



BUILDING DEMOLITION STRATEGY

**NOSE DOCK HANGAR
IQALUIT AIRPORT**

IQALUIT, NUNAVUT

FINAL REPORT

Prepared For:

Ms. Tammy Burr
Public Works and Government Services Canada
Suite 100 – 167 Lombard Avenue
Winnipeg, Manitoba, R3B 0T6

Prepared By:

Amec Foster Wheeler
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26 March 2016

Amec Foster Wheeler Project No. TV147005

**Building Demolition Strategy
Nose Dock Hangar, Iqaluit, Nunavut
March 2016**



26 March 2016

Tammy Burr, B.Sc., PMP
Senior Environmental Specialist
Public Works and Government Services Canada
Suite 100-167 Lombard Avenue
Winnipeg, Manitoba
R3B 0T6

**Re: Building Demolition Strategy
Nose Dock Hangar, Iqaluit, Nunavut
Amec Foster Wheeler Project No. TV147005**

Dear Ms. Burr:

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) is pleased to present this Building Demolition Strategy for the above-referenced property in Iqaluit, Nunavut. We appreciate the opportunity to assist you on this project.

If you have any questions or desire further information, please feel free to contact me as identified below.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure

Seth A. Gilbert
Demolition & Decommissioning Technical Lead
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Email: seth.gilbert@amecfw.com

A handwritten signature in black ink, appearing to read "Patrick Campbell".

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EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) was retained by Public Works Government Services Canada (PWGSC) prepare a building demolition assessment report for the Nose Dock Hangar located at the Iqaluit airport, Nunavut.

The Nose Dock Hangar is a single storey building with an approximate area of 1,200 m² (12,900 ft²), located on the north side of the Iqaluit airport. The interior is primarily an open unfinished area with three offices, washroom and a mezzanine. The building was reported to be constructed in the 1940s. A newer ATCO style trailer is attached to the main hangar building and consists of a kitchen and two offices. Utilities to the building have been disconnected and the building is not in use.

Amec Foster Wheeler performed a Hazardous Material Survey at the hangar and developed abatement specifications in the summer of 2015. In the fall of 2016, PWGSC retained a hazardous material abatement contractor and the abatement work was carried out in January and February 2016, under the supervision of Amec Foster Wheeler.

Amec Foster Wheeler was also retained by PWGSC to develop a demolition assessment report for the hangar. The Site visit for this component of the work took place between 18 and 19 November 2015. The purpose of the demolition assessment is to provide an overview of the key elements involved that will allow the project to move from bid phase to demolition execution.

This report provides the findings of the demolition assessment, including a summary of estimated demolition materials, volumes and weights.

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1.0 PROJECT OVERVIEW

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) was retained by Public Works Government Services Canada (PWGSC) to prepare a building demolition assessment report and cost estimate for the Nose Dock Hangar located at the Iqaluit airport, Nunavut.

This document specifies the strategy for the demolition scope of work for the Nunavut Nose Dock Hangar located at the airport in Iqaluit, Canada. It is to be read in conjunction with the rest of the project documentation but is treated as a completely separate scope. It is not envisioned at this time that there is any impact between this scope and that of the other project documents. This document gives an overview of the key elements involved that allow the project to move from bid phase to demolition execution. It provides the basis on which the Demolition scope will be executed and the inputs to the estimate.

The scope comprises the Nose Dock Hangar located at the airport in Iqaluit, Nunavut. This demolition strategy has been developed to provide an overview of how the demolition of the Nose Dock Hangar will occur. The general principle will be that the Nose Dock Hangar will be demolished down to grade level. All concrete slabs will remain, however, an alternate cost will be provided by the bidding demolition contractors to remove the slab and associated footings and foundations only after the PWGSC has rendered a final decision regarding the removal of the slab and associated footings and foundations.

This document will provide details of how this demolition project will take place from design, bid phase, pre-construction, and construction. It will present the requirements for both environmental and occupational safety that must be incorporated to ensure a successful project in compliance with legislation, and PWGSC standards. It will also outline strategies for the sub-contracting and construction management that should be employed over the course of the project.

2.0 SITE WIDE OBSERVATIONS

The site as a whole provides minimal space for the execution of the demolition scope of work. The facility is essentially located on the tarmac side of the airport property, and within the security fence. A Demolition Key Plan Drawing and photo log is provided in Appendix A. It should be noted that access to the site is via a gate on the tarmac side of the facility, which will require an escort at any time access is required. The secondary access gate to the site is located on a road that is a fire lane, and will not be able to be used to gain access to the site. Minimal contractor vehicle parking is available within the area of the Nose Dock Facility. In order to save space, the temporary trailer which is currently attached to the facility, and is scheduled to be demolished, could be removed from the facility as a first demolition task, and used as a contractor field office before being properly disposed of.

Access within the facility by contractor vehicles should only be allowed on prescribed roads and paths of travel. Roads that lead to active areas of the airport, or don't require contractor access, should be well marked and barricaded so as to not allow any contractor vehicles.

3.0 DEMOLITION OBSERVATIONS

Upon conclusion of the site visit, it was determined that the Nose Dock Facility should be demolished mechanically, with the use of a high-reach excavator. Amec Foster Wheeler anticipates that the high reach excavator will be used in combination with another local excavator fitted with mechanical shears. Hydraulic shears are to be used to reduce potential worker exposure to lead in typical metal cutting activities. The contractor is required to provide to a written demolition plan which will address the dismantling of the building including the protection of the concrete slab which is to remain at the Site.

It should be noted that any crane use will likely require lighting approved and meeting the requirements of NavCanada and/or the local airport authority, and the boom will likely need to be lowered prior to a scheduled aircraft take-off or landing. Based on the aforementioned and the complexity of acquiring a crane in a northern community, the use of a crane for the demolition of the hangar has not been considered further.

Before any physical demolition work begins, the demolition contractor and the airport/PWGSC must coordinate and identify locations where utilities will need to be cut and capped, as well as any utilities that may need to remain and stay active.

4.0 DEMOLITION WASTE AND DISPOSAL

It is assumed that all general demolition debris (including all building materials excepting structural and limited other steel components with lead-containing paint) can be disposed of in the local landfill in Iqaluit. It is expected that the structural steel cannot be disposed of locally as the materials are coated with lead based paint. As such, all structural steel (as well as minor quantity of man-doors and metal skirting on the building), estimated to be 365 m.tons, will need to be shipped from Iqaluit to a southern Canadian province, most likely Quebec. While Amec Foster Wheeler has evaluated disposal of the materials in Quebec, further investigation to determine impacts to the overall demolition costs and procedures.

5.0 OVERALL PROJECT STRATEGY FOR DEMOLITION SCOPE

5.1 Project Goals and Drivers

The intended outcome is to help PWGSC gain a favorable demolition bid for execution of the work from a reputable demolition contractor who is capable of performing demolition work within an area adjacent to an active commercial runway.

5.2 Restrictions and Limitations

Due to the fact that the Nose Dock Hangar is adjacent to an active commercial runway, any means of demolition via explosives should not be considered as an acceptable means of demolition. As previous indicated, the use of a crane is not anticipated for the demolition work given use restrictions due to airport operations.

As the site is located within the secure area of the airport, site security will be required and is to be provided by the contractor. Based on airport requirements, short term fencing, meeting the Airport Authority requirements, will be erected on the tarmac in a manner that the Nose Dock hanger is outside the secure area of the airport. It is assumed that once the fence is erected, a security escort will not be required, unless access to the tarmac is needed. It should be noted

that once the building is removed, permanent fencing meeting the Airport Authority's requirements (assumed to be the property line but yet to be determined by the Airport Authority) will be installed. It is anticipated that portions of the short term fencing will be reused and a security escort will be required for a short period when the short term fencing is being removed and transferred to the permanent fence.

It is expected that all work will be conducted during the summer months when Iqaluit is accessible by water to allow for the shipping of waste and materials.

5.3 Risk Management Plan

The following risks have been identified as part of the demolition of the Nose Dock Hangar. It should be noted that this is a living document and will change as the demolition progresses throughout the duration of the schedule.

5.3.1 Asbestos Abatement

Asbestos containing material have been removed from the hangar. Refer to the Asbestos and Hazardous Materials Survey Report and Abatement Report provided under separate cover.

5.3.2 Other Hazardous Building Materials

Hazardous building materials including suspect PCB-containing ballasts, mercury lamps/lighting and select materials with lead paint coatings, have been removed from the hangar. The structural steel, select man doors and the metal skirting along the base of the building are coated with lead-containing paint. It is anticipated that these materials will be removed in-tack where possible. Removal or cutting of metal with lead paint using hot-work methods will not be completed to minimize worker exposure issues. It is anticipated that all steel materials will be cut with mechanical shears where possible and packaged for shipping and disposal at an accepted waste disposal facility as previously indicated.

Refer to the Asbestos and Hazardous Materials Survey Report and Abatement Report provided under separate cover.

5.4 Definition of Final State of Nose Dock Hangar after Demolition

The intended outcome upon completion of the demolition process is to leave the defined area of demolition in a clean state. The completion of the demolition should include the complete removal of the Nose Dock Facility structure, including but not limited to: piping, equipment, tanks, vessels, structural steel and concrete, all removed to existing slab-on-grade. All piping, wiring conduits, and all other utilities will be appropriately cut and capped. Utility cut and cap locations will need to be identified by PWGSC or its identified representative prior to execution of cut and capping.

As previously identified, removal of the building will result in a void in the existing security fencing which currently abuts to the hanger building. Arrangements must be made with the Airport Authority with respect to security, prior to removal of the short term fencing installed by the contractor and the final construction of the permanent fencing erected by the Contractor.

The pre-demolition condition of the site is defined as the baseline for the commencement of demolition activities. This will include identification of equipment in the Nose Dock Hangar that will be potentially salvaged and/or re-purposed (if any), how much waste and hazardous waste will be left behind following decommissioning and responsibilities for waste disposal. This information will be communicated to the demolition contractor to ensure contractor has a full understanding of his scope, incorporating the management of waste and hazardous waste into a responsibility matrix within the project documentation is key to planning safe execution of the work, avoiding environmental contamination, and accurate commercial agreements.

5.4.1 Site Visit Report

A site visit report has been completed. The report discusses the outcome of the site visit that was performed between 18 and 19 November 2015. This document will be under a separate cover to PWGSC.

5.4.2 Hazardous Building Materials Survey

Hazardous Building Materials have been removed from the hangar with the exception of select steel materials with lead paint coatings. Refer to the Asbestos and Hazardous Materials Survey Report and Abatement Report provided under separate cover for further potential risks involving hazardous waste.

5.4.3 Demolition

Work will begin with the demolition of the Nose Dock Hangar and continue systematically. A basic high level strategy of demolition includes but is not limited to, and subject to modification, is as follows:

1. Project award.
2. Conduct kick-off meeting, determine schedule and work hours.
3. Confirm disposal and shipping of waste with local authority and outside waste facility for structural and other steel as previously indicated.
4. Contractor to provide written demolition plan and project submittals.
5. PWGSC (or its representatives) and the Contractor completes identification and location of all utilities to be cut and capped (if any).
6. PWGSC and the Airport Authority to confirm site security and fencing requirements for short term fencing during demolition and the permeant fencing.
7. Arrange for on-site security and sort term security fencing as required by local authority.
8. Mobilize equipment and workers to the site.
9. Arrange for the PWGSC Representative to attend the site to observe work activities. The activities and schedule of the PWGSC Representative are at the discretion of PWGSC.
10. Overall general demolition sequence to be completed:
 - a. Establish security and site access.
 - b. Isolate all utilities in each work area.
 - c. Establish stormwater controls.

- d. Mark all piping, electrical, and instrumentation that must be protected inside work areas.
 - e. Remove all instruments, cabling, etc.
 - f. Demolition proceeds from small equipment to large equipment including establishment of site office.
 - g. Separate waste streams as appropriate depending on disposal requirements / destination of waste.
11. Repair any voids in the remaining hanger slab and prepare slab as per the direction of PWGSC.
 12. Erect the permanent security fence and remove short term fencing. It is anticipated some of the short term fencing will be reused for the permanent fence.
 13. Provide project updates and milestone documentation as required and provide final closure documents.

It is estimated that the execution of the demolition would take approximately four weeks from start to finish and would occur in the summer months. An additional month of time prior to the demolition execution would be needed to complete bid packages, have a pre-bid site visit walk-thru and receive contractor bids.

A summary of Estimated Demolition Materials and a Construction Cost Form (Table B-1) is provided in Appendix B.

5.4.4 Demolition Sequencing

A demolition plan should be provided by the demolition contractor and reviewed by PWGSC or its representative prior to any demolition execution beginning. The demolition plan should also follow all applicable city and territorial codes and regulations.

5.4.5 Acceptable Methods of Demolition

Demolition shall be executed by mechanical methods only. Explosives may not be used to complete any demolition due to the proximity of the Nose Dock Hangar to an active commercial runway.

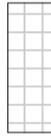
5.4.6 Adjacent Live Areas

Because the Nose Dock Hangar is essentially located on an active commercial runway, detailed coordination between airport representatives and the demolition contractor will need to take place prior to beginning any demolition activities to identify and agree potential risks to the active runway. This would include coordination of the potential use of a high-reach excavator to complete demolition execution.

APPENDIX A

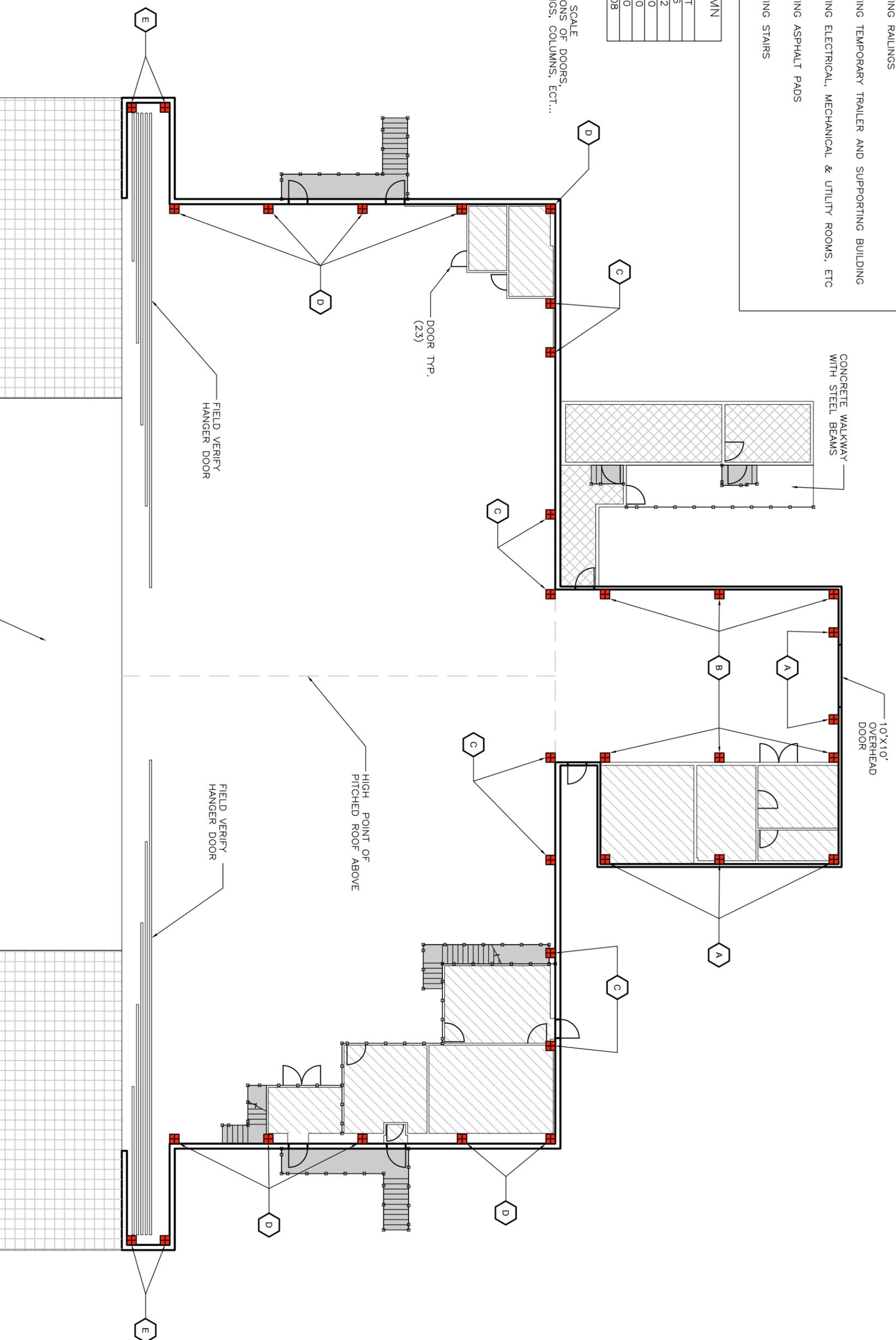
DEMOLITION KEY PLAN DRAWING and PHOTO LOG

KEY PLAN

	EXISTING VERTICAL COLUMNS
	EXISTING RAILINGS
	EXISTING TEMPORARY TRAILER AND SUPPORTING BUILDING
	EXISTING ELECTRICAL, MECHANICAL & UTILITY ROOMS, ETC
	EXISTING ASPHALT PADS
	EXISTING STAIRS

VERTICAL COLUMN SCHEDULE	
COLUMN TYPE	LFT
A	86
B	172
C	350
D	300
E	100
TOTAL	1008

- GENERAL NOTES:
- DRAWING IS NOT TO SCALE
 - FIELD VERIFY LOCATIONS OF DOORS, WALLS, PADS, RAILINGS, COLUMNS, ECT...



EXISTING CONCRETE PAD

BUILDING DEMOLITION ASSESSMENT PHOTO LOG



Photo 1. Column Type "A" Profile.



Photo 2. Column Type "A" Profile.



Photo 3. Column Type "B" Profile.



Photo 4. Column Type "B" Profile.



Photo 5. Column Type "C" Profile.



Photo 6. Column Type "C" Profile.



Photo 7. Column Type "D" Profile.



Photo 8. Column Type "D" Profile.



Photo 9. Interior Elevation Showing Column Spacing.

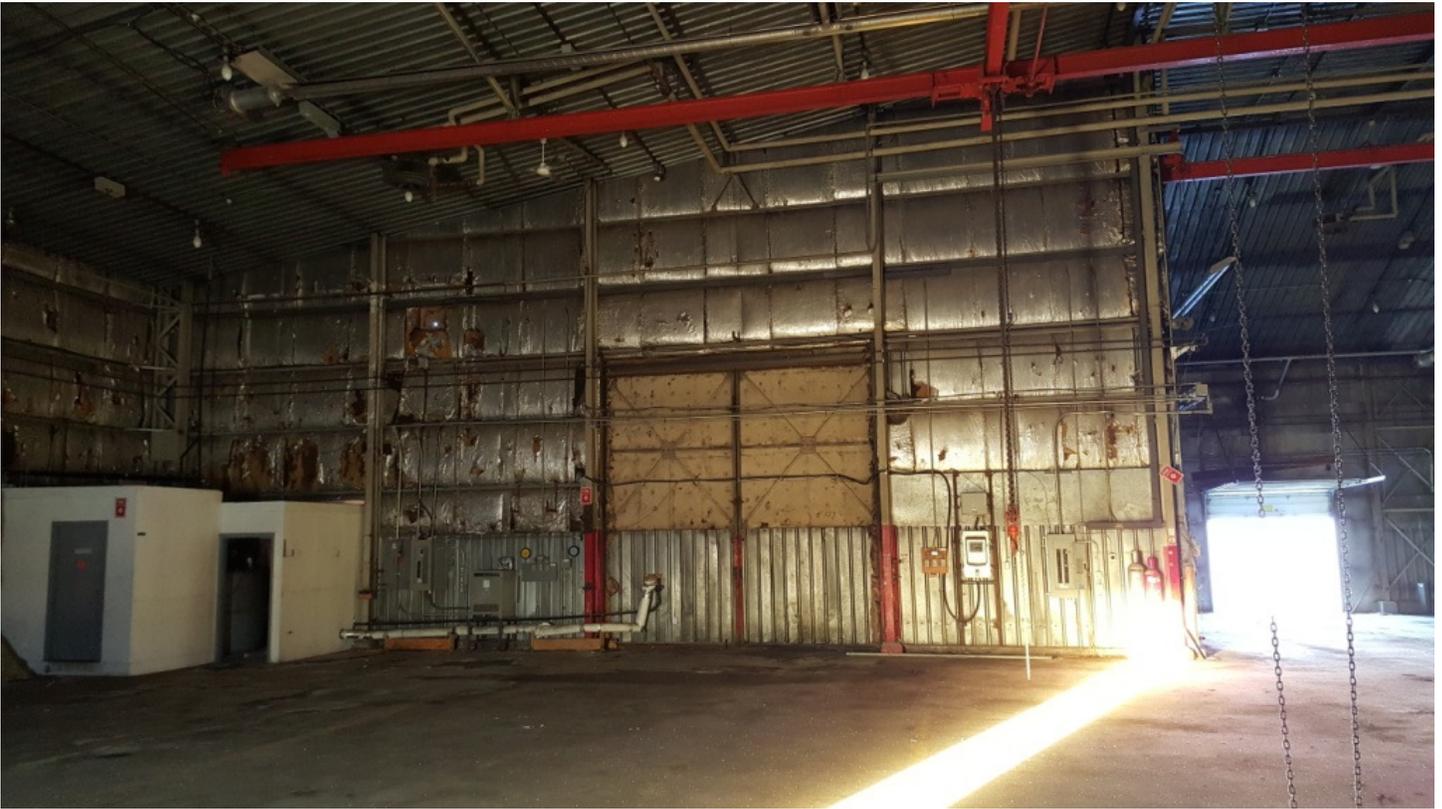


Photo 10. Interior Elevation Showing Column Spacing and Height.



Photo 11. Interior Elevation Showing Column Spacing and Height.

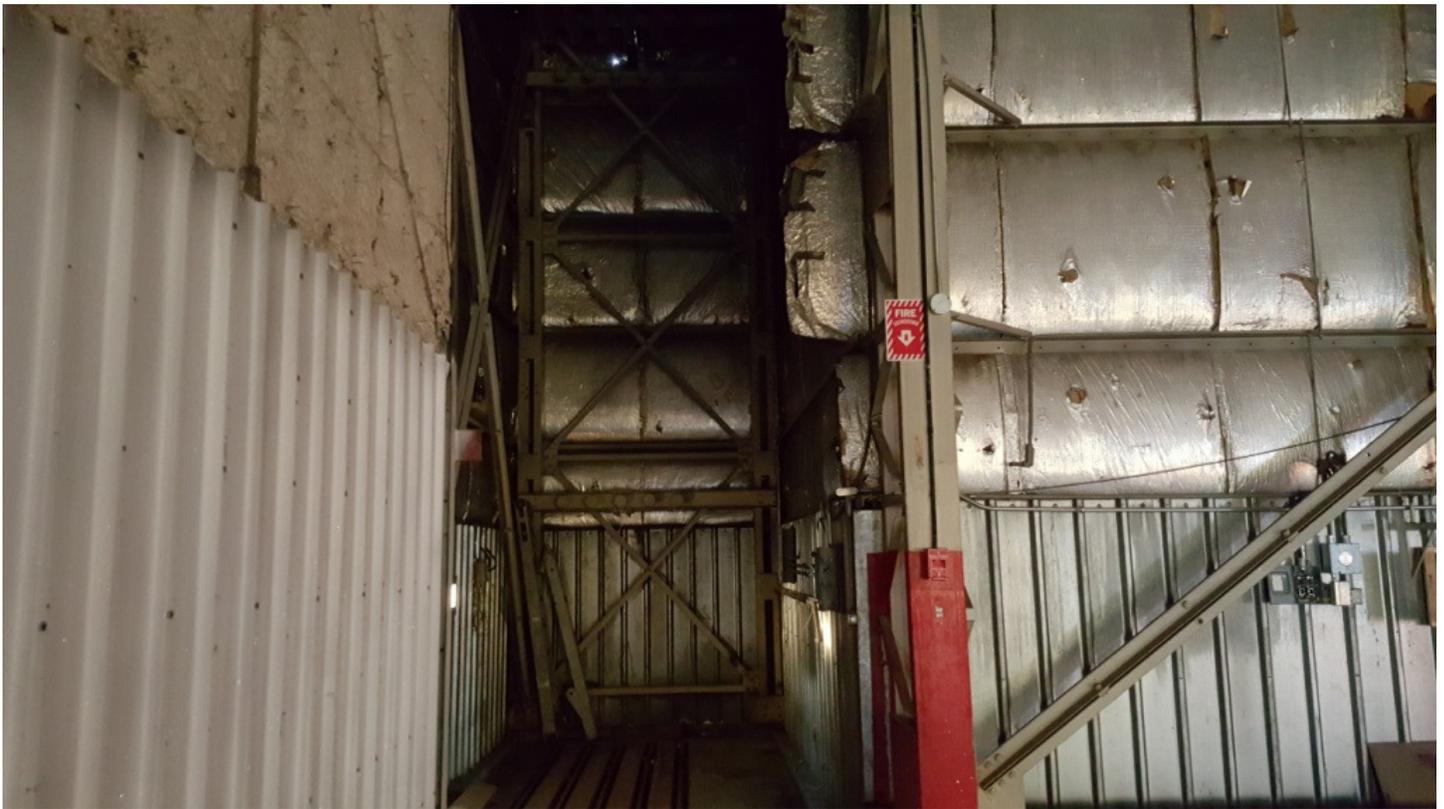


Photo 12. Interior Elevation Showing Column Spacing and Height at Hangar Door Storage Area.

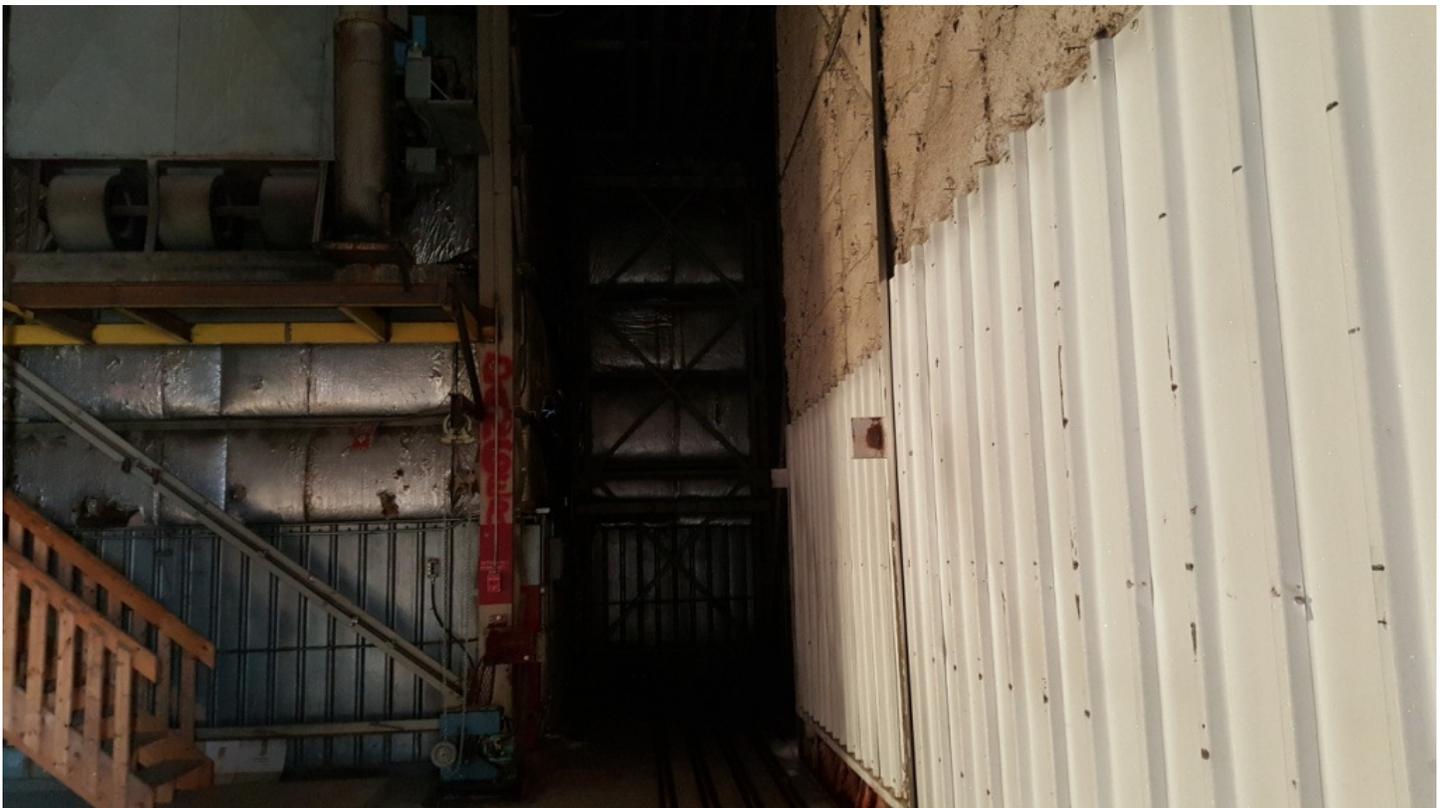


Photo 13. Interior Elevation Showing Column Spacing and Height at Hangar Door Storage Area.



Photo 14. Overall Interior Elevation.

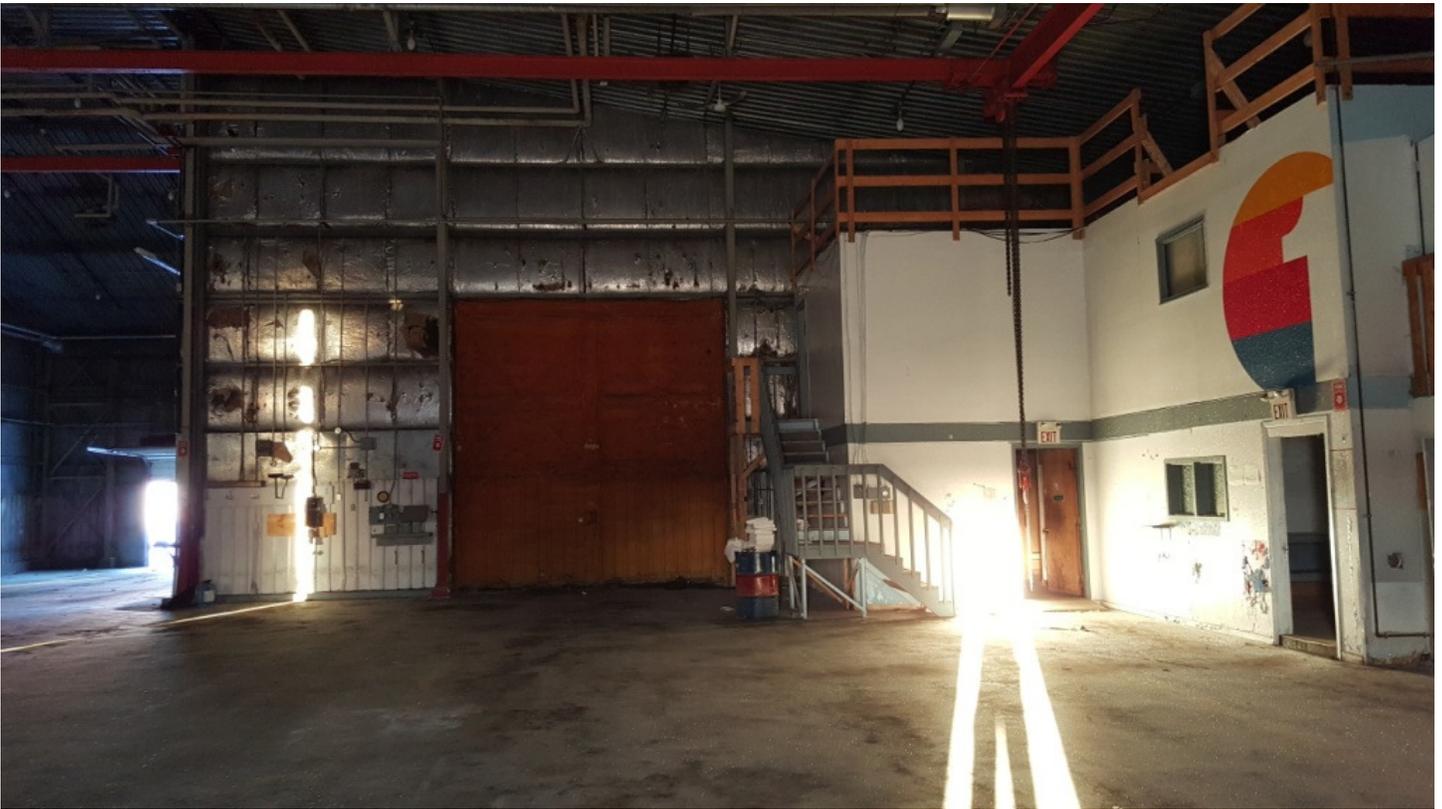


Photo 15. Overall Interior Elevation.



Photo 16. Interior Elevation Showing Column Spacing and Height.

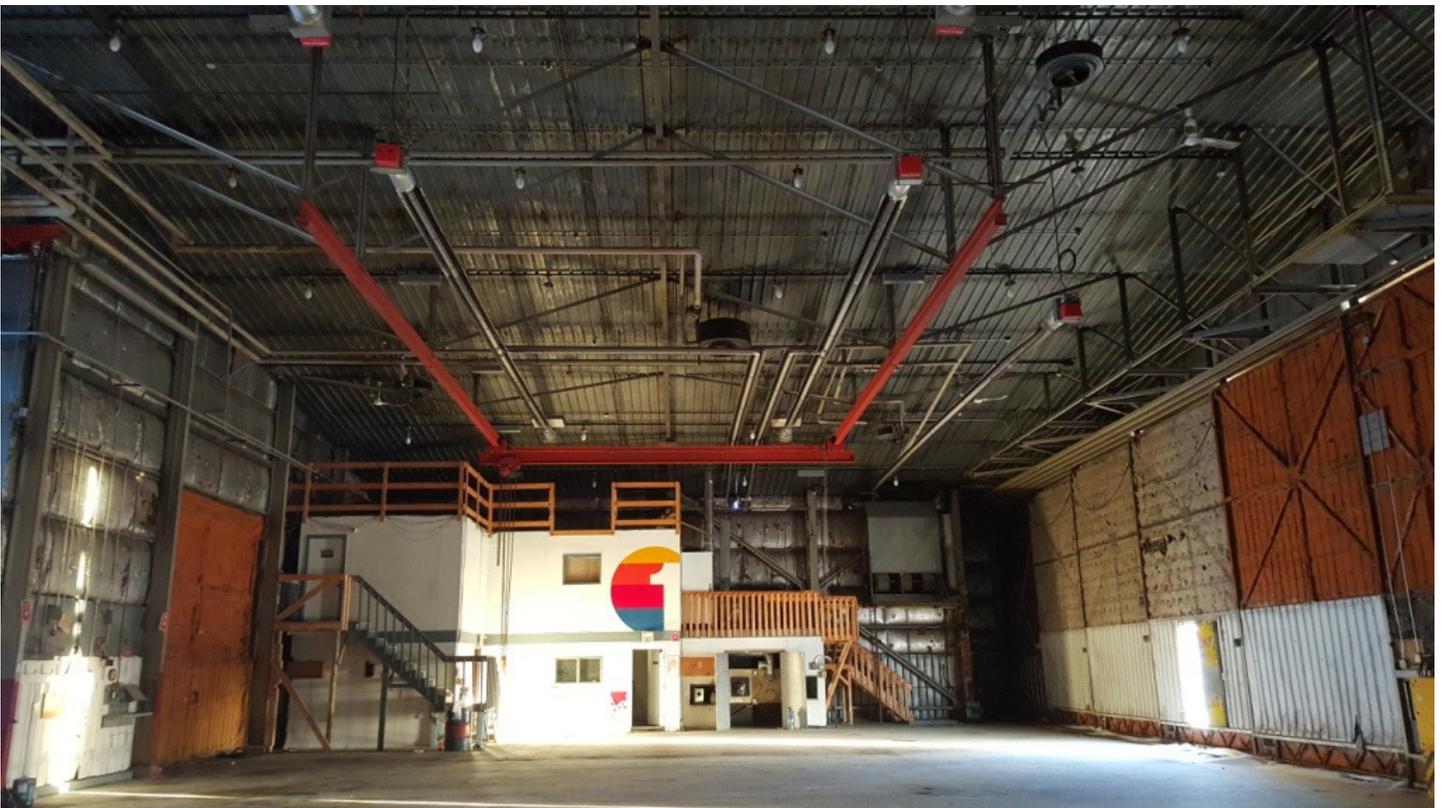


Photo 17. Overall Interior Elevation – Showing Roof Structure and Roof Supported Equipment.

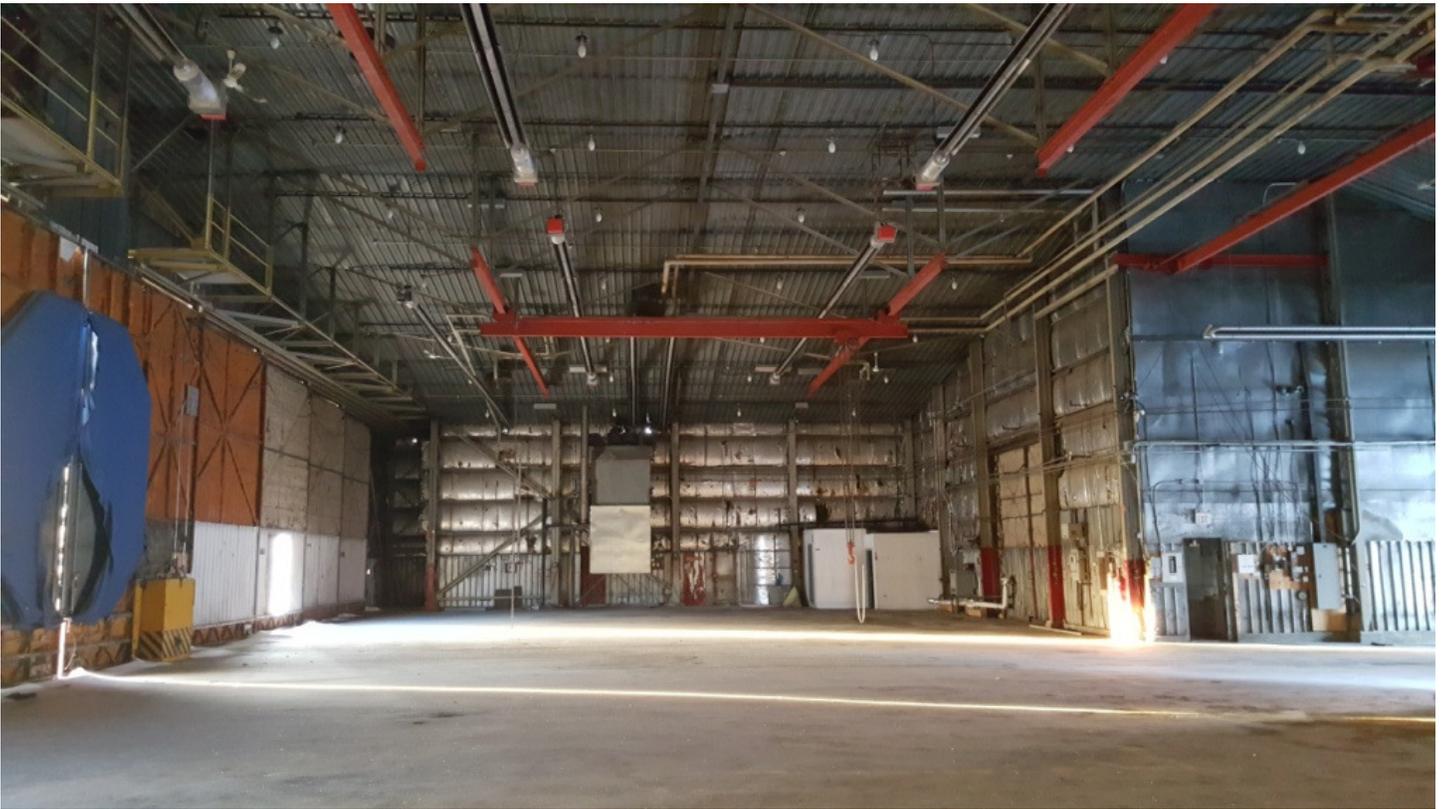


Photo 18. Overall Interior Elevation – Showing Roof Structure and Roof Supported Equipment.



Photo 19. Column Detail above office area.



Photo 20. Column Connection Detail above office area.



Photo 21. Photo Showing Building Footings



Photo 22. Photo Showing Building Footings



Photo 23. Photo Showing Building Footings



Photo 24. Interior Elevation Showing Column Spacing and Height.



Photo 25. Interior Elevation Showing Mechanical Room.



Photo 26. Interior Elevation Showing Column Spacing and Height.

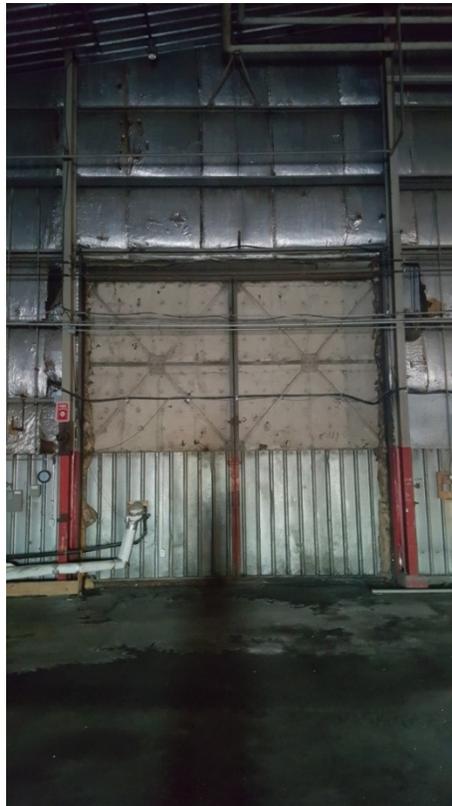


Photo 27. Interior Elevation Showing Column Spacing and Height.

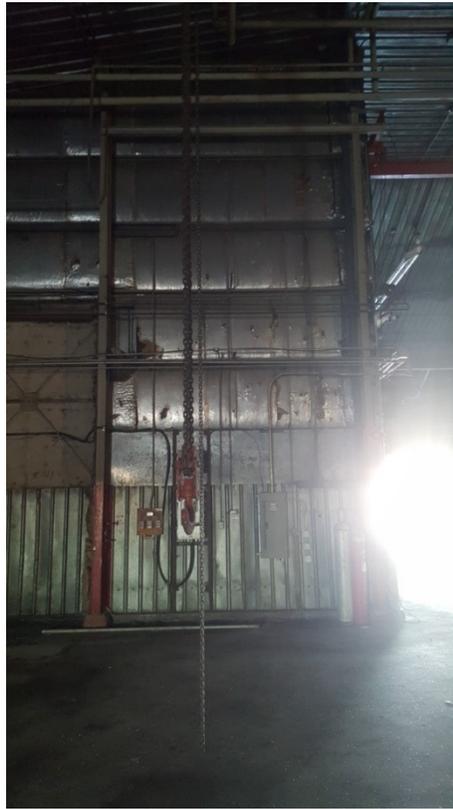


Photo 28. Interior Elevation Showing Column Spacing and Height.



Photo 29. Interior Elevation Showing Column Spacing and Height.



Photo 30. Interior Elevation Showing Column Spacing and Height.



Photo 31. Interior Elevation Showing Column Spacing and Height.



Photo 32. Photo Showing Building Footings



Photo 33. Photo Showing Building Footings



Photo 34. Photo Showing Building Footings



Photo 35. Photo Showing Building Footings



Photo 36. Detail Photo of Building Footing.



Photo 37. Detail Photo of Building Footing.



Photo 38. Detail Photo of Building Footing.



Photo 39. Detail Photo of Building Footing.



Photo 40. Detail Photo of Building Footing.



Photo 41. Detail Photo of Building Footing.



Photo 42. Detail Photo of Building Footing.

APPENDIX B

**SUMMARY OF ESTIMATED DEMOLITION MATERIALS
VOLUMES AND WEIGHTS**

TABLE B1 - ESTIMATED DEMOLITION MATERIALS AND CONSTRUCTION COST FORM

CONTRACTOR AMEC - Prepared by: Seth Gilbert	ADDRESS
	General Construction Subtotal
	Contractor Engineering Fees (10% of contractor labour)
	50 % Mark-up For Working in Iqaluit (N1)
	RSMears Iqaluit, Nunavut CCI
	Consulting / Engineering Fees
	General Construction Prime Contractor Profit
General Construction Prime Contractor Bonding	General Construction Contingency
CONTRACT FOR (Work to be performed) NUNAVUT NOSE DOCK HANGAR	
PURCHASE REQUEST NUMBER	PROJECT NUMBER TV147005
WORK LOCATION IQALUIT, NUNAVUT	
Proposed Project Amount	

DEMOLITION
SELECTIVE DEMOLITION
SELECTIVE BUILDING DEMOLITION
NOSE DOCK HANGAR (12,900 SF)

LINE NO.	ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	MATERIAL COSTS		LABOR COSTS				EQUIPMENT COSTS		Weights		LINETOTAL
				UNIT	TOTAL	CREW	LABOR HOURS	AVERAGE RATE	TOTAL	UNIT	TOTAL	TONS	% (N1)	
1	DEMO EXISTING WOOD STAIRS AT TEMPORARY TRAILER	SQFT	18										0%	
2	DISONNECT & REMOVE EXISTING TEMPORARY TRAILER	EA.	1											
3	DEMO EXISTING WOOD STAIRS & HANDRAILS AT EXITS	SQFT	234										2%	
4	DEMO EXISTING ELECTRICAL, MECHANICAL & UTILITY ROOMS, ETC.	SQFT	8,427										65%	
5	REMOVE/SALVAGE EXISTING H.M. DOORS & FRAMES	EA.	15											
6	DEMO EXISTING INTERIOR WOOD STAIRS AT OFFICE AREA & MECHANICAL ROOM	SQFT	129										1%	
7	DEMO EXISTING INTERIOR WOOD RAILS AT OFFICE AREA & MECHANICAL ROOM	LFT	716											
8	DEMO EXISTING WASHROOM FIXTURES	EA.	1											
9	REMOVE EXISTING WATER HEATER	EA.	1											
10	REMOVE EXISTING TANKS	EA.	1											
11	REMOVE/SALVAGE EXISTING O.H. CRANES	EA.	2											
12	REMOVE/SALVAGE EXISTING O.H. RADIANT HEATERS	EA.	7											
13	REMOVE/SALVAGE EXISTING STEAM HEAT FANS	EA.	7											
14	REMOVE/SALVAGE EXISTING CEILING FANS	EA.	6											
15	REMOVE EXISTING METAL PANEL ROOF	SQFT	13,638										106%	
16	REMOVE EXISTING METAL PANEL WALLS	SQFT	21,400										166%	
17	REMOVE/SALVAGE ALL STRUCTURAL STEEL (A)	LFT	86										8	
18	REMOVE/SALVAGE ALL STRUCTURAL STEEL (B)	LFT	172										16	
19	REMOVE/SALVAGE ALL STRUCTURAL STEEL (C)	LFT	350										32	
20	REMOVE/SALVAGE ALL STRUCTURAL STEEL (D)	LFT	300										27	
21	REMOVE/SALVAGE ALL STRUCTURAL STEEL (E)	LFT	100										9	
22	REMOVE/SALVAGE ALL STRUCTURAL STEEL (HOR)	LFT	3,020										274	
23	REMOVE HANGAR DOOR RAILS	LS	1										0	
24	FILL VOID FOR HANGAR DOORS WITH CONCRETE	SQ. YDS.	100										7	
25	SHORT TERM SECURITY FENCING SUPPLY, INSTALL AND REMOVE	Ea.	1											
26	PERMINANT SECURITY FENCING SUPPLY, INSTALL	Ea.	1											
27	SECURITY ESCORT													
28	ESTIMATED DEMOLITION MATERIAL DISPOSAL COSTS	LS	1											
29	ESTIMATED EQUIPMENT COSTS (N2)	LS	1											
30	SHIPPING STEEL OFF-SITE TO SOUTHERN PROVINCES	LS	1										0	

NOTES:
 N1 - QTY. of Item divided by total building Sq. FT.