damage to the BUR membrane.
(Photo #69)

Roof Condition: Good

Photograph # 69

Area Q6 – The roof area is composed of a 4-ply BUR membrane that is in overall good condition. The roof membrane is approximately 10 years old and should still be under warranty.
(Photo #70)

Roof Condition: Good

Photograph # 70

Area Q6 – Some minor vegetative growth was present and should be removed. As the root system develops, it can cause damage to the BUR membrane.
(Photo #71)

Photograph # 71

Area Q7 – The roof area is composed of a built-up roof membrane and appears to be functioning as designed.
(Photo #72)

Roof Condition: Good

Photograph # 72

Area Q9 – Overview of the 10-year-old BUR membrane. The roof system appears to be performing adequately and is in good condition.
(Photo #73)

Roof Condition: Good

Photograph # 73

Area Q9 – At the roof-to-wall transition, the existing sealant is displaying signs of cohesive failure as the sealant is breaking down within the bulk layer of the adhesive and creating a location for moisture entry.
(Photo #74)

Photograph # 74

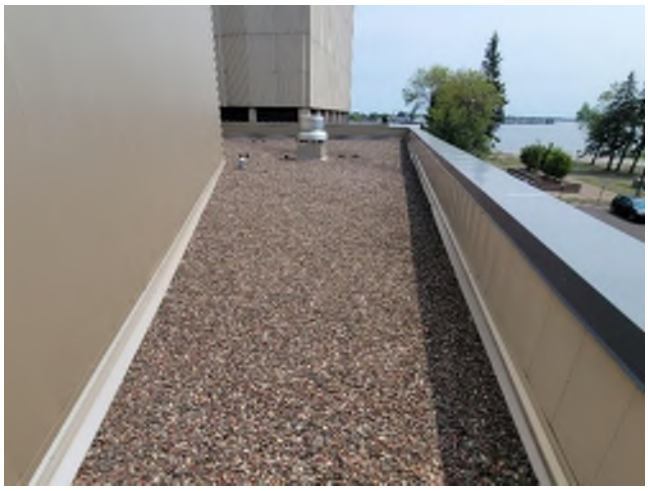
Q10 – The built-up roof membrane is performing adequately and no issues were reported by onsite personnel. Overall, the roofing is in good condition.
(Photo #75)

Roof Condition: Good

Photograph # 75

Area Q11 – The built-up roof membrane of Area Q11 was installed in 2011 and is performing as designed. The roof system is in good condition and minimal repairs are required at this time.
(Photo #76)

Roof Condition: Good



Photograph # 76

Area Q11 – At an obsolete roof stack penetration, the existing sealant at the rain collar has failed and is no longer properly adhered, allowing for moisture infiltration.
(Photo #77)

Photograph # 77

Area Q12 – Overview of the built-up roof membrane installed in 2011. The roof system is performing adequately and requires no repairs at this time.
(Photo #78)

Roof Condition: Good

Photograph # 78

Area Q13 – The built-up roof membrane was found to be in good condition overall; however, a few minor deficiencies require repairs at this time to assure continual serviceability of the roof system.

At one location, the pipe flashing of an obsolete roof penetration was left open for direct moisture entry.
(Photo #79)

Roof Condition: Good

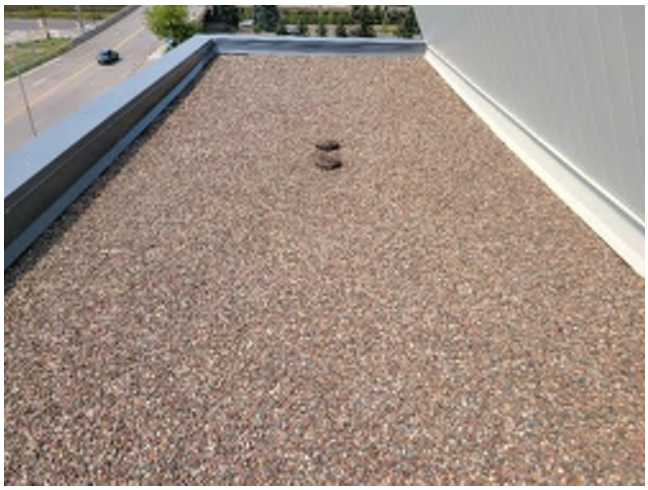
Photograph # 79

Area Q13 – Existing sealant at rain collars has lost adhesion to the roof stack substrate and should be replaced with new to prevent moisture infiltration.
(Photo #80)

Photograph # 80

Area Q14 – The built-up roof membrane is performing adequately and no issues were reported by onsite personnel.
(Photo #81)

Roof Condition: Good



Photograph # 81

Areas Q15 & Q16 – The roof system is composed of a 4-ply built-up roof membrane over rigid roof insulation. No issues were reported by onsite personnel and minimal deficiencies were observed during our walkthrough.

At a few locations, the existing sealant has failed and no longer properly seals, allowing for moisture entry.
(Photo #82)

Roof Condition: Good

Photograph # 82

Areas Q15 & Q16 – At a few locations, the side laps of the modified bitumen base flashing have lost adhesion to the adjacent membrane sheet creating a fishmouth and a location for moisture infiltration.
(Photo #83)

Photograph # 83

Area Q17 – Overall, the built-up roof membrane of Area Q17 is performing as anticipated; however, a few minor repairs are required at this time.

Some of the side laps of the base flashing have lost adhesion to the adjacent sheet creating a location for moisture entry.
(Photo #84)

Roof Condition: Good

Photograph # 84

Area Q17 – The modified bitumen base flashing is displaying signs of UV degradation and is beginning to show signs of sagging.
(Photo #85)

Photograph # 85

Area Q18 – Overview of the existing built-up roof membrane that was installed in 2011. The roofing appeared to be performing adequately and is in good condition.
(Photo #86)

Roof Condition: Good

Photograph # 86

AMSOIL ARENA – CONCLUSIONS

The majority of the roof areas are approximately 10 years old and appear to be in good condition as they are functioning as designed. While any repairs should be completed under warranty, below is a list of recommended roof repairs to maintain the anticipated service life:

1. Repair all fishmouths in the base flashing as recommended by the Manufacturer.
2. Remove and dispose of all vegetative growth.
3. Remove and replace deteriorated sealant with new polyurethane sealant. Sealant to be tooled upon completion of installation.
4. Properly seal all open roof stack penetrations, including applying new sealant at rain collars.
5. Continue to monitor the degradation of the modified bitumen base flashing.

Estimated Repair Budget: $1,500.00 (Based on the age of the roof, repairs should be completed under warranty)

III. FINAL CONCLUSIONS:

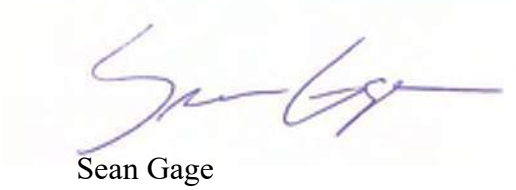
The majority of the roof areas throughout the Duluth Entertainment Convention Center (DECC) consist of an EPDM- or BUR-type roof system with the majority of these roof areas being considered either satisfactory or good condition. While some deficiencies were observed, the majority of them can be repaired, with many of the repairs being completed under the Manufacturer warranty. There were; however, a few roof areas that should be considered for replacement in the next 1-5 years. Please refer to the attached budgetary spreadsheet for further information.

IV. REMARKS:

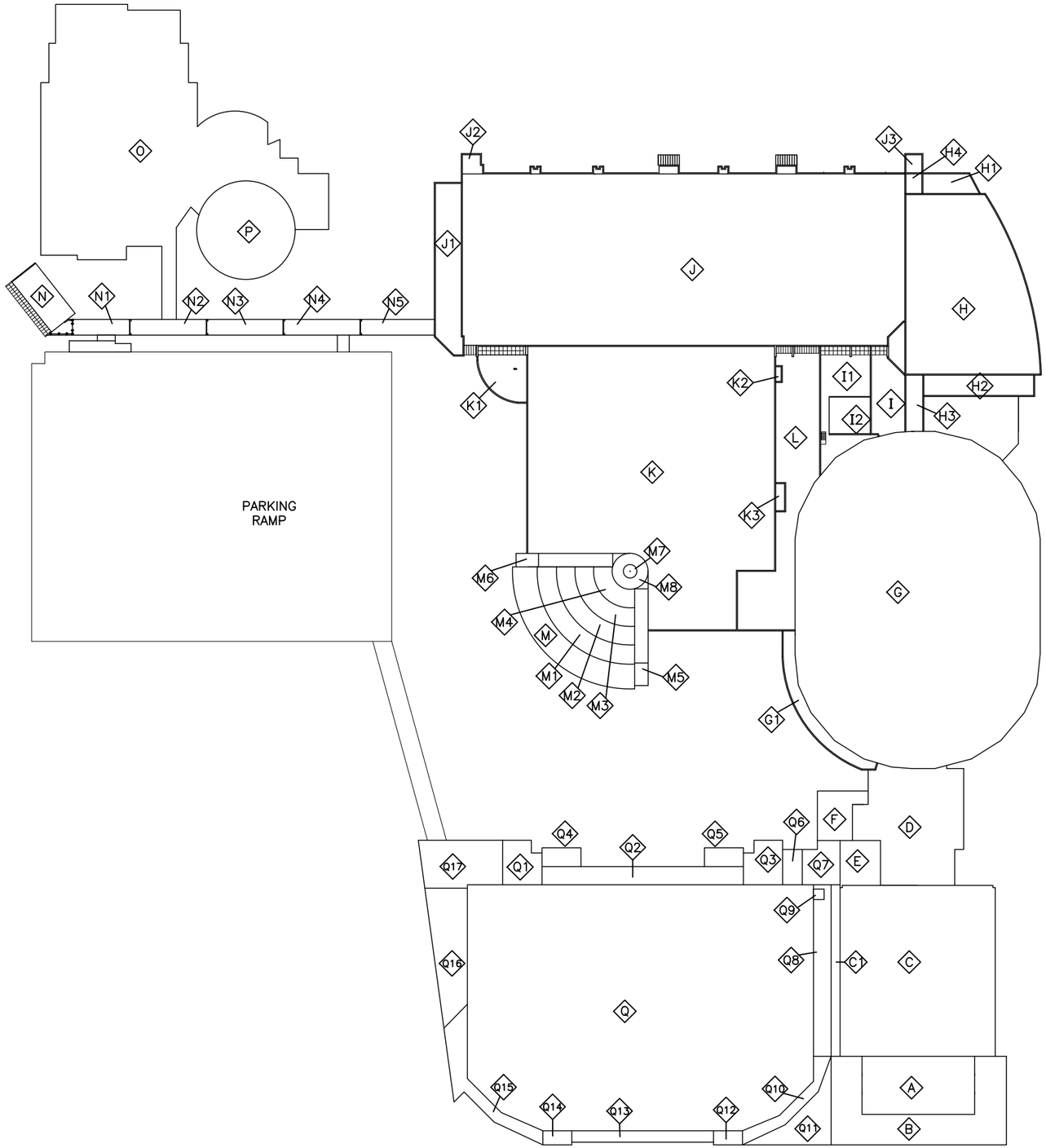
This report is not intended as a bidding document and may not address all deficiencies within the roof area. If there are any questions or concerns regarding this report, please contact the author.

Respectfully,

ROOF SPEC, INC.



Sean Gage
Senior Consultant
RRC, CDT, CEI, Associate AIA



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ROOF PLAN

NTS

DULUTH ENTERTAINMENT
CONVENTION CENTER
350 HARBOR DRIVE
DULUTH, MN 55802

ROOF SPEC INC.
2400 Prior Ave. N.
St. Paul, MN 55113
(651) 639-0644

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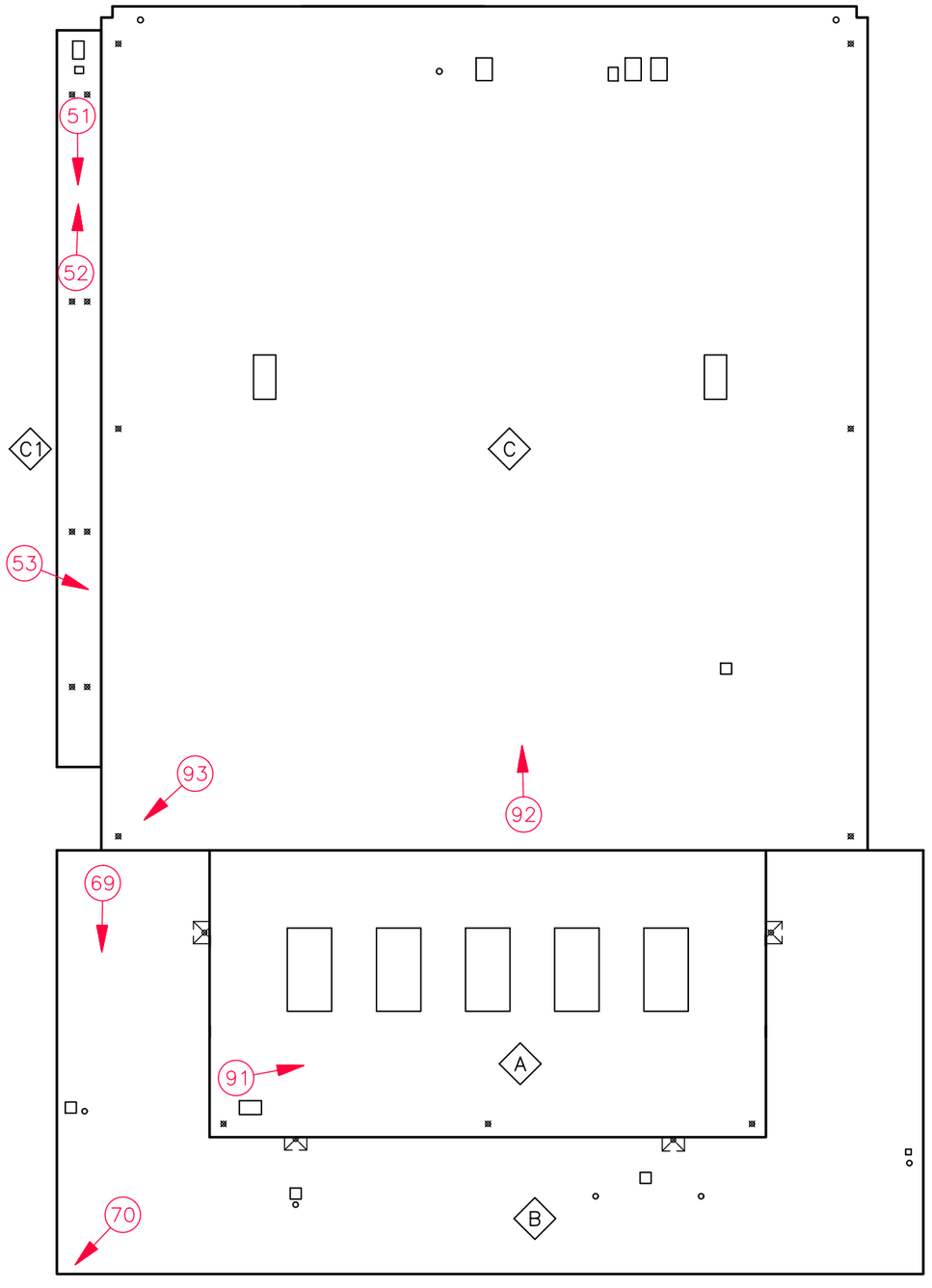
09/05/2021



ROOF PLAN (AREA A, B, C)

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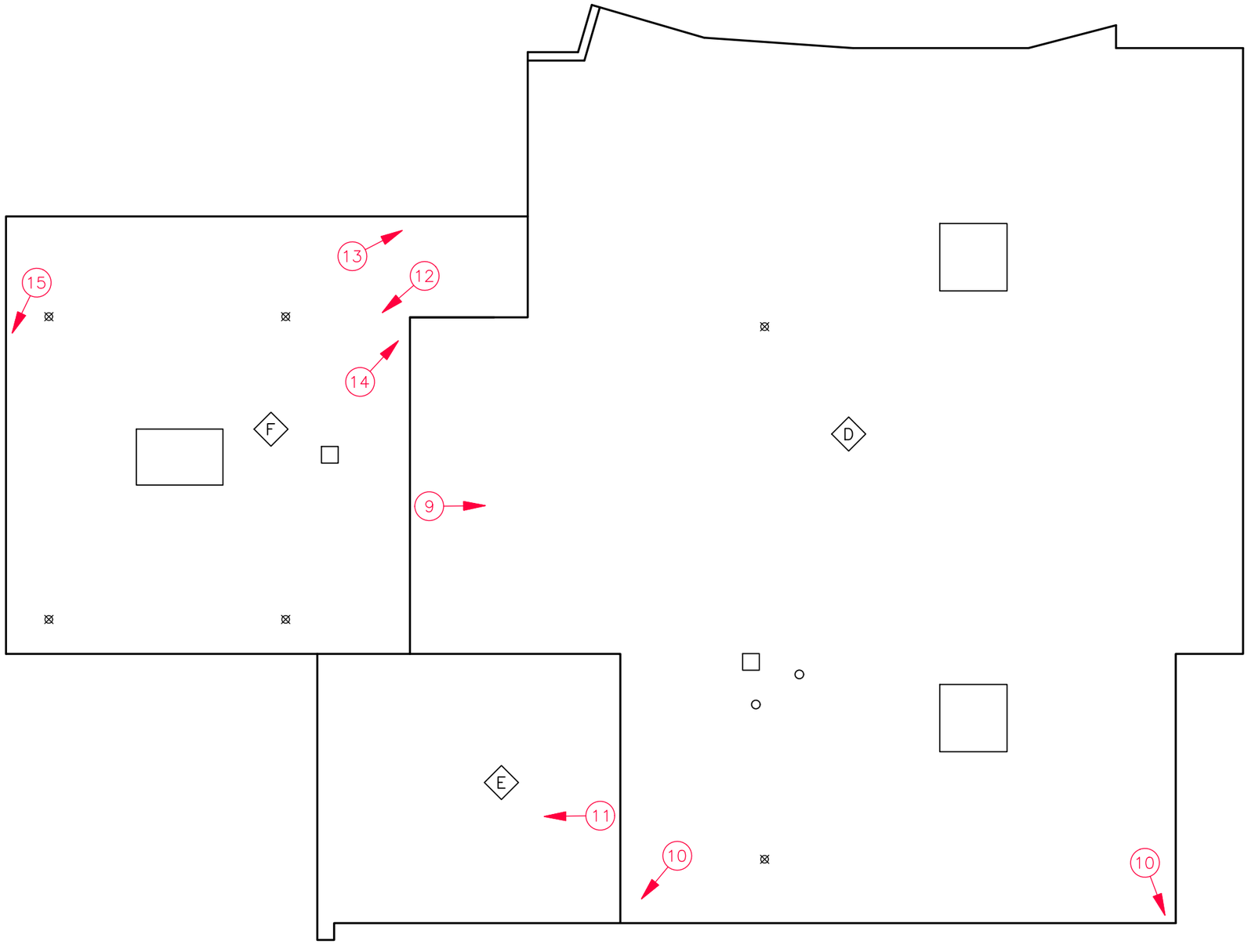

ROOF PLAN (AREA D, E, F)

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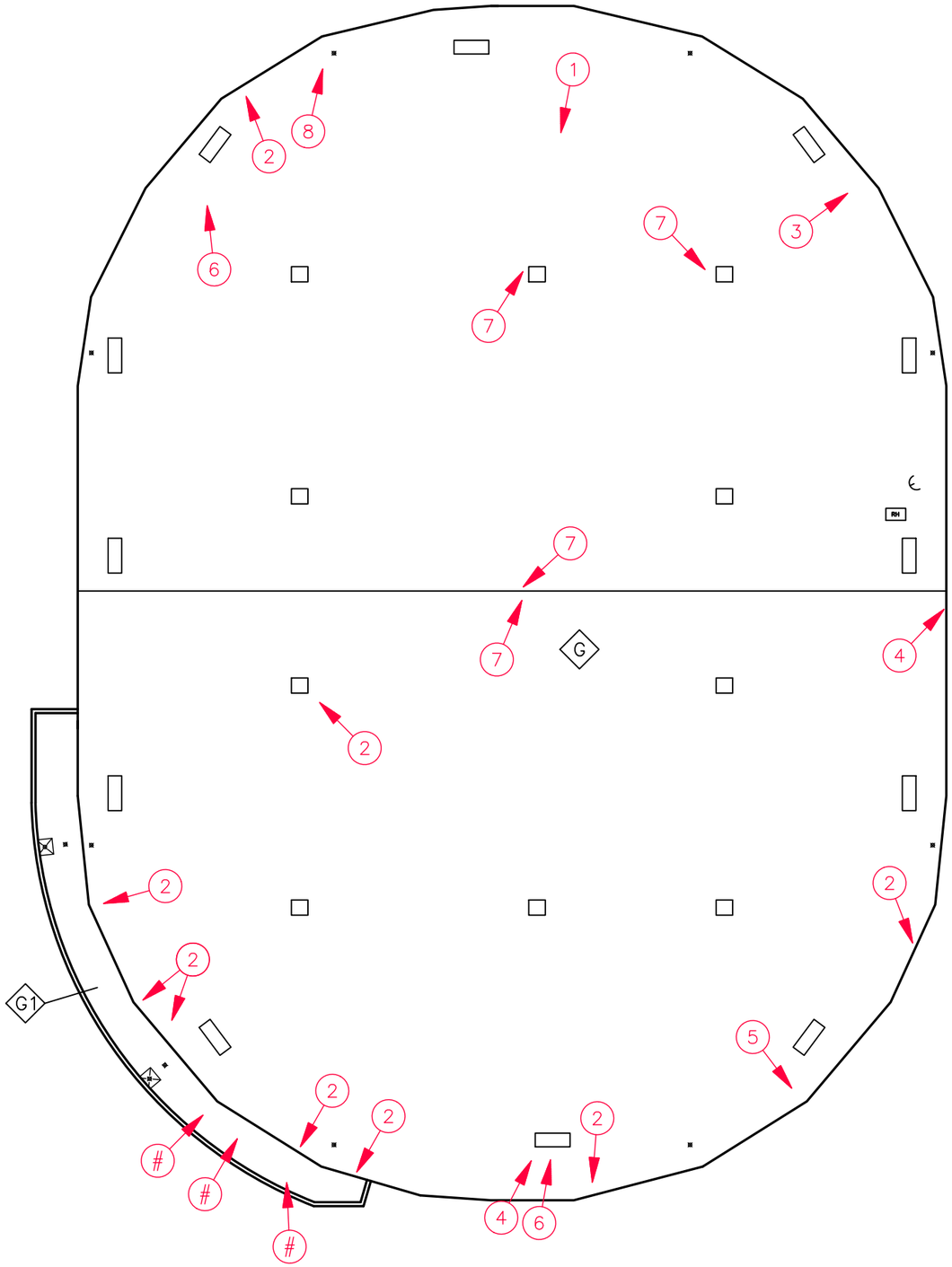

ROOF PLAN (AREA G)

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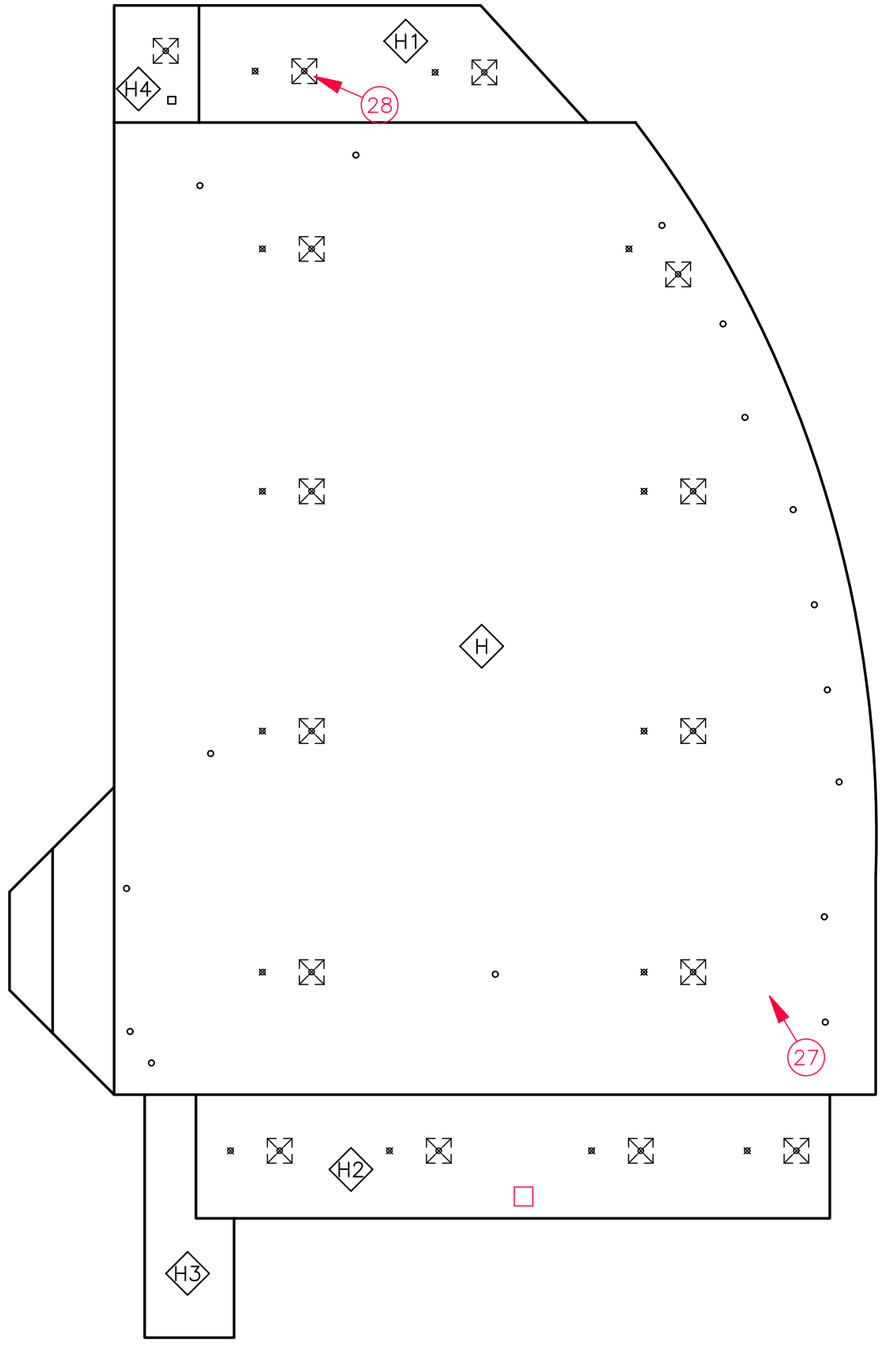

ROOF PLAN (AREA H)

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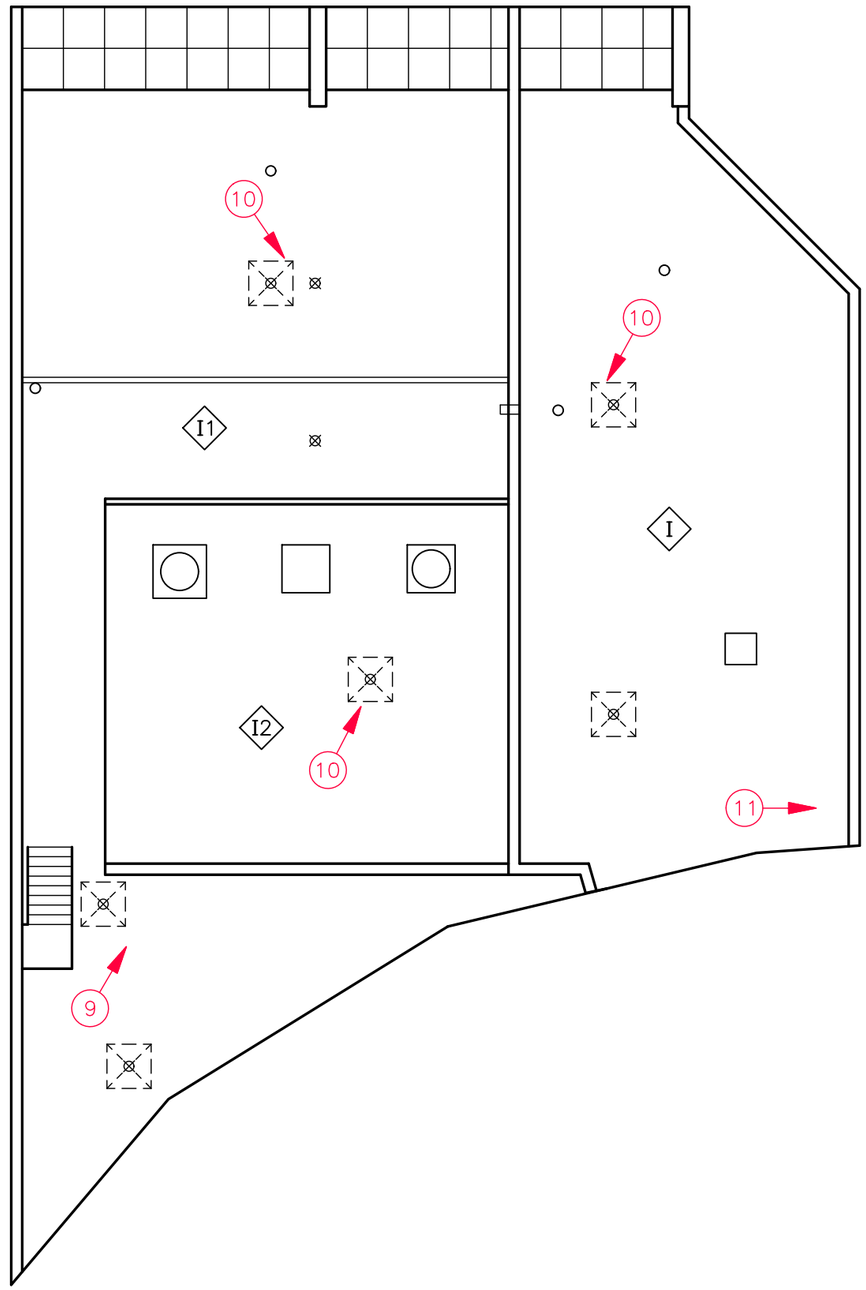

ROOF PLAN (AREA I)

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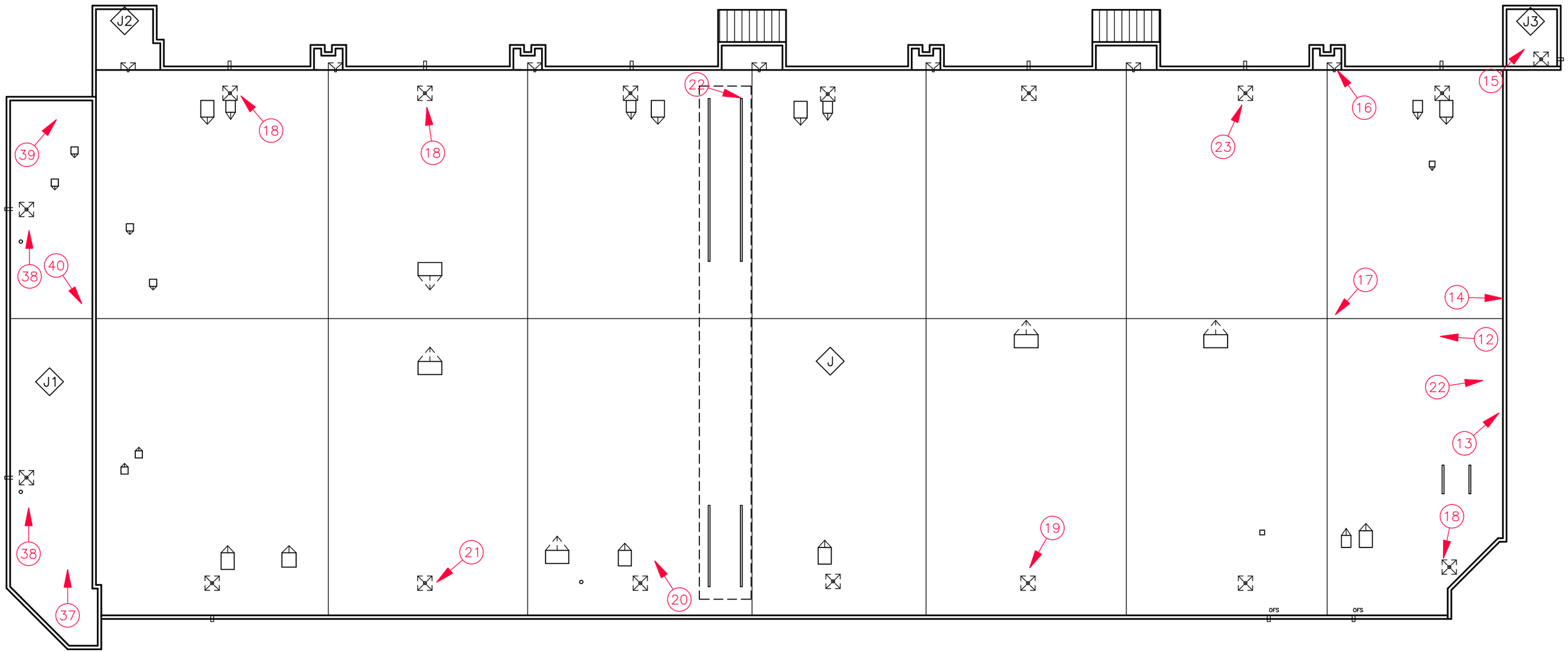

ROOF PLAN (AREA J)

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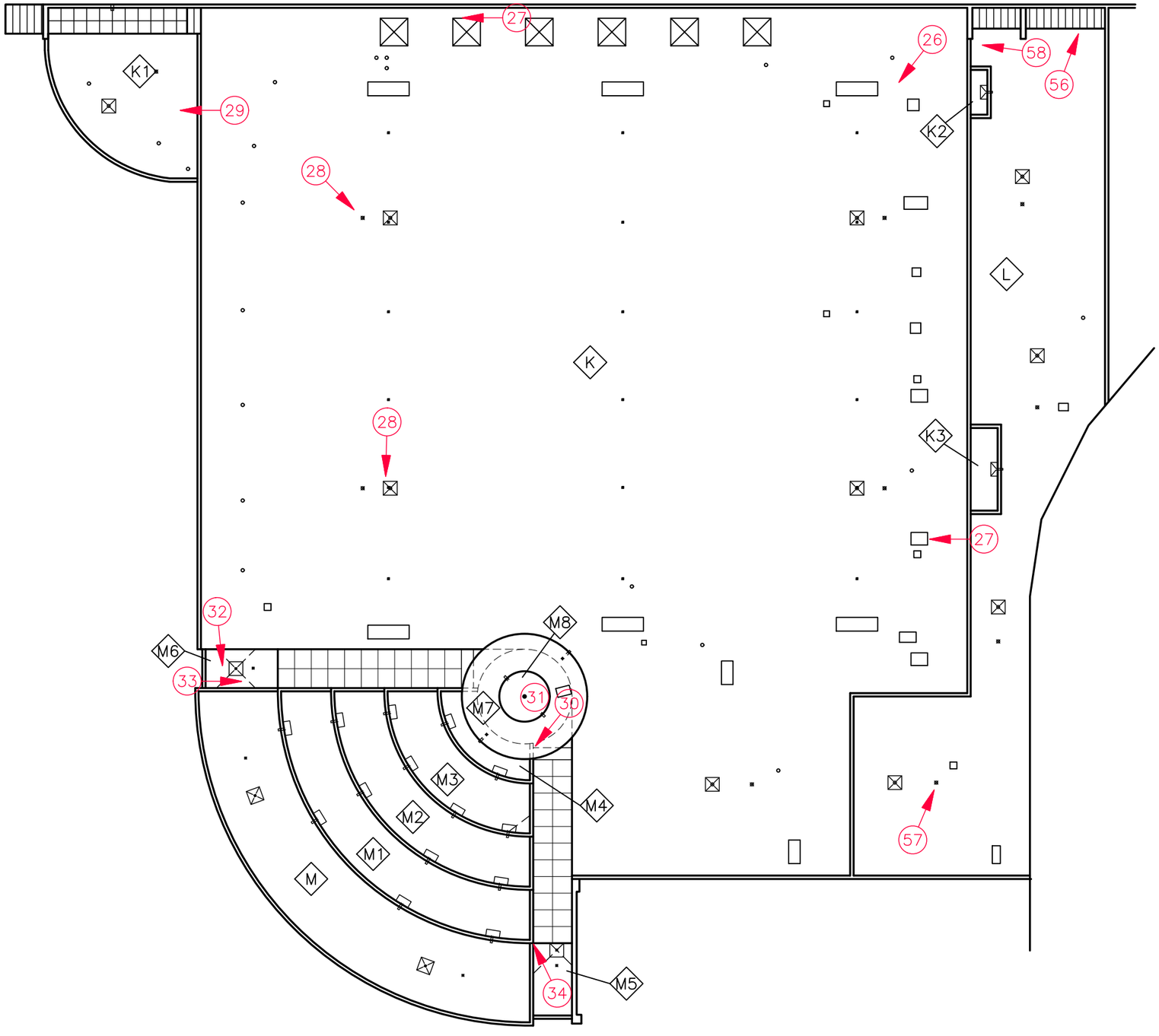

ROOF PLAN (AREAS K, L, M)

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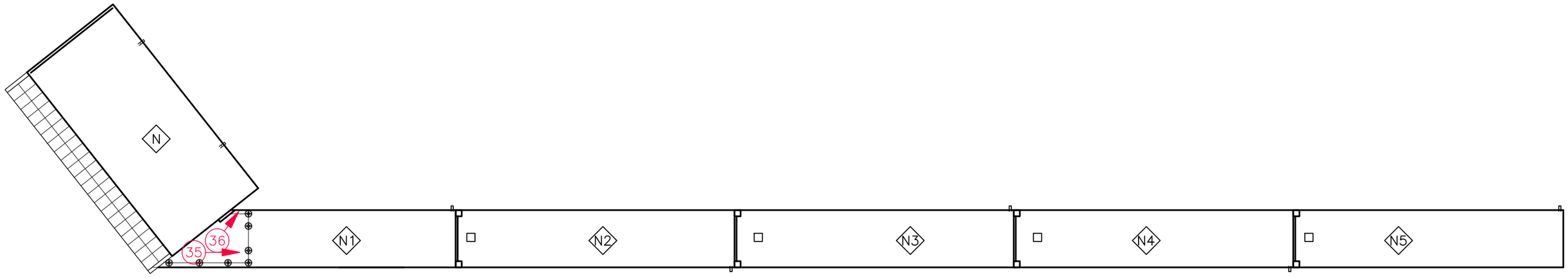

ROOF PLAN (AREA N)

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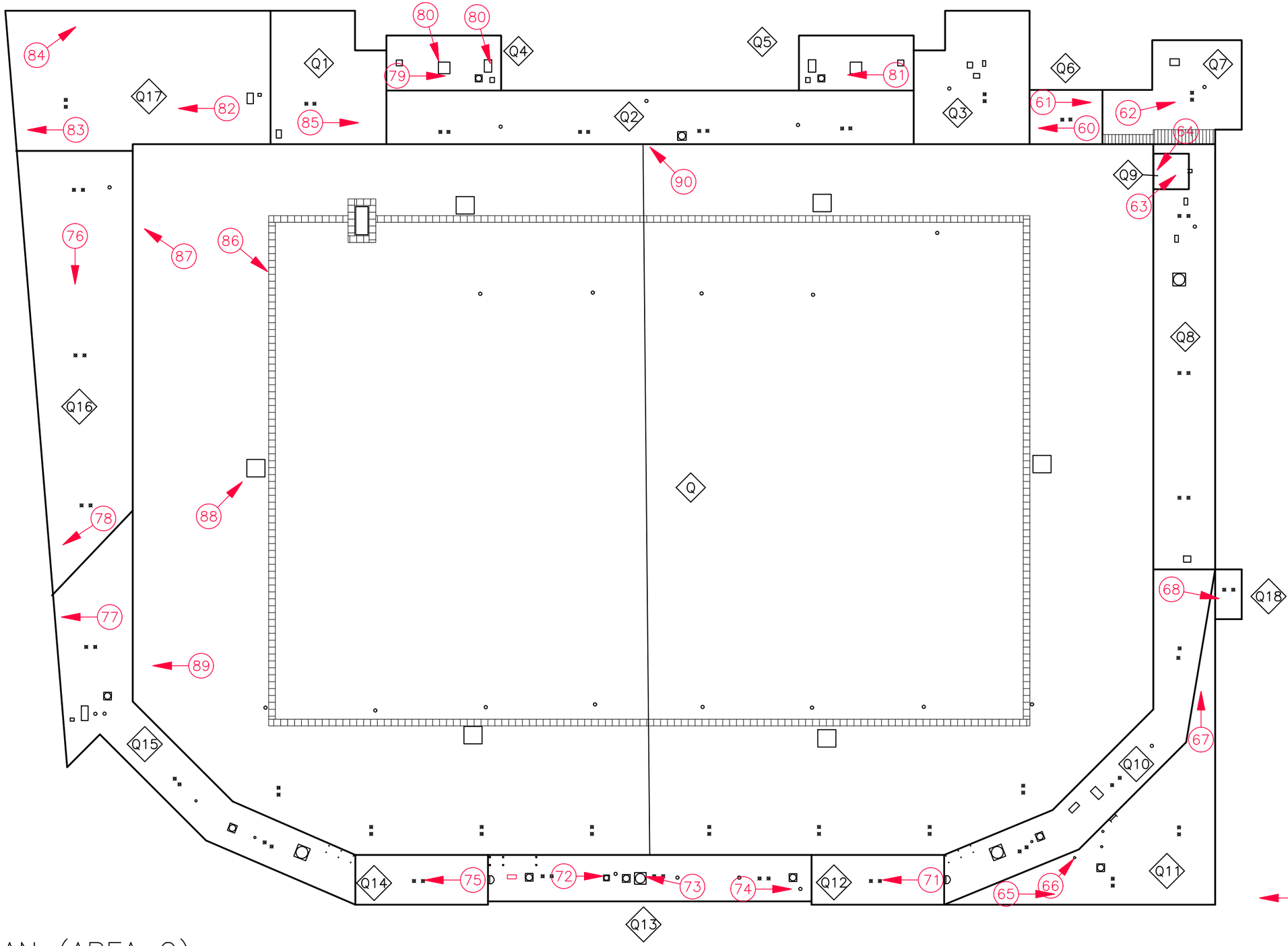

ROOF PLAN (AREA Q)

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REPORT OF STRUCTURAL REVIEW

DECC PARKING STRUCTURE

350 Harbor Drive, Duluth, MN

OWNER:
Duluth Entertainment and Convention Center
350 Harbor Drive, Duluth, MN
218-722-5573

December 19, 2019

Prepared by:

LHB, Inc.
Christopher J. Miller, PE, SE

LHB Project No. 190745

21 West Superior
Street, Suite 500
Duluth, Minnesota
55802
218 727-8446
Fax 218 727-8456
www.LHBcorp.com

I hereby certify that this 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.

Signed: Christopher J. Miller Date: 12/19/19

Name: Christopher J. Miller

Reg. No.: 49840

PURPOSE

The purpose of this report is to provide an Annual Structural Review (Type II) in accordance with the requirements of the City of Duluth Construction Services & Inspections Division "Annual Structural Review of Parking Structures" guidelines. This review is entirely a structural review and not a review for code compliance in other areas.

BACKGROUND INFORMATION

The DECC parking ramp structure located at 350 Harbor Drive in Duluth, MN is in good condition.

The parking ramp structure consists of the original structure, which was constructed in 1999/2000 and an expansion on the south side which was constructed in 2009.

The original portion of the parking structure consists of four parking levels of approximately 180 feet x 278 feet. The top 3 elevated levels consist of one way post-tensioned 6" slabs spanning 21'-9", supported by post-tensioned beams spanning 60'-0", supported by conventionally reinforced concrete columns. The lowest level consists of 5" slab on grade. The foundation consists of footings supported by concrete filled steel pipe pile. LHB and Carl Walker designed the ramp in 1999.

The expansion portion of the parking structure consist of 5 parking levels approximately 122 ft x 278. The top 4 elevated levels consist of one way post-tensioned 6" slabs spanning 21'-9", supported by post-tensioned beams spanning 61'-0", supported by conventionally reinforced concrete columns. The lowest level consists of 5" slab on grade. The foundation consists of footings supported by concrete filled steel pipe pile. LHB and Carl Walker designed the ramp in 2008.

PROCEDURES

Preparation of this report included visual inspection of the top and bottom of the structural deck, and support beams and columns, as well as selective chain dragging and hammer sounding of the elevated decks and review of existing drawings for the original and expansion structure and previously prepared 2015 structural review report.

VISUAL OBSERVATIONS AND FINDINGS (ORIGINAL STRUCTURE)

Level 1 (Basement):

Level 1 is a slab on-grade surface. Its condition is fair and consistent with its age containing concrete cracks located at various locations throughout the level with two spalls near the bottom of the ramp up to Level 2. The top of the concrete stub wall at the southeast corner of the parking structure adjacent to the sidewalk has minor chipping that is not a structural concern.

Level 2:

Hairline cracks were observed in the top of the deck at approximately 19 locations at the edge of the slab adjacent to columns (see photo 1 for typical condition). The cracks are not a concern at this time, but they should be continually monitored and repaired if spalls form.

The expansion joint between the slab on grade and the elevated deck is in poor conditions with the northern 2 feet of the gland torn (see photo 2). Throughout the remainder of the expansion joint, the nosing is cracking. The expansion joint located between the original structure and the 2009 expansion was observed to be in good condition. The expansion joint should be flood tested yearly and repaired if leaking.

There was no evidence of concrete delamination as a result of spot chain dragging the elevated deck.

The traffic coating over the concrete pour strips located at the center of the structure is in poor condition with areas of coating worn to the concrete surface. (see photo 3)

Efflorescence was present in the underside of the deck at the construction joint in the northeast corner of Level 2 indicating water penetration through the joint.

Adjacent to both the northwest and southwest construction joint, there is a crack in the underside of the deck. At the time of the inspection, the crack was not observed to propagate through the deck. If the crack becomes visible in the top of the deck the crack should be sealed.

Multiple interior columns along grid lines 3 and 4 have hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset (see photo 4). These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

Level 3:

Hairline cracks were observed at 17 locations at the edge of the slab adjacent to columns. Additional deck cracks are also located near the interior column at grid intersection L-3.

There was no evidence of concrete delamination as a result of spot chain dragging the elevated post-tensioned concrete deck.

The traffic coating over the concrete pour strips located at the center of the structure is in poor condition with areas of coating worn to the concrete surface.

The expansion joint located between the original structure and the 2009 expansion was observed to be in fair condition. The expansion joint should be flood tested yearly and repaired if leaking.

Multiple interior columns along grid lines 3 and 4 have hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset. These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

The column at grid N/5 is cracked and spalled at the barrier strand anchor angle (see photo 5). The cables should be de-tensioned, anchor removed, column repaired, new anchors installed that will not impart load to the corner of the column, and barrier strands re-installed.

Level 4 (Roof):

Hairline cracks were observed at 8 locations at the edge of the slab adjacent to columns.

A previously repaired partial depth concrete patch, approximately 5 sq ft, is delaminated.

The traffic coating over the concrete pour strips located at the center of the structure is in poor condition with areas of coating worn to the concrete surface. Additionally, the traffic coating in the southeast corner adjacent to the expansion joint is in poor condition.

The expansion joint located between the original structure and the 2009 expansion was observed to be in fair condition with minor cracking in the nosing. The expansion joint should be flood tested yearly and repaired if leaking.

There was a small crack observed in the bottom of the beam on grid line C between grids 2 and 3. The crack does not warrant a structural repair at this time, however the beam should be monitored and repaired if the beam begins to spall.

Adjacent to both the northwest and southwest construction joint there are cracks in the underside of the deck. At the time of the inspection, the crack adjacent to the northwest construction joint was not observed to propagate through the deck. The cracks adjacent to the southwest construction joints were observed in the top of the deck as well as the underside. These cracks should be routed and sealed.

Multiple interior columns along grid lines 3 and 4 have hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset. These hairline cracks do not require a structural repair, however, should be monitored and repaired if spalls form.

The column at grid E/4 was observed to be cracked and spalled on both the underside of the level 4 deck and on the top of the level 3/4 ramp (see photo 6). The spalls should be repaired with a concrete repair to avoid further deterioration.

The tops of the columns at grids B/3 and B/4 were observed to be cracked at the interface with the level 4 support beam (see photo 7). The area of cracked concrete was not accessible for concrete sounding due to its height and should be sounded withing the next year to determine if a repair to slow further deterioration is warranted.

VISUAL OBSERVATIONS AND FINDINGS (EXPANSION STRUCTURE)

Level 1 (Basement):

The slab on grade is in good condition with no significant cracking or spalling noted.

Level 2:

The expansion joint between the slab on grade and the elevated slab is in fair condition with minor areas of nosing cracking.

Traffic coating over the concrete pour strip at the center of the structure is in poor condition (see photo 1).

The beam supporting level 2 on grid 8 between grids L & M was observed to have 10 sq ft of delaminated concrete in the bottom of the beam. The beam does not warrant a structural repair at this time, however the beam should be monitored and repaired if the beam begins to spall.

Multiple interior columns along grid line 8 exhibit hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset (see photo 8). These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

Level 3:

The traffic coating on the level 2/3 up/down ramp pour strip is in poor condition. The traffic coating on the pour strip in the center of the level 3 deck (non-ramp portion) was observed to be in good condition at the time of the inspection.

Multiple interior columns along grid line 8 exhibit hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset. These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

Level 4:

The traffic coating on the level 3/4 up/down ramp pour strip is in fair condition. The traffic coating on the pour strip in the center of the level 4 deck (non-ramp portion) is in poor condition.

Multiple interior columns along grid line 8 exhibit hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset. These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

Level 5:

The traffic coating on the pour strip in the center of the structure is in poor condition.

Approximately 3 ft long cracks were observed in the bottom of the beams supporting level 5 at both grids C & J between grids 8 & 10. There is an approximate 2 ft long crack in the beam web on grid 8 between grids K & L. The beams do not warrant a structural repair at this time, however the beam should be monitored and repaired if the beam begins to spall.

Multiple interior columns along grid line 8 exhibit hairline cracks at the columns to beam interface where the up/down ramp and elevated deck are offset. These hairline cracks do not require a structural repair, however, the columns should be monitored and repaired if spalls form.

The barrier cable bracket at column J/8 has a missing bolt likely due to impact. The bracket should be re-secured to the column.

ENGINEER'S OPINION

The overall condition of the structure is good. The deficiencies observed and noted in this report do not require immediate repair to maintain the minimum design code structural capacity in the upcoming year.

It is our opinion that the structure can safely sustain the 40 pounds per square foot (psf) live load required by the Minnesota State Building Code.

REPAIR AND MAINTENANCE

Recommended Maintenance & Repair

Deficiencies observed do not require immediate repair to maintain minimum design code structural capacity. However, the following maintenance activity/ repairs are recommended:

- Original Structure
    - Traffic Coat deck areas with hairline cracks adjacent to columns.
    - Replace expansion joint at slab on grade to elevated deck interface.
    - Recoat traffic coating on all pour strips
    - Re-seal construction joints
    - Seal crack adjacent to construction joint in level 5
    - Repair concrete spall to column E/4 at the beam supporting level 4
    - Repair delaminated patch noted on level 5 and traffic coat to 6 inches beyond perimeter of concrete repair.
    - Column Spall at Grid N/5 between levels 2 and 3: Detension cables, remove anchors and angles, repair column, install new angles and anchors which will not impart load to column corner, re-install cables.

- Expansion Structure
    - Recoat traffic coating on all pour strips
    - Re-anchor barrier cable bracket at Column J/8 above level 5

Appendix

Photo 1 – Original Structure – Hairline cracking in elevated deck at column

Photo 2 – Original Structure – Failed expansion joint at slab on grade to elevated slab interface

Photo 3 – Original Structure – Failed traffic coating over concrete pour strip (Level 3 shown, other levels similar)

Photo 4 – Original Structure – Typical hairline column cracking at staggered beam interface

Photos 5 – Original Structure – Cracked and spalled column corner at N/5 (barrier strand anchorage) between levels 2 and 3.

Photo 6 – Original Structure – Crack and spalled concrete in column at Grid E/4

Photo 7 – Original Structure – Cracked top of column at Grid B/4 (B/3 similar)

Photo 8 – Expansion Structure – Failed traffic coating over pour strip

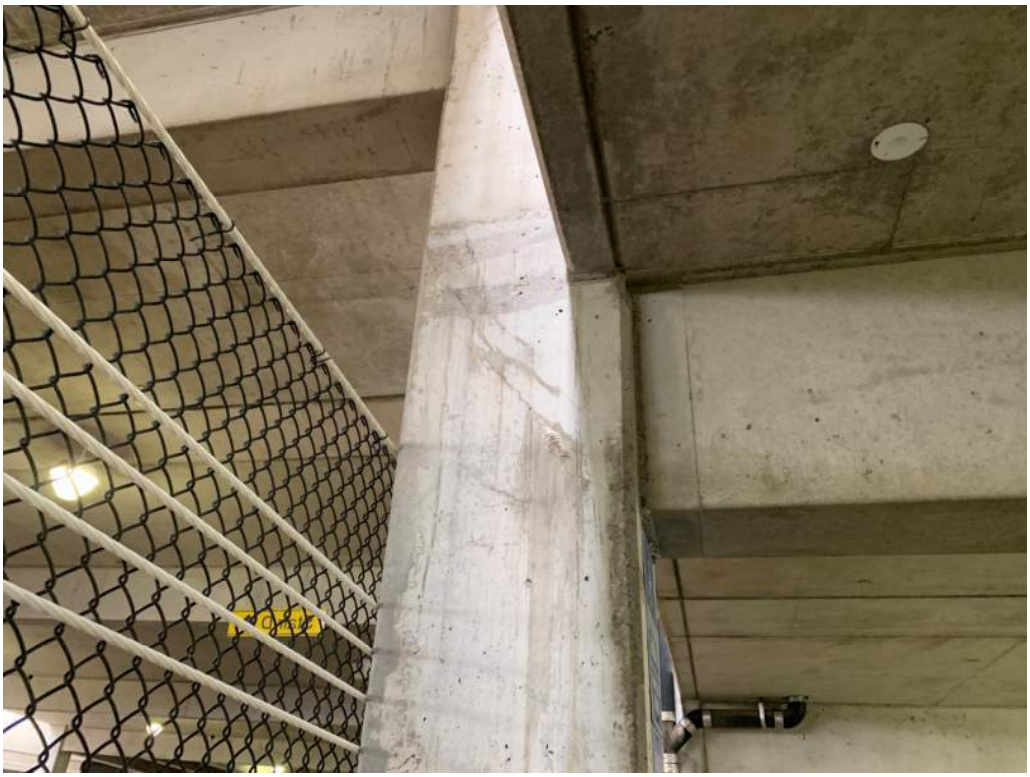

Photo 9 – Expansion Structure - Typical hairline column cracking at beam interface

Photo 10 – Expansion Structure – Crack in bottom of beam supporting level 5 at grid C between grids 8 & 10 (Grid J similar)

Photo 11 – Expansion Structure – Crack in beam web supporting level 5 on grid 8 between grids K & L

Photo 12 – Expansion Structure – Loose barrier cable bracket at column J/8