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March 3, 2017

Group

# Jasper Activity Centre

**Recreation Facility Assessment**
April 2016

Group2
Architecture
Interior Design

## TABLE OF CONTENTS

## 1.0 EXECUTIVE SUMMARY

In the fall of  2015 Group2 Architecture and Interior Design, along with their sub-consultant team (RJC Engineering (structural), Remedy Engineering (mechanical), and SMP Engineering (electrical)) were engaged to evaluate the existing Jasper Recreation Facility. The team met in Jasper on December 1st and 2nd with Yvonne McNabb and building facilities staff. Present at the site review were:

- Group2:
  - Rob Copeland
  - Mike Ryan
  - Stacy Christensen
- RJC:
  - Mark Ritchie
  - Gord Simpson
- Remedy Engineering:  Jeff Swart
- SMP Engineering:  Kevin Showalter

This report is based on the site and drawing review as well as discussions with staff.  The buildings have been reviewed in terms of their operational condition, compliance to the Alberta Building Code and suitability of the existing space for the program and functions that are being hosted at the facility.

Recommendations are made for items which require maintenance, renovation to better facilitate the functions of the facility and identification of any  Building Code issues that will have to be addressed.

A draft of the report was reviewed by YvonneMcNabb, Gord Hutton, Mark Fercho and Jeremy Todgham and comments were provided to the consultants to be incorporated into the final report.

## 2.0 FACILITY BACKGROUND

The Jasper Recreation Centre is a collection of Town owned facilities located on a single block within the Town Site of Jasper. There are two separate buildings on the site – the Jasper Fitness and Aquatic Facility and the Jasper Activity Centre/Arena. The construction history of the buildings is:

- Ice Arena – 1961
- Multi-purpose Hall/Activity Centre – 1977
- Curling Centre – 1979 (partially renovated in 2011 to included gymnastics space)
- Pool – enclosed in 1989 (fitness centre added in 2011)

## 3.0 REPORT INTENT

The intent of this report is to evaluate the Jasper Recreation Facility Complex and provide an assessment of the immediate and long term improvements and upgrades that should be contemplated. The areas addressed fall into three main categories:

1. Building Code issues
2. Ongoing maintenance and renewal items
3. Functional program deficiencies

This Facility Assessment Report represents the first phase of the scope of work anticipated. The second phase of the reporting will provide upgrade and renovation concepts that build on the list of recommendations and the priority areas as identified by the stakeholder group.

## 4.0 BUILDING CODE REVIEW

A high level building code analysis has been conducted of the entire facility. This analysis uses the current 2014 Alberta Building Code, and not the Building Codes which governed the original buildings and subsequent renovations and additions. Please note that any deficiencies found will need to be addressed if significant renovations or expansions are undertaken.

### 4.1 AQUATICS AND FITNESS FACILITY

Building Information

- Area: 2,308m2
- Occupancy: A2 (3.1.2.1)
- Partially Sprinklered
- Combustible and non-combustible construction
- 2 storeys

Classification

- 3.2.2.26 – Group A, Division 2, up to 3 Storeys, Increased Area, Sprinklered
  - o Must be sprinklered
    - Fitness facility expansion conforming, original pool non-conforming
  - o Up to 2,400m2 if 2 storeys in height
    - conforming
  - o Combustible or non-combustible construction allowed
    - conforming
  - o Floor assemblies shall have a 45 min. fire resistance rating

- Unknown
  - Mezzanine shall have a 45 min. fire resistance rating
    - No mezzanine present
  - Load bearing walls, columns shall have a 45 min. fire resistance rating
    - Unknown

## 4.2 ACTIVITY CENTRE/ARENA

Note: The Activity Centre and Arena must be treated as a single building since they are not separated by a compliant fire wall with a 2 hour fire resistance rating (3.1.10.2)

### Building information

- Area: 7,004 m2 (Arena = 2,773m2, Activity Centre = 4,231m2)
- Occupancy: A3 (Arena), A2 (Activity Centre) (3.1.2.1)
- Partially sprinklered
- Combustible and non-combustible construction
- 2 storeys with Mezzanine

### Classification

- 3.2.2.29 – Group A, Division 3, Any Height, Any Area, Sprinklered
  - Must be sprinklered
    - Non-conforming (ice rink requires dry sprinkler system)
  - Non-combustible construction only
    - Non-conforming (structure is non-combustible, partitions are combustible)
  - Floor assemblies shall have a 2 hr. fire resistance rating
    - Non-conforming (main floor structure of the activity Centre over the basement is not fire sprayed)
  - Mezzanines shall have a 1 hr. fire resistance rating
    - Non-conforming (mezzanine structure is not fire sprayed)
  - Load bearing walls, columns, shall have a fire resistance rating not less than the supported assembly

o 3.3.2.2 Fire Separations

1) Except as permitted by Senteence (2), the seating area of a Group A Division 1 occupancy shall be separated from adjacent occupanies in the floor area by a fire separation having a fire-resistance rating not less than 1 h if the occupant load int he seating area exceeds 200.

2) The fire-resistance rating of the fire separation required by Sentence (1) is permitted to be less than 1 h but not less 45min provided the fire resistance required by Subsection 3.2.2 is permitted to be less that 1h for

a) the floor assembly above the floor area

b) the floor assembly below the floor area if there is no floor assembly above

3) If usable space exists under the tiers of seats in an arena-type buildings, a fire separation with a fire resistence rating not less than 45min shall be provided between the space and the seats or the space shall be sprinklered.

### Public Washroom Count:

- Men: 19
- Capacity: 1600
- Women: 17
- Capacity: 800

## 5.0 FACILITY OBSERVATIONS

The following are observations of select areas where concerns were identified by the Town of Jasper or Group2 and their sub consultants. These are meant to be high level comments on all areas of the facility based on site observations and drawing reviews. Please note that the 1975 set did not include the specification documents that had a listing of the assemblies.

### 5.1 ARENA

#### 5.1.1 REFRIGERATION PLANT

The refrigeration plant was built as part of the original arena construction in 1961, and was located at the SW corner of the arena (see key plan). When the activity centre was added in 1977 the main entry doors were located immediately adjacent to the refrigeration rooms exterior exit door.

The refrigeration plant contains all the compressors, ammonia, heat exchangers that are required for the refrigeration system for the ice slab (see mechanical report in section 7 for complete details). A room with this equipment requires separation from the rest of the building with a 1 hour fire separation (see article 3.6.2.1). It is also required to have a vestibule entry from within the building and a direct exterior exit. The vestibule entry is a requirement due to the possibility of an ammonia leak in the refrigeration room and the resulting need to be able to better contain a leak should it occur. The direct exterior exit is a requirement for the same reason.

The vestibule entry that exists is too small to be functional as a vestibule. In addition the doors, while rated, do not adequately seal.

The location of the direct exterior exit door adjacent to the main entry to the facility is also a significant concern. In the event of an ammonia leak the likelihood of ammonia impacting the entry area (and any occupants passing by) is high. While not strictly a building code issue this does create a difficult and potentially dangerous operational condition.

Recommendation: This mechanical room should be relocated away from frequently occupied areas of the building and rebuilt with a proper vestibule. At this point a likely location is at the NE corner of the Arena adjacent to the existing Zamboni room (see diagram). This will be explored further in the conceptual designs that will be developed. As the mechanical review (see section 7) recommends replacement or refurbishing of much of the equipment in this room this provides a timely opportunity to install this equipment in a more appropriate location.

#### 5.1.2 DASHER BOARDS

The existing dasher boards surrounding the hockey playing surface are fixed in place, steel framed boards with related gates and glass. The dasher boards are in good working condition but they are not the impact absorbing type that is consistent with contemporary NHL sized hockey rinks. Contemporary impact absorbing dasher boards help to prevent injuries by flexing to absorb much of the impact and therefore reduce injury . While there is no building code or other requirement to install this type of dasher board we were told on site that some user groups of the Jasper Activity Centre (notably the Edmonton Oilers) have expressed a preference for facilities with the flexible boards. Flexible impact absorbing dasher boards are financially important for professional athletes and their teams as injuries that result in down-time have a significant impact on their professional careers.

Recommendation: Reduce the finished size of the playing surface and replace the existing dasher boards with an impact absorbing type.
Installation of upgraded dasher boards will not be possible without reducing the overall rink size.

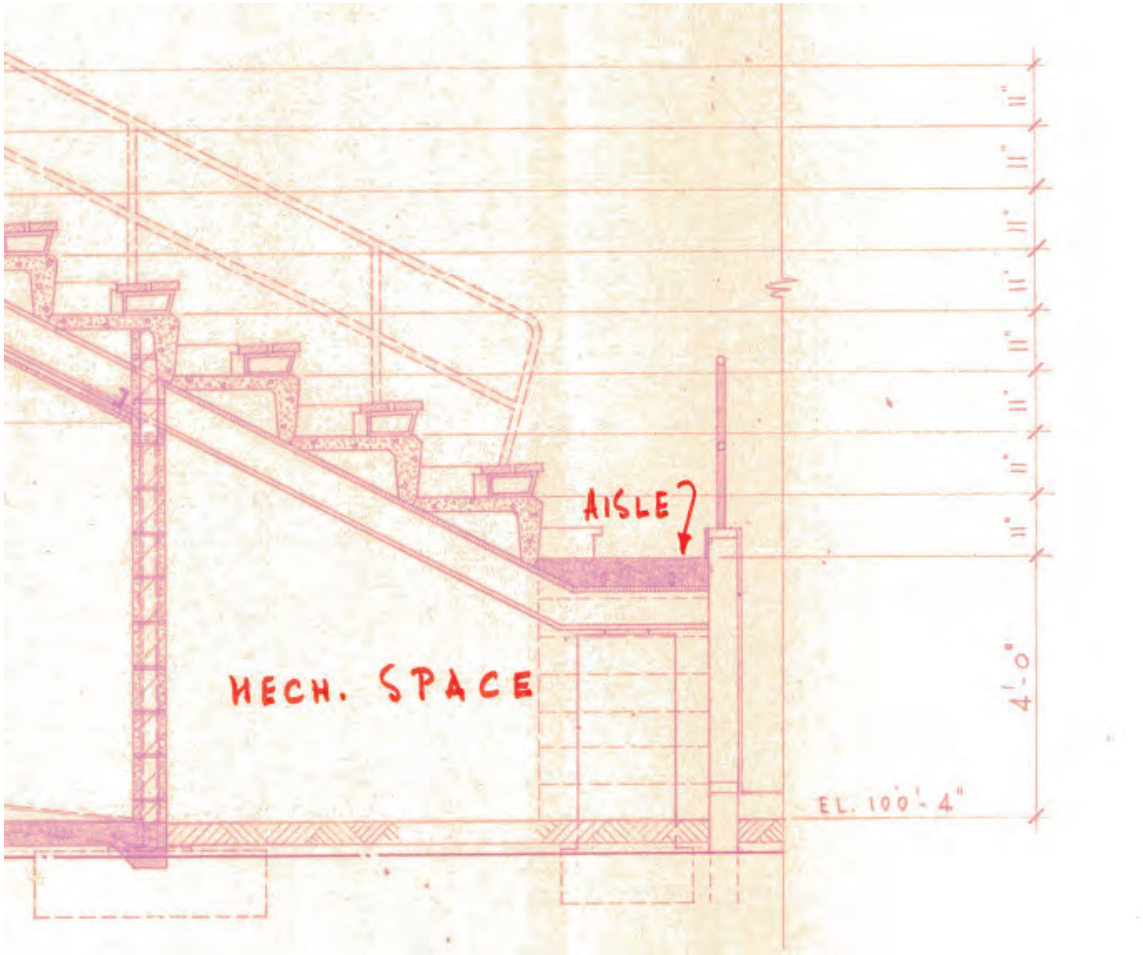



Image 2, existing dasher board / bleacher detail showing no room for flexible dasher boards

The cast in place concrete of the arena seating effectively restricts the area available for a flexible dasher board system and reconfiguring the arena seating to create the space required would entail complete demolition of the cast in place concrete seating which is not considered viable at this time. A more likely scenario is to reduce the width of the playing surface from +/- 85' to +/- 84'. This would provide the room needed for the upgraded dashers and we suspect that this compromise would be welcomed by the rinks users.

### 5.1.3 CHANGE ROOMS

The existing change rooms are located under the west bleachers and are approximately 22m2 in area with two change rooms sharing a single washroom and shower room. We were told that user groups have reported that the existing change rooms are too small and that the number and layout of these existing change rooms do not meet their needs.

Contemporary change rooms for ice arenas are typically designed to accommodate 23 players and have their own internal washroom and shower facilities. Based on the number of players being accomodated washroom fixture counts as per 3.7.2.2 is to provide one toilet/one urinal, and based on the showering requirement for pools one shower per 50 or contemporary standards of four shower heads. This meets the Building Code requirement of 1 stall for 25 occupants (male or female) if it is assumed that each change room is used by one gender only at any given time. There is no code requirement to make all these facilities barrier free as long as some provision is made somewhere to provided barrier free change room space. It is good practice to apply barrier free standards within at least two of the four change rooms. A standard area requirement for change rooms is 55m2 to 70m2.

Recommendation: Four expanded and reconfigured change rooms are required to meet the needs of the user groups that currently are booking the arena for their tournaments and events. These rooms should be located in an area that is adjacent to the arena playing surface.

### 5.1.4 ARENA SEATING

The arena seating is a combination of individual seats with backs (on the East side) and bench seating with no backs (on the West side). Seating is provided on a concrete cast in place seating rake with circulation/egress aisles accessed from the main floor up to the seats. At the top of the seating there is a standing room and circulation space. The total seating capacity of the arena is 776 sm. None of the spectator seating is accessible for persons with disabilities.

Based on the seating capacity at least seven barrier free viewing spaces should be provided (see article 3.8.2.1). The required washroom capacity for the arena seating is 6 male fixtures and 12 female fixtures. Right now the arena has access to 13 male fixtures and 11 female fixtures.

Recommendation: Accessible seating options should be provided and additional female fixtures provided.

### 5.1.5 ZAMBONI ROOM

Zamboni rooms are treated as storage garages in the Alberta Building Code and must be separated from the rest of the facility with a 1 hour fire separation. Zamboni rooms should have direct access to the exterior with an overhead door to facilitate movement of the Zamboni in and out of the facility as needed. Ice melt pits are also required for the dumping of ice resurfacing shavings.

The existing Zamboni room is located in the NE corner of the arena adjacent to a facility storage and work room. The room appears to be properly separated from the existing facility with a 1 hour fire separation. The room has an ice melt pit but the capacity of the pit is roughly 6.5m3 and contemporary standards call for a capacity of 12.5m3. A new overhead door has been recently added to this room to accomodate the new Zamboni.

Recommendation: The Zamboni room should be renovated to allow full access to the playing surface and to the exterior of the building. Increasing the capacity of the snow melt pit is desirable but not critical for the ongoing operation of the arena.

## 5.2 FITNESS AND AQUATICS CENTRE

### 5.2.1 WATERSLIDE

The current waterslide was installed when the pool was enclosed in 1989. It is accessed and partially supported by a steel framed structure independent of the building structure. The waterslide terminates in an independent plunge pool between the shallow play pool and the lap pool.

The steel stairs up to the slide start are showing significant signs of wear and corrosion (refer to structural report in section 6 for more detail). The slide itself has deteriorated to the point that the fiberglass surface represents a serious injury risk as glass fibers have become loose. The manufacturer of the slide is unavailable to provide replacement sections of the slide and other repair methods have not provided a durable solution.

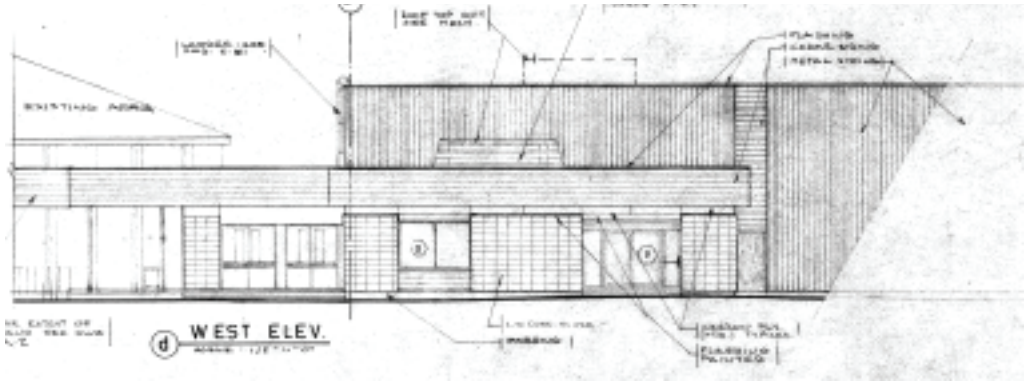
The slide terminates in a 1.5 m deep plunge pool The contemporary standard for water slide terminations is a shallow run-out with a water depth of less than 0.1m. Town review has determined the existing configuration to be acceptable.

Recommendation: A replacement slide is required to be designed and installed. New stairs and rehabilitation of the stair structure is also required.

### 5.2.2 FAMILY DRESSING ROOMS

Two family change rooms are available for use and are accessed directly from the pool deck. This location presents an operational challenge since life guards are required to be on duty until the pool deck can be secured from the public and this can't happen until after the family change rooms are empty. This often constitutes an additional 15 minutes of on duty lifeguard time at the end of pool open times and is a strain on the operations.

Additionally, pool operators report that water from the shower in the family dressing room is leaking under the walls of the family dressing rooms into the communal dressing rooms behind.




Recommendation: A reconfiguration of the existing change rooms should be developed that provides better access. Gender neutral change rooms would be the preferred solution to maximize flexibility. Renovating this area should also rectify water damage issues (not visible but anticipated upon demolition).

## 5.3 ACTIVITY CENTRE

### 5.3.1 MAIN ENTRY

The main entry to the facility is on the west side of the building and is set back from the street by over 60m. It is pinched between two wings of the building with an overhang at the entrance that is low and finished with a dark wood material providing very little light into the area in front of the entrance. The ground surface is a recycled rubber tile finish and is difficult to maintain in winter conditions. Several of the tiles were missing at the time of our evaluation. The doors are solid and also contribute to the dark and unwelcoming entrance to the building.

The distance of the main door to the street, combined with the narrow access route, does not conform with current fire fighting access design (ABC 3.2.5.5)

Recommendation: A careful redesign of the entrance, approach and overhang area should be undertaken to improve the appearance of the entry and address the operational concerns related to snow clearing on the rubber tiles. Sidewalks and turf stone should be removed and replaced

Image 2, Approach to the main entry. The exterior exit door from refrigeration room is at the entry on the left

with proper surfaces and drainage issues require attention to keep the water from ponding and freezing at the front entrace.  Changes must be made to provide a conforming fire fighting access route.

### 5.3.2 MULTIPURPOSE ROOM

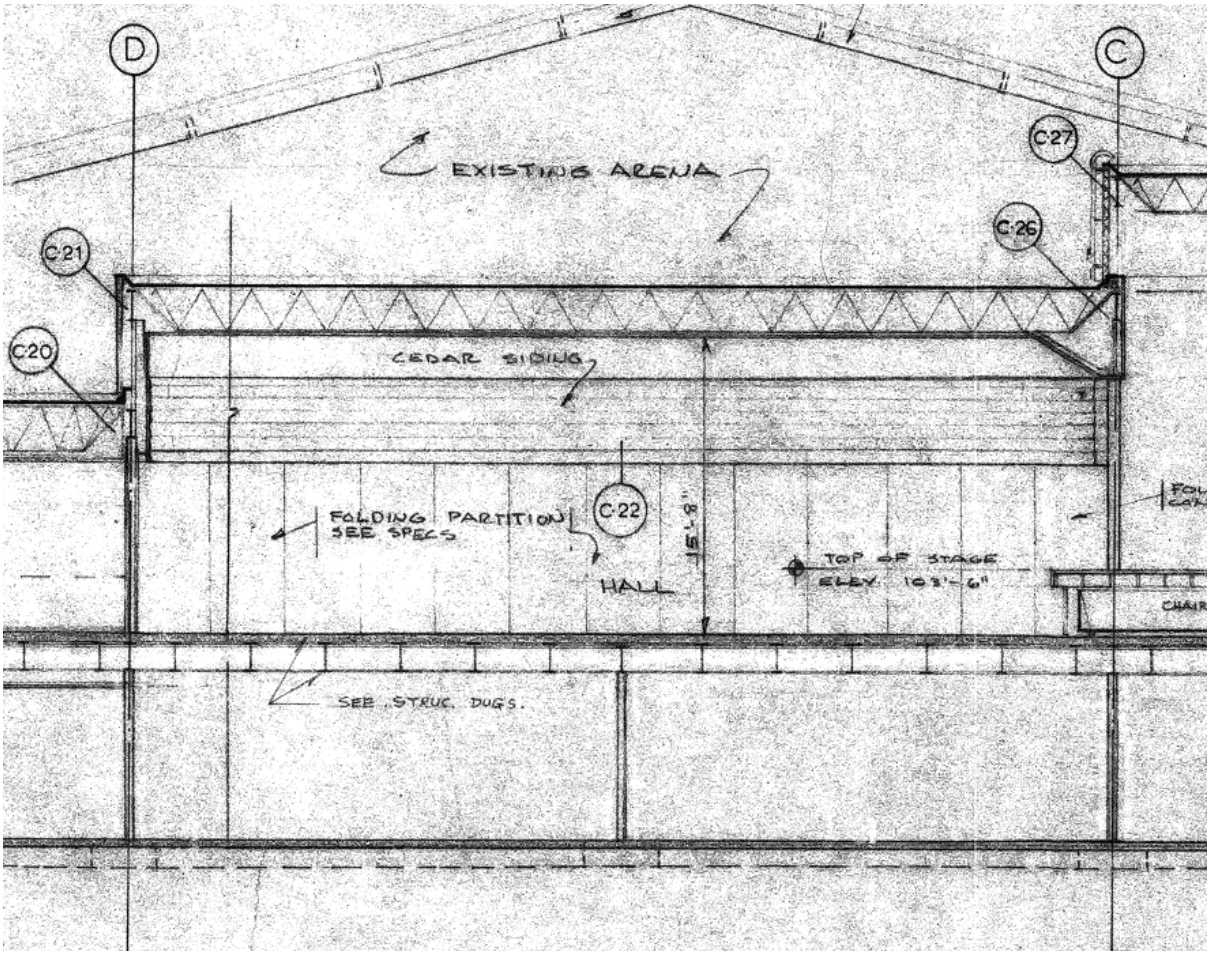
The multipurpose room is the primary large gathering space in the facility. It is served by a commercial kitchen and has a raised stage. Access to the multipurpose room is from the main lobby. A portion of the multipurpose room serves as a lobby to the arena.

The finishes in the multipurpose room are showing a great deal of wear. The flooring has exceeded it's life span and matching flooring stock is not available for future repairs. The operable wall that divides this space from the arena lobby is very worn and becoming difficult to operate.

The multipurpose room has no windows or any other connection to the outdoors. The kitchen facilities seem to be large enough for their current needs but do have significant mechanical deficiencies (see section 7).

Recommendation: New flooring, ceiling, and wall  finishes should be considered and the operable wall should be replaced. Reconfiguration and possibly expansion of the multipurpose

Image 3, Multipurpose room finishes. Ceiling tiles are worn, wall finishes are dated and floor is past it's serviceable life span




room should be considered to provide views to the mountains and better serve large gatherings. The kitchen should be renovated to meet current mechanical building code requirements. Investigating appropriate dance flooring so ensure the flexibility of the space should be part of the scope for this room.

### 5.3.3 BASEMENT DORMS

Rooms in the basement are used for a variety of functions including additional meeting space, fitness space, storage, and dormitory space for visiting youth groups and summer camp programs. Sleeping functions in this area are not conforming and additional safety provisions may be necessary to ensure this activity can continue. As residential occupancies are a C occupancy and the building is an A2 therefore there should be a one hour fire rating between the spaces used as dormatories; this will need to be confirmed. The basement rooms been renovated and reorganized many times creating a mixture of finishes. There is no barrier free access to the basement.

Washroom facilities in the basement are limited to three fixtures per gender as well as shower and change room facilities. Six shower heads per gender are provided. None of the washroom facilities are barrier free.

Article 3.7.2.2 of the 2014 Alberta Building Code requires that one plumbing fixture (toilet) be provided for every 10 persons of each sex in a residential occupancy.

Recommendation: Updating the finishes in the basement rooms could be considered as an

efficient way to improve the available meeting space of the facility and upgrade the space used for dormitories.  Barrier free access and barrier free washrooms should also be provided. Adequate plumbing fixture counts should be provided for all dormitory beds. Life safety aspects in terms of ratings and travel paths should be investigated further.

### 5.3.4 ADMINISTRATION OFFICE SPACE

The Municipality of Jasper administrative offices are located in this facility.

Recommendation: Increased office space and a stronger connection between the existing management offices and the Municipality of Jasper Administration office should be considered.

### 5.3.5 ADDITIONAL MEETING SPACE

The facility currently hosts many conventions and events that require meeting space. Users and facility staff have reported that they are often lacking meeting rooms for these events. Additional meeting spaces could improve the range of events the facility could host.

Recommendation: Consideration should be given to the creation of additional meeting space. Proximity to existing facility assets such as the multipurpose room could be a benefit.

### 5.3.6 ACCESSIBILITY

Many areas of the building are not accessible by persons with disabilities. There is no elevator to provide access to the basement facilities or to the mezzanine area. The arena also has many areas not accessible by persons with disabilities.

Recommendation: A review of the facility with current guidelines for access by persons with disabilities should be performed. Additions and renovations will require updated areas to conform to current codes and guidelines. Future events and hosted programs will benefit from complete access to the services of the facility by all user groups.

# 6.0 STRUCTURAL REPORT

April 19, 2016

Attention Mr. Rob Copeland
Group2 Architecture Interior Design Ltd.
Suite 120 – 510, 12th Avenue SW
Calgary, AB

Dear Mr. Copeland:

RE: Jasper Recreation Center,
Structural Assessment RJC No.: CAL.113403.0001

Read Jones Christoffersen Ltd. (RJC) was engaged to perform an assessment of the Jasper Fitness and Aquatic Centre, with the scope of our review being to comment on the condition of the existing structures. The scope of this structural assessment results from a visual walk-through and therefore only readily apparent deficiencies were detected.

## 1.0 INTRODUCTION

RJC met on site with maintenance and operations staff December 1, 2015 to review and comment on the condition of the both Jasper's Fitness Facility and Aquatic Centre. The recreation facility is a multi-use facility which is comprised of two separate buildings structures directly adjacent to one another. The Fitness Facility was constructed in three phases over a period of 18 years. Each phase supporting a different program: Arena (1961), Multi-Purpose Hall/Activity Centre (1977), and Curling/Gymnastics Centre (1979). The Aquatic Centre, constructed in two phases over a period of 22 years, supports a Natatorium (1989) and Fitness Centre (2011). Our observations for both the Fitness Facility and Aquatic Centre are discussed in Sections 2.0 and 3.0, respectively.

## 2.0 FITNESS FACILITY

The Fitness Facility is a single storey building constructed in three phases housing the Arena, Multi-Purpose Room/Activity Centre, and Curling/Gymnastics Centre. Our observations are detailed below.

### 2.1 Fitness Facility – Arena (1961)

At the time of our review, drawings were supplied by Jasper Recreation Facility dated June 1960, prepared by Middleton and Sinclair.

The arena is a single storey steel structure built on a cast-in-place concrete foundation. The steel structure is comprised of ten (10) interior beams that taper in depth from 760mm at mid-span to 1200mm at each end. The frames are supported on columns that are integral with the beams and taper in width from 1200mm to 400mm at the base of the columns. Wide flange roof purlins 250mm in depth span between frames. The purlins in turn support the remaining roof assembly which consists of dimensional lumber roof decking on edge. The main lateral load bracing system consists of a combination of moment frames and in-plane bracing. The main floor consists of a cast-in-place concrete slab-on-grade (SOG) for both the ice rink as well as the remaining event space. At the time of our review only the perimeter concrete slab-on-grade (non-cold slab) was exposed to view. Pre-cast concrete bleachers are located on either side of the rink. However, at the time of our review the underside of the bleachers structure was hidden from view. Note the bleachers structural system is not shown on the supplied drawings.

### 2.1.1 Observations

The structure appeared to be in good condition except for the following:

.1 As shown in Figure 5.1, the timber roof appears to be in good condition; however, water staining was observed between the plank laminations.

.2 As shown in Figure 5.2, visible cracking of the concrete SOG was observed. Since destructive testing was not performed, the depth of the crack was not determined. The crack was linear in direction and located on the North East end of the arena.

## 2.2 Fitness Facility – Multi-Purpose Hall and Activity Centre (1977)

At the time of our review, drawings were supplied by Jasper Recreation Facility, dated June April 1976, prepared by Howard and Robert Bouey.

The Multi-Purpose Hall and Activity Centre (MPH&AC) is a single storey steel structure with a partial basement located below approximately half the building's footprint. The roof is comprised of 76mm metal decking supported by 460mm and 760mm deep open web steel joists (OWSJ) on wide-flange steel beams. The main floor is a combination of both a 125mm concrete SOG and a suspended steel structure above the basement area. The main floor suspended steel structure is composed of 75mm concrete topping on 38mm metal deck supported by 460mm deep OWSJ on wide flange steel beams. The sub-structure consists of a 300mm cast-in-place concrete perimeter retaining wall and concrete pad and strip footing foundations. At the time of our review building finishes hid the majority of the structure except for the suspended main floor steel structure located above the basement. The main lateral load bracing system consists of steel crossed braced frames.

### 2.2.1 Observations

The structure appeared to be in good condition except for the following:

.1 As shown in Figure 5.3, no fire spray was observed on the main floors metal deck nor open web steel joists and steel structure.

## 2.3 Fitness Facility – Curling/Gymnastics Centre (1979)

The Curling/Gymnastics centre is a single storey steel structure. The foundation is assumed to be cast-in-place concrete pad footings. The roof consists of metal deck supported by clear-span OWSJ supported on perimeter steel girders. The main floor consists of a cast-in-place concrete slab-on-grade for both the curling and gymnastics spaces. The curling rink cold slab was not visible at time of review. The main lateral load bracing system is assumed to be the perimeter block wall.

At the time of our review, drawings were not provided.

### 2.3.1 Observations

The structure appeared to be in good condition.

# 3.0 AQUATIC CENTRE

The aquatic centre is a single storey structure constructed in two phases and houses both the Natatorium and Fitness center. Our observations are detailed below.

## 3.1 Aquatic Centre – Natatorium (1989)

At the time of our review, partial drawings were supplied by Jasper Recreation Facility dated 1988, prepared by Lamb McManus Associates Ltd. Neither the original 1956 exterior pool drawings nor the 1988 roof framing drawings were included in the supplied information.

The Natatorium is a single storey steel structure on a concrete foundation. The steel structure is comprised of steel gable trusses spanning the width of the pool, which are supported on steel HSS columns. The columns are in turn supported on concrete pilasters and a perimeter 250mm foundation wall, which bears on concrete pad and strip footings. The roof was constructed over top of an original 1956 fifty yard outdoor pool. The original cast-in-place concrete 50 yard pool was sub-divided into a single 25 meter competition pool and two separate leisure pools within the original footprint. A 1200mm wide crawl space separates the original 300mm wide pool walls and the 1988 perimeter concrete foundation walls. The pool deck (the slab above the crawl space) is

a 125mm thick reinforced cast-in-place concrete suspended slab. The main lateral load bracing system consists of steel crossed braced members.

### 3.1.1 Observations

The structure appeared to be in good condition except for the following:

.1 As shown in Figure 5.4, significant corrosion was observed at the base of the majority of steel columns. It appears the columns have been re-coated with paint to mitigate the risk of future corrosion. However, the coating does not appear to be effective as the significant corrosive staining was observed. Since nondestructive testing was not performed the severity of the corrosion was not determined.

.2 As shown in Figure 5.5, significant corrosion of the water slide steel stair was observed.

## 3.2 Aquatic Centre – Fitness (2011)

At the time of our review, drawings dated 2001 were supplied by Jasper Recreation, the drawings were prepared by Williams Engineering.

The Fitness Center is a single storey building. The roof consists of 76mm metal decking on exposed glulam purlins which are supported by exterior steel beams. The steel beams are supported on steel columns (wide flange and HSS members) which bear on concrete pad footings. The main floor is a 120mm reinforced concrete slab-on-grade. The main lateral load bracing system consists on steel cross bracing.

### 3.2.1 Observations

The structure appeared to be in good condition expect for the following:

.1 As shown in Figure 5.6, the roof beam to roof girder bolted connection contains a bolt spacing that appears to be less than the minimum allowable by code.

# 4.0 RECOMMENDATIONS

The following are recommendations based on our observations noted above.

## 4.1 Arena

As shown in Figure 5.1, the timber roof appears to be in good condition; however, water staining was observed between the plank laminations. It is our recommendation the source of water staining between the timber planks be determined. The wood in the stained areas should be checked for rot.

As shown in Figure 5.2, visible concrete cracking of the SOG was observed. Since destructive testing was not performed, the depth of the crack was not determined. The crack was located on the North East end of the arena and was linear in direction. It is our opinion that the cracks around the ice rink are not of structural concern nor do they pose any major safety risk. The estimated cost to locally repair the SOG is in the order of $7,500.

### 4.2 Multi-Purpose Hall and Activity Centre

As shown in Figure 5.3, no fire spray was observed on neither the main floors metal deck nor open web steel joists and steel structure. The Architect should confirm if a fire rating assembly is required, and if so, this portion of the structure would not meet the Alberta Building Code and application of fire resistance spray would be required.

### 4.3 Natatorium

As shown in Figure 5.4, significant corrosion at the base of the majority of steel columns was observed. It appears the columns have been re-coated with paint to mitigate the risk of future corrosion. Since non-destructive testing was not performed, the severity of the corrosion was not determined. Due to the appeared severity of the corrosion, we strongly recommend destructive site testing be taken from each steel column within the Natatorium to better determine the remaining steel thickness. Completion of this test will determine the severity of the corrosion and allow us to determine the load carrying capacity of the structure. Until the non-destructive testing is performed, we are unable to estimate the cost of restoring/repairing the corroded columns. We estimate the cost of the non-destructive testing, along with an analysis of each columns load carrying capacity, to be in the order of $12,000 to $17,000, excluding expenses.

As shown in Figure 5.5, significant corrosion of the water slide steel stair was observed. It is our recommendation that the corroded steel stair be removed and replaced with a structure less susceptible to corrosion. Due to the severity of the corrosion, and because destructive testing was not performed on corroded members, we are unable to determine the life expediency of the stair.

### 4.4 Fitness Centre

As shown in Figure 5.6, roof beam to roof girder bolted connection contains a bolt spacing that appears to be less than the minimum allowable by code. It is our recommendation the Engineer of Record should comment on the load carrying capacity of the bolted connection.

## 5.0 FIGURES

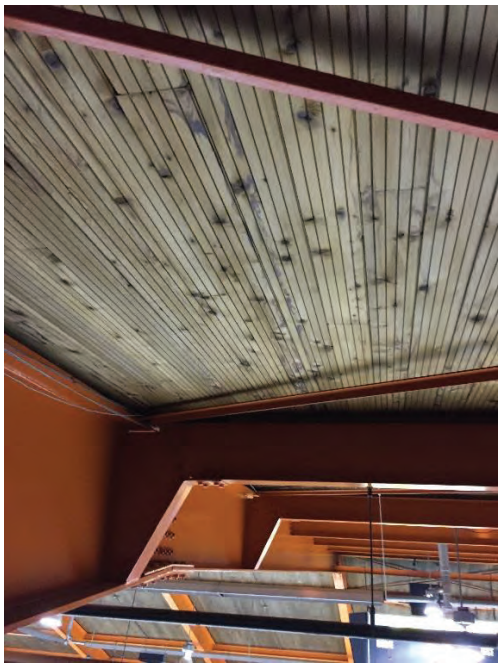


Figure 5.1: Arena – Steel Roof Structure (Water Staining of Timber Decking)

Figure 5.2: Arena – Main Floor (Slab-on-Grade Crack)

Figure 5.3: Multi-Purpose Hall – Main Floor Steel Structure (Missing Fire Spray)

Figure 5.4: Natatorium – Main Floor Column (Corrosion at Base of Columns)

Figure 5.5: Natatorium – Steel Stair (Corrosion of Typical Stair Members)

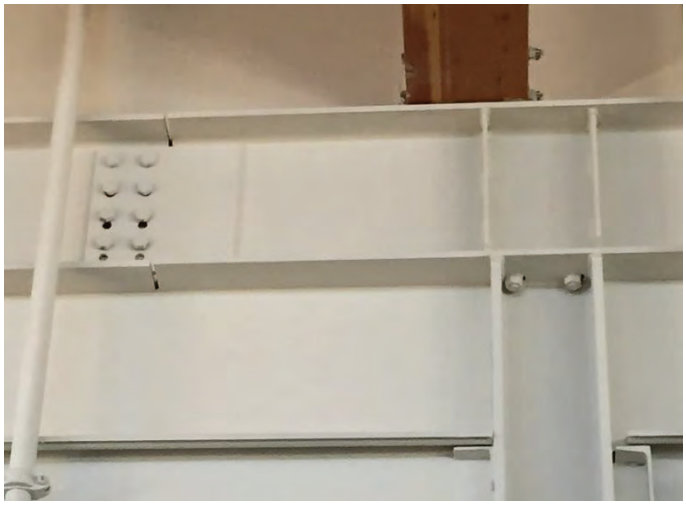


Figure 5.6: Fitness – Steel Columns (Bolt Spacing)

## 6.0 LIMITATIONS

The review undertaken was of visual nature only. No testing nor dismantling of any covering was performed. Reviews were made on a random basis with no attempt to review or inspect every element or portion of the buildings. The intent of the review was to determine areas of visually obvious deterioration and need for repair, but not to ascertain the quality or sufficiency of any specific aspect of the building. Our comments are not a guarantee or warranty of any aspect of the condition of the building whatsoever.

This report is for the sole use of the client. No other party shall be entitled to rely on this report without the express written permission of Read Jones Christoffersen Ltd.

Yours truly,
Read Jones Christoffersen Ltd.
APEGA Permit to Practice No. P00152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# 7.0 MECHANICAL REPORT

## 1 GENERAL

### .1 Introduction

The Jasper Recreation facilities are located at 305 Bonhomme Street in Jasper, Alberta. The recreation facilities include an aquatic center, fitness center, hockey arena, curling rink with 4 sheets of ice, multipurpose room, racquet center and more. The facility was built in phases starting with the arena which was built in the 1960's, all the way up to the fitness center which was built in 2002.

A site review was conducted on Tuesday, December 1and Wednesday, December 2, 2015. The development of the opinions of the mechanical components and systems comprising this facility is based on a walkthrough and visual review of mechanical components, feedback from operational and maintenance (O&M) personnel, and a review of all available drawings. The report is based on the conditions present and viewed during the review to obtain a representative impression of the facility.

The review occurred during prevailing weather conditions and did not test the capabilities of the seasonally operated equipment during climatic extremes. During the review, photographs of the selected representative conditions of the project were taken, some of which have been included for reference. Destructive testing or exposure of building materials (such as removal of finishes) to expose concealed spaces, disassembly of equipment, or local excavation, was not undertaken.

### .2 Mechanical Systems Overview/Executive Summary

The Jasper Recreation facilities range in age from approximately 10 to 50 years old. During those years, a lot of the systems or system components, have been upgraded or replaced. In general, the mechanical systems are in acceptable condition and have been well maintained.

Site Services: Since the underground water, gas, sanitary and storm services could not be inspected directly, they have been assessed in comparison to similar installations of similar age, assuming a normal life cycle associated with the system. The O&M personnel did not report any problems but a video survey of the underground sanitary and storm services would be worthwhile to ensure there are no sags, separations or blockages.

Plumbing: Plumbing systems are generally in reasonable condition. There were no visible or reported leaks on any of the sanitary, storm or water piping and O&M personnel are repairing them as they arise. There is a lot of domestic water piping which is uninsulated, consideration should be given to insulting the piping throughout to prevent heat loss. There is no consistency on the plumbing fixtures and trim. Some are infrared and some are manual. As fixtures and/or washroom groups reach the end of their life expectancy, they are upgraded. That said, there does not appear to be many water efficient fixtures in place and consideration may want to be given to upgrading fixtures to a more water efficient product throughout. There are numerous domestic hot water plants throughout the facility, all of

which seem to be working well. If any of the spaces are upgraded, the domestic hot water plants would be upgraded as well. Specifically in the arena facility where mechanical systems are a little spread out, consideration should be given to a centralized domestic hot water plant.

Fire Protection: Some of the spaces are sprinklered and some are not. The 2 main spaces that remain unsprinklered are the arena and the aquatic facility. The spaces that are sprinklered are done so in accordance with NFPA 13. Depending on which spaces receive upgrades, a code review of the facility will determine if a sprinkler upgrade is required. For instance, if the arena receives a renovation or modernization, the building classification may determine that a sprinkler upgrade is required in that space. In addition to sprinklers, fire extinguishers are in place throughout in accordance with NFPA 10.

HVAC: There are a variety of HVAC systems throughout the Jasper Recreation facilities. Primarily the systems consist of perimeter hot water heating operating in conjunction with constant volume ventilation systems. Most of the constant volume ventilation comes from roof mounted packaged gas heating/DX cooling units. Units are replaced on an as needed basis depending on life cycle. There is a heat recovery system that was installed in 2001 to recapture waste heat from the refrigeration plant. The system feeds preheat coils on a few of the larger roof top units as well as in slab heating in the multi-purpose room. The multipurpose room in slab system has never worked and its debatable how much heat is recaptured on the AHU's as the heat is low grade, not high temperature. The arena space is currently without any ventilation to speak of and neither the arena nor curling rink currently have any dehumidification in place.

Controls: There is a direct digital automation control system in place that services the major mechanical systems. The Activity center appears to be a Siemens automation system and the Aquatic/Fitness facility is a Delta system. There are no reported issues from the O&M staff.

Refrigeration Plant: The refrigeration plant has been upgraded in various phases over the course of the Arena and Curling Rinks life. Strong consideration however should be given to a plant upgrade and relocation. The existing room condition is not in conformance with CSA Standard B52 – Mechanical Refrigeration Code. If a new refrigeration plant was built, some of the existing components (compressor, chiller, etc.) may be able to be reused but further analysis would be required. The curling rink refrigerated slab is original from 1972 making it approx. 40 years old, and the hockey rink slab was replaced in 1996 making it 18 years old. The hockey rink slab is heaving so much that the ice thickness varies between 20mm to 65mm thick. Additionally, the headers in the curling rink are very fragile. Consideration should be given to new refrigerated slabs as well.

Pool Hydraulics: The aquatic facility was originally built as an outdoor pool. In 1988 it was turned into an indoor pool, and the hot tub, wading pool and slide were all added at that time. The turnover rates are not in compliance with current Alberta Building Code and Alberta Health Services standards but until a major upgrade is undertaken, the current turnovers are acceptable. Overall the pool systems are in good condition and have been well

maintained. Consideration should be given to 2 upgrades associated with the pool systems; 1) replace the gas chlorine with a liquid chlorine system (sodium hypochlorite) for safety reasons, and 2) consider adding medium pressure UV to the 3 pools to improve water and air quality.

# 2 SITE SERVICES

The Jasper Recreation facility is split up into 2 standalone buildings both of which are separately serviced. They are as follows:

## .1 Fitness and Aquatic Center

### .1 Water

The Fitness and Aquatic facility is serviced with a 150mm water service fed from Bonhomme Street. It is a combined service for water and fire protection. There is a hydrant on the front of the street which services the siamese connection.

### .2 Sanitary

There is a sanitary service into Bonhomme Street but its exact location, size and condition is unknown. The O&M staff did not report any problems with the service.

### .3 Storm

There is a storm service to the Fitness and Aquatic facility presumably fed from Bonhomme Street. But its exact size, location and condition are unknown. The O&M staff did not report any problems.

### .4 Gas

There is a gas meter located in the corner of the main floor aquatic mechanical room. Consideration should be given to relocating the meter to the outside of the building. The gas meter and the primary service are owned by the local gas utility, any required upgrades and costs would be covered by them.

## .2 Activity Center

### .1 Water

There is a dual water service that terminates in the Activity Center basement mechanical room. There is a 150mm water service for domestic water and a 200mm service for fire protection. The service lines run out to Pyramid Avenue and tie into the main within the street. There is a hydrant on Pyramid Avenue to serve the siamese connection on the face of the building.

### .2 Sanitary

The original arena drawings show a 200mm sanitary service run in the same trench as the water service into the town main in Pyramid Avenue. It is assumed this service is still active but the exact size, location and condition of the service is unknown. O&M personnel did not report any issues.

### .3 Storm

There is a 200mm storm service that feeds the site from Pyramid Ave. It feeds site catch basins in the parking lots, it does not service the building. O&M personnel did not report any issues.

### .4 Gas

There is a gas meter located on the exterior of the building on the east side. The meter feeds the Activity Center. The gas meter and primary service are owned and operated by the local gas utility, any upgrades would be completed by them.

## 3 PLUMBING

### .1 Domestic Water

Domestic hot, cold and recirculation water piping is generally fed throughout the facility via a copper pipe distribution system. Due to renovations and upgrades over the years, much of the piping has been replaced. There are no visible or reported problems. Some of the water piping is insulated and some is not. Consideration should be given to insulating all the water piping where accessible to prevent heat loss on the domestic hot and condensation on the cold.

### .2 Domestic Hot Water

There are a few different domestic hot water systems in place:

.1 Fitness and Aquatic Center: A single copper tube atmospheric fired Raypack boiler feeds 2 –120 gallon storage tanks for domestic hot water.

.2 Activity Center: 2–80 gallon, 450MBH water heaters located in the basement mechanical room serve the domestic hot water load for the Activity Center.

.3 Arena Change Rooms: There is a single 80 gallon, 300MBH water heater with storage tank located in a refrigeration room to service the hockey change rooms.

.4 Arena Flood Room: There is a single residential wall mounted boiler located in a mechanical room above the flood room. The boiler feeds hot water heating as well as 2 DHW storage tanks located in the flood room.

Overall the domestic hot water systems are in acceptable condition with at least 5 years of life remaining. Consideration should be given to a centralized domestic hot water system in the activity center that feeds the entire facility.

## .3 Plumbing Fixtures

There is a wide variety of plumbing fixtures and trim throughout the facility. Over the life of the facility, a lot of the fixtures and trim have been upgraded. Fixtures appear to be in reasonable condition throughout with no major fixture replacement required, generally the fixtures are as follows:

.1 Water Closets: Vitreous china floor mounted bowls with battery and manually operated flush valves

.2 Urinals: Vitreous china wall mounted urinals with battery and manually operated flush valves

.3 Lavatories: Vitreous china lavatories with 100mm center sets

.4 Shower: Single temperature metering faucet (both manual and hard wired) with wall mounted commercial shower heads

.5 Kitchen Sinks: Stainless steel drop in sinks with 200 mm center set

.6 Drinking Fountains: Wall mounted chilled water type

None of the above fixtures appear to be of the water conservation type. Changing out fixtures which utilize large volumes of water, such as showers and water closets, will not only reduce water consumption, they will also reduce gas consumption. All the fixtures currently in place have at least 5 years of life remaining.

## .4 Sanitary System

A conventional gravity buried piping system connects all plumbing fixtures, floor drains, equipment drains and specialty drains to the building sewer. Generally all above grade piping consists of cast iron and copper, all below grade piping consists of plastic ABS DWV and cast iron. The exception to this is the main floor plumbing that's exposed in the ceiling space in the Activity Center basement where plastic piping is utilized. This is not allowed by code when the ceiling space is used as a return air plenum which is the situation in the basement ceiling space.

### .5 Storm System

Roof drains throughout the buildings are connected together where they are internally piped and discharged out to grade thru rainwater leaders thru the wall. Above grade piping consists of cast iron piping.

### .6 Natural Gas

Natural gas is distributed from the meter locations throughout the building thru a steel pipe distribution system. Most of the gas distribution is exposed on the roof running on sleepers. The gas service and meter appear to be of adequate size and capacity, no work is required.

## 4 FIRE PROTECTION

### .1 Sprinklers

The building is partially sprinklered with a conventional wet pipe sprinkler system. It is zoned as follows:

.1 Activity Center:

.1 Zone 1: Basement
.2 Zone 2: Main floor, excluding arena
.3 Zone 3: Mezzanine

Note: The curling rink system is a dry pipe system.

.2 Aquatic/Fitness Facility:

.1 Zone 1: Fitness addition, excluding aquatic facility.

The sprinklers consist of fusible link recessed chrome plated heads in all finished ceiling areas and exposed heads in exposed areas. The piping is grooved victaulic type piping with mechanical couplings.

An in depth code analysis may reveal that some of the unsprinklered areas require coverage, further investigation required.

### .2 Fire Extinguishers

Fire extinguishers are provided throughout in accordance with NFPA 10. Extinguishers in occupied areas are located in wall mounted cabinets.

### .3 Fire Hydrants

There are 2 hydrants located around the building perimeter which appear to provide the building with adequate coverage. One of the hydrants is located approximately 25 meters from each of the building siamese fire department connections.

## 5 HVAC

### .1 Activity Center

The facility was built in phases over the past 50 years and due to the varied usage throughout and the phased construction, there is not a central HVAC system in place. The bulk of the facility is fed from packaged roof-top gas fired units with some of the areas housed with perimeter hot water heating. In total there are 10 roof-top units, most of which have air conditioning. Operating in conjunction with the roof-top units are approximately 60 exhaust fans and a number of unit heaters, cabinet unit heaters, etc. The HVAC systems breakdown as follows:

.1 **Arena:** The arena area HVAC consists of gas fired infrared heaters. There are hot water unit heaters in place but O&M personnel indicated they are no longer utilized and have been abandoned in place. Other than a couple of small high level propeller type wall fans (4 in total and 2 of which don't work), there is no ventilation in the arena. There is also no dehumidification in place which results in high levels of humidity and condensation during the shoulder seasons. The arena HVAC should be upgraded with the addition of a package gas fired desiccant dehumidifier which can serve 3 purposes; 1) it can provide dehumidification into the arena space, 2) it can provide ventilation into the arena space based on feedback from CO2 sensors, 3) it can provide carbon monoxide (CO) evacuation in the event of a high level CO measurement.

.2 **Curling Rink:** The curling rink area has 2 gas fired unit heaters for heating and a ceiling hung intake fan for ventilation. The unit heaters cycle based on space temperature as measured by low voltage thermostats. The intake fan has an outside air and return air damper that modulates to maintain the supply air temperature but to also provide outside air into the curling rink. The fan is manually controlled. Like the arena, the curling rink needs a dehumidification unit to be added to provide dehumidification and ventilation.

.3 **Mezzanine Area:** This area is fed from a packaged roof-top heat/cool unit. The unit appears to be approximately 10 years old, there are no visible or reported problems.

.4 **Basement:** The basement area HVAC consists of perimeter hot water heating operating in conjunction with a constant volume ventilation unit located within the main basement mechanical room. The boiler plant feeds portions of the entire Activity Center including the basement area. The boilers in place are atmospheric fired Lochinvar Copper Fin boilers with 1800MBH input each. The boilers appear to

be approx. 15 years old. There are 4 pumps tied into the hot water heating, 2 duty and 2 standby, which feed the building load. The ventilation unit is original from 1972, it is approximately 6500cfm capacity. The return air from the adjacent studio spaces has been blocked off due to noise issues and there is not a defined path for the return air back to the ventilation unit. The ventilation unit is over 40 years old and has reached the end of its service life.

.5 **Administration:** The administration area is fed by 3 package roof top heat cool units, ranging in size from 3 to 5 tons, and perimeter hot water heating. The roof top units appear to be new within the last 7 years. There are no visible problems or reported HVAC issues in this area.

.6 **Child Care:** The child care area is fed by a package roof top heat/cool unit operating in conjunction with perimeter hot water heating. The roof top unit appears to be approx. 7–10 years old, there are no visible or reported problems.

.7 **Main Hall Multi-Purpose Room:** The main hall and arena lobby are fed by a packaged heat/cool roof top unit. The unit appears to be approximately 15 to 20 years old, it has reached the end of its life expectancy and replacement is recommended.

.8 **Squash Courts:** The squash courts are fed from a roof top heat only unit. The unit is original from 1972. The unit has reached its life expectancy and complete replacement is recommended.

.9 **Gymnastics Area:** The gymnastics area was originally constructed as a curling rink. At a later date it was converted into a gymnastics area. The original refrigerated slab was supposed to be utilized for heating by using waste heat from the refrigeration plant but due to damaged piping within the slab, this was never utilized. The space HVAC is accomplished by using gas fired ceiling hung unit heaters. Additionally there is a packaged Eng Air roof top unit that feeds the space. The Eng Air unit was built in 2010. It has gas heating and DX cooling. It also utilizes waste heat from the refrigeration plant with an outside air preheat coil.

.10 **Washrooms/Janitor Rooms:** There are washrooms and janitor rooms scattered throughout the facility. Where they are located on outside walls, the washrooms have hot water heating in place, but all are exhausted using roof mounted centrifugal fans.

Overall, the HVAC systems in the activity center are in reasonable condition. Some of the systems are reaching the end of their service life and if the spaces are upgraded, the mechanical should be upgraded as well. There are some HVAC upgrades that should be considered within the next 5 years, they are as follows:

.1 **Arena:** The arena HVAC should be completely upgraded. What's in place currently is insufficient.

.2 **Curling Rink:** A new dehumidification unit should be considered for the curling rink area.

.3 **Squash Courts:** The squash HVAC has reached its life expectancy, complete replacement should be considered.

.4 **Main Hall:** The main hall roof-top unit has reached the end of its service life, unit replacement should be considered.

## .2 Aquatic and Fitness Facility

The Aquatic and Fitness facility was built in numerous phases. The facility started as an outdoor pool. It was then enclosed in 1988 at which time the hot tub, wading pool and slide were added. Lastly in 2001, the Fitness facility was added on. There are 2 heating boilers that feed the facility, the heating plant is located in the aquatic facility and appears to be from the 1988 addition. The HVAC systems are follows:

1. **Heating:** The aquatic facility has a boiler plant that feeds that serves 3 functions; 1) it provides hot water heating for the conducted load, 2) it provides glycol heating for the ventilation load, 3) it provides hot water heating for the pools. The plant consists of 2 Gas Master boilers with 1500MBH input each. The boilers are steel tube with Reilo forced draft burners providing an efficiency of 85%. All the piping within the pool mechanical room is Victaulic and shows some signs of leaking.

2. **Natatorium HVAC**: The Natatorium facility has an indoor ventilation unit. The unit is a constant volume unit and feeds 25,000CFM of air into the natatorium environment via overhead duct distribution. The unit provides heating and ventilation and runs 24/7 to control the space humidity and temperature. Humidity is controlled by regulating the volume of outside air into the space as measured by space humidity sensors. The ventilation unit is a packaged unit with a supply air fan, preheat coil on the outside air, reheat coil, mixing section, filter section and return air fan. The unit was installed in 1988 making it 27 years old. While on site, O&M staff mentioned that the return fan shaft had broken. The main return fan is going to be replaced with a fan wall type system, this work is currently underway.

3. **Locker Rooms:** The locker rooms are heated with wall mounted convective radiation. Ventilation comes from 2 Eng Air furnaces that bring in 100% outside air and operate in conjunction with roof mounted exhaust fans.

4. **Fitness Center:** The fitness area is heated by in slab heating and convection wall cabinets. The in slab heating is fed from the hot water heating system. The fitness ventilation comes from a roof mounted packed Eng Air unit DX cooling and glycol heating unit. The unit feeds 8300CFM into the fitness area. The unit was installed in 2001 making it 14 years old, there are no visible or reported problems.

Overall the Aquatic/Fitness facility HVAC is in acceptable condition. All HVAC components appear to be well maintained. There are no visible problems that need immediate attention, the system should all have a minimum 5–10 years life remaining.

# 6 REFRIGERATION

The Jasper Recreation facility is equipped with an ammonia refrigeration system which feeds the hockey arena and 4 sheets of curling ice. The plant was originally installed in 1960 but was upgraded in 1991. The equipment is generally well maintained and kept clean and has good service access. The system is as follows:

.1 **Compressors:** Two reciprocating Mycom 45 TR direct drive 60 HP self-contained units and a Vilter 100 TR 150 HP screw compressor are currently in place. The machines are over hauled on a regular schedule, and should not require replacement with continued regular maintenance. The compressors are on glycol cooling, which is the preferred method. There is 190 TR available but only enough power for 145 TR. So only 2 or the 3 compressors ever run.

.2 **Condenser:** The Vilter roof mounted condenser was installed in 1991. The condenser is leaking and creating a significant build-up of ice on the sloped roof. The condenser is on a chemical treatment system, the effectiveness of the chemical treatment needs to be continually monitored. Due to leaking, the unit should be repaired and relocated to a stand.

.3 **Chiller:** The chiller is a 16 year old plate and frame unit. The chiller should not require replacement due to life cycle in the near future if the brine is kept in good condition.

.4 **Pumps**: It appears that all of the pumps from the 1991 install are in place. The pumps should be considered for replacement when major equipment is replaced.

.5 **Control System:** The plant uses a new Programming Logic Controller (PLC) system for plant control. The Motor Control Centers (MCC) is in good condition.

.6 **Piping Systems:** All of the piping appears to be in reasonable condition at this time. The insulation on the piping appears to be fiberglass with PVC jacket that breaks down with moisture penetration. The insulation is not effective and frost can build at seams in the insulation, which leads to accelerated corrosive attack.

.7 **Relief System:** Appears to be compliant with CSA code.

.8 **Heat Recovery:** There was a heat recovery system installed in 2011. The design intent of the system was to feed the in slab heating in the gymnastics area as well as preheat coils on select roof top air handling units. Due to problems with the in slab heat and the need to increase discharge pressure on the refrigeration plant to generate any usable heat, the system has not met the expectations of the Town of Jasper.

.9 **Refrigerated Slabs:** There are 2 refrigerated slabs within the facility; 1) there is a 200' x 85' standard NHL size ice slab in the arena, and 2) There is a 4 sheet curling rink. The Hockey slab was replaced in 1996 making it 19 years old, the curling slab is original from 1972 making it over 40 years old. The hockey slab ice thickness varies from 20mm to 65mm (3/4" to 2-1/2") due to heaving. There have been problems reported with the underfloor heating system on the hockey rink. The curling rink doesn't appear to have an underfloor heating system. In both cases the slabs have reached their life expectancy and complete replacement should be considered.

Other items of note on the refrigeration system are as follows:

.1 The vestibule into the refrigeration room is very restrictive and does not allow easy access, but more importantly, easy egress from the room in the event of an emergency.

.2 The existing ventilation system is not in compliance with mechanical refrigeration code B-52. There is no minimum ventilation or make-up air into the room and the exhaust does not adequately exhaust the room.

.3 The exit door that opens directly to the outside is directly adjacent to the main entrance which, in the event of an emergency, makes for a dangerous situation.

.4 The room and doors are not well sealed.

Overall, the refrigeration system has reached the end of its useful life. Consideration should be given to, not only a new plant, but a plant relocated to the west end of the existing building. The new plant would include a new or rebuilt condenser housed on a stand rather than the roof to prevent the potential for ice build-up in the future. The new refrigerated slabs could also consider the use of polyfusion welded pipe and fittings which would eliminate the need for header trenches.

## 7 POOL SYSTEMS

There are 3 pools on site, they are as follows:

.1 Main Pool: Volume: 780,000 L (206,000 US gallon)

Flow Rate: 41 LPS (650 US GPM)
Turnovers: 6hrs

.2 Wading Pool/Slide Pool

Volume: 32,000 L (85,000 US gallon)
Flow Rate: 28 LPS (444 US GPM)
Turnovers: 36 mins

.3 Whirlpool

Volume: 18,000 L (4,750 US gallon)
Flow Rate: 28 LPS (333 US GPM)
Turnovers: 15 mins

The 3 pools each operate with independent filtration systems. The systems are all typical and have the following components:

.1 **Pumps:** Pool pumps are base mounted, brass construction with flange connections. Each pump is housed with a hair/lint strainer attached to the suction side. The hair/lint strainers have see through lexan lids.

.2 **Heat Exchangers:** Individual plate and frame type heat exchangers are provided, one for each pool.

.3 **Filtration:** Each pool uses high rate pressure sand filters of the horizontal type constructed of polyester and fiberglass filament winding complete with floor saddles. Each filter is housed with a 5 valve manifold and pressure gauge panel for the backwash cycle.

.4 **Skimmers:** The pools are all housed with heavy duty, one piece surface skimmers with a 6" floating weir to accommodate variations in the pool depth.

.5 **Backwash**: A single sump tied into the sanitary main is provided to accommodate the filter backwash cycle and pool drainage.

.6 **Chemical System:** The chemical disinfection systems for all three pools utilizes gas chlorine operating in conjunction with caustic soda to balance the pool PH levels.

.7 **Pool Controllers:** A single pool controller (Acutrol AK600) is provided to control PH/ORP on all three pools.

The pool controller has the following features:

.1 Super chlorination
.2 Alarms
.3 Overfeed
.4 Passwords
.5 Mixing times
.6 7 day, 24 hour timer
.7 Modem Connection
.8 ORP reading
.9 PH reading

Overall the Jasper Recreation Center Aquatic pool hydraulics are in moderate to good working order. The facility is maintaining good water quality with no visible or reported problems. There are 2 recommendations to improve the current operations:

.1 Change the gas chlorine to a sodium hypochlorite (liquid chlorine) system. There are inherent dangers associated with using gas chlorine for pools. The dangers of using gas include delivery problems, improper connections of tanks, and failure of equipment or PVC tubing. All of these could lead to significant injury or death. The most common option for a new chlorination system is a liquid chlorine (sodium hypochlorite) system. A large bulk storage tank with secondary containment would be placed in the existing gas chlorine room. A chemical pump would be added for each of the pools that would be controlled directly by the chemical controllers. The issue that needs to be handled is how to get the chemicals delivered. The preferred method of delivery is to have the chemical supplier deliver in bulk or to have them transfer the liquid chlorine from 50 gallon drums to the bulk storage tank. This prevents the Aquatic Center from handling the chemicals. This system requires minimal maintenance to operate and is much safer.

.2 Another recommendation to consider is medium pressure UV systems for the pools. These systems have been found to greatly improve the pool water quality and natatorium air quality. A UV system destroys pool chloramines, which are the major cause of poor air quality and a corrosive environment. UV also destroys other harmful contaminates that chlorine cannot destroy. It is important that these be put on all the pools in the natatorium to ensure proper air and water quality.

## 8 MISCELLANEOUS SYSTEMS

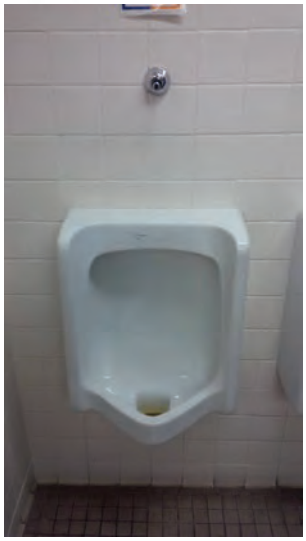
.1 Steam Room: There is a steam room located in the natatorium. The steam is generated from a single gas fired steam generator with 147 MBH input and 110 lbs/hr of steam capacity. There is a water softener on the steam generator supply. The steam generator appears to be approximately 7 years old which is near the end of its service life. Replacement of the generator within the next 3-5 years is likely.

.2 Kitchen Exhaust: There are 2 commercial kitchen exhaust hoods located within the activity center. The hoods are approximately 3.0m long x 1.2m deep (8' x 4'). For each hood there is an exhaust fan on the roof. The exhaust fan is an upblast type and is installed in accordance with NFPA 96. In both situations there is no make-up air currently installed. A direct fired make-up air unit should be added to make-up the exhaust quantity.

## 9 ORDER OF MADNITUDE COSTS

The following are order of magnitude costs for the major mechanical items identified within the report.

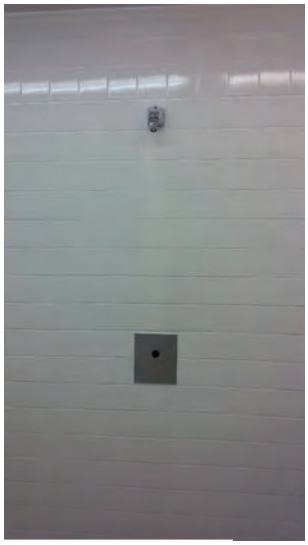
.1 Plumbing Fixture Replacement: Allow $1,000/fixture for a direct replacement



Typical Urinal

Typical Lavatory

Typical Water Closet



Typical Shower

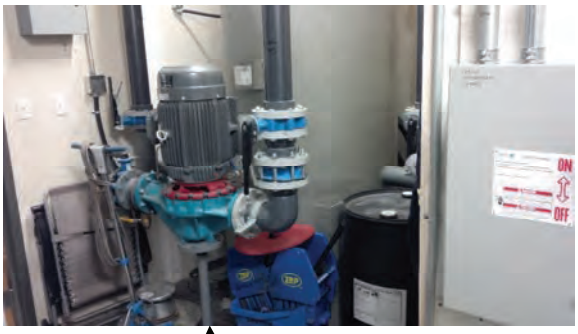
Typical Janitor Closet

Activity center incoming water services

Plastic pipe in basement R/A plenum

Activity center basement AHU


Typical wall mounted
FEC




Refrigeration plant waste heat systems

Refrigeration Plant Roof mounted condenser

Typical roof-top heat/cool unit


Kitchen exhaust hood

Refrigeration plant reciprocating compressor

Refrigeration plant screw compressor

Refrigeration plant reciprocating compressor


Refrigeration plant plate & frame chiller


Arena flood room hot water heating

Brine pumps

Redundant hot water unit heaters in arena

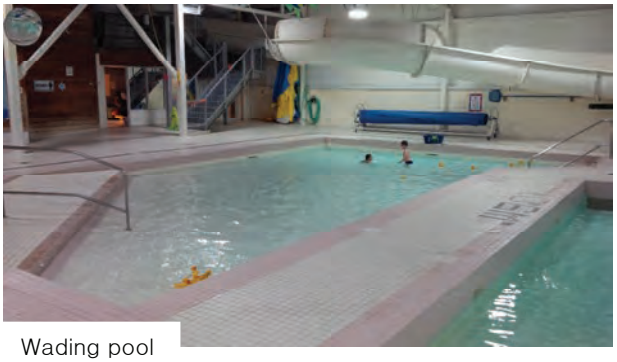
Arena infrared heaters


Pool controller

Locker room make-up

Aquatic facility incoming water service

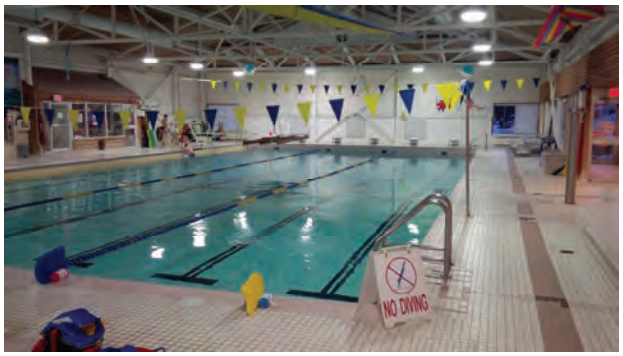
Hot tub



Wading pool

Slide pool

Typical pool pump




Main 25m lap pool

Pool piping in tunnel

## 8.0 ELECTRICAL REPORT

## 8.1 EXECUTIVE SUMMARY

The building under review is a recreation facility across two buildings comprised of an aquatics centre, fitness area, gymnastics area, curling rink, and one hockey rink and administration offices. The buildings electrical systems have had some spot upgrades where necessary however, a large majority of the equipment is dated technology or past the expected lifetime of the equipment. Recommended upgrades in areas of sub distribution, lighting, motor control, communication systems, emergency lighting, exit lighting. These items are reviewed in further detail within the report.

## 8.2 PROJECT DETAILS AND INTENT

The intent of this report is to evaluate the electrical systems of the Jasper Recreation Facility which will be evaluated as two separate buildings. The facilities are located on Bonhomme Street, Jasper, Alberta and have been reviewed in terms of their operational condition, compliance to both the Canadian Electrical Code and Alberta Building Code.

This report is based on discussions with maintenance personnel and a comprehensive site review.

## 8.3 FITNESS AND AQUATICS CENTRE

### 3.1 UTILITY SERVICE & TRANSFORMER

The utility service is located on the west side of the building along Bonhomme Street. It is the form of an underground fed padmount transformer with a 120/208V secondary and complete with a utility meter. The utility service and transformer are maintained and serviced by the electrical utility. The transformer appears to be adequately sized for the building and should meet all current and foreseeable future needs based on the buildings current intended use.

**Recommendation:** The utility service and transformer are maintained and serviced by the electrical utility and therefore no recommendations are offered.

### 3.2 MAIN DISTRIBUTION BOARD

The main distribution board is a Siemens main distribution panel type assembly with fused disconnect switches. The main distribution board is fed from the electrical utility transformer noted in item 3.0 via underground secondary feeder. The main electrical service is 120/208volt, 800 ampere, 3 phase, 4 wire, complete with surge protection. The main distribution board is currently near full capacity based on available space. The system appears to have been installed during the renovation in 2010 and seems to be in adequate working condition.

**Recommendation:** The board appears to be servicing the needs of the site however there is not space for any future expansion. When/if expansion occurs, a new board should be considered.


## 3.3 SUB-DISTRIBUTION EQUIPMENT

The sub distribution system comprises of 120/208 volt feeders to sub electrical panels and motor control centres located throughout the facility which feed the various areas such as new fitness, aquatics and administration. The branch distribution splitters are in overall good condition with limited lugs for expansion. The branch circuit panelboards located throughout the facility range in age from 5-7 years old to original construction period. The recently installed panel boards are in good condition with adequate space for future expansion. The branch circuit panel boards installed at or near original construction are nearing the end of their life cycle. The panel boards located in pool environment mechanical spaces are badly corroded.

**Recommendation:** Complete thermal scan analysis, cleaning/maintenance of all sub-distribution components. Replace the original branch circuit panelboards. The new distribution for the fitness areas is new and appears to be in very good condition.

## 3.4 LIGHTING


### 3.4.1 Interior Lighting

The interior lighting is in the form of various types of fluorescent and induction luminaires. The majority of fluorescent luminaries in the un-renovated and original areas of the building are T8 technology with T5 fluorescents and dimmable ballasts controlled by a Lutron Graphik Eye in recently renovated areas such as the fitness area. The pot lighting in this facility is a mix of compact fluorescent and LED retrofit type fixtures. The building operator mentioned there is flickering of the T5 lamps when they are dimmed. The pool lighting levels appear to be lower than the IESNA recommended levels for a leisure pool however the operators seem to be satisfied it meets their requirements. The lighting in the original areas is control via low voltage control (pool) or manual local switches.

**Recommendation:** Consider switching to LED technology throughout combined with local occupancy sensor control to reduce overall energy consumption. Induction lighting in the pool area appears to be newly installed and working well. Replace corroded low voltage relay control panel.

### 3.4.2 Exterior Lighting

The exterior lighting is in the form of mainly wall mounted luminaires along the building. This lighting is controlled by a time clock and photocell arrangement. The exterior lighting is a mixed arrangement of LED and high pressure sodium type fixtures. The luminaires appear to be in overall good condition.

**Recommendation:** Replace the high pressure sodium wall mounted luminaires with new LED type to match the new addition wall mounted fixtures.

## 3.5 LIFE SAFETY SYSTEMS

### 3.5.1 Fire Alarm System

The fire alarm system is a Mircom FX 2000 addressable type system which is externally monitored and the system is in operational condition. The panel is brand new in 2015 along with new devices such as manual release pull stations at the exits and heat or smoke detectors as required. The signaling is achieved by combination horn/strobes. The signaling devices appear to be properly spaced throughout.

**Recommendation:** The system appears to be operational and up to code. Nothing recommended at this time.

### 3.5.2 Emergency Lighting

The emergency lighting in the building is in the form of battery pack c/w remote heads which appear to be in good working condition. Routine testing and maintenance has been completed to ensure proper operation.

**Recommendation:** Consider replacing existing incandescent emergency remote heads with new LED type fixtures as part of a maintenance routine.

### 3.5.3 Exit Lighting

The exit lighting presently is supplied by incandescent and LED illuminated exit signs located above exit doors and along exit routes. The present coverage appears adequate. Further review of exit sign locations and routing should be completed by an architectural consultant.

**Recommendation:** Replace remaining incandescent exit signs with LED lamp technology and test all exit lighting circuitry.

## 3.6 COMMUNICATIONS SYSTEM

### 3.6.1 Cabling

The main communications service enters the building through an underground conduit to the local service provider's pedestal. The main communications feed is a copper cable which is terminated in the main floor electrical room adjacent to the main distribution. Device cabling is distributed throughout the building by means of conduit and free air cabling. The facility has category 5e cabling throughout.

**Recommendation:** Tidy existing wiring and terminations.

### 3.6.2 Sound Systems

The existing sound systems in the pool area are not operational. The maintenance staff mentioned it has not worked since the renovation and that a wire was likely cut. The intercom communication from the pool to the front desk is also not operational.

**Recommendation:** Review existing sound system wiring and find the source of the issue. Commission system.

### 3.6.3 Security Systems

The intrusion system in the building has been decommissioned due to many false alarms. As an alternate security measure CCTV cameras have been installed. The DVR and monitor are located in the main electrical room. One of the cameras is not operational.

**Recommendation:** The owner seems to be satisfied with the level of security in the building. Find source of issue and fix the camera that is not working. Consider installing a card access system to reduce the amount of keyed doors throughout the facility.

## 3.7 GROUNDING

It is strongly recommended based on the facilities age and magnitude of alterations undertaken that a comprehensive grounding study be undertaken to test ground continuity of all pool area metal components as required by the Canadian Electrical Code Part. This should also be implemented as part of bi-annual maintenance shut down.

## 3.8 MOTOR CONTROL

The motor starters and motor control centres (MCC's) in the pool mechanical room are fed via the existing building sub-distribution. The main MCC and starters are in poor condition, badly corroded and broken parts. The majority of the starters are in the hand position since the Auto function no longer works, pilot lights are burnt out, and parts are not available for it any longer. The original motor control centres and starters are dated and may pose problems for future repairs and expansions. The other motor control centre (MCC-100) is new and appears to be in good working condition.

**Recommendation:** A retrofit/replacement of the original MCC is strongly recommended.

## 3.9 WIRING METHODS


The wiring methods and condition of the existing wiring with the renovated areas of the facility is good. The state of the wiring in the pool area and the associated service areas is, in some cases, contrary to the Canadian Electrical Code and is severely corroded in some areas.

**Recommendation:** A thorough review of the wiring within the pool area and support spaces and replacement of some wiring within these spaces is recommended.

## 8.4 ACTIVITY CENTRE

## 4.1 UTILITY SERVICE & TRANSFORMER

The utility service is located on the north side of the building along Conought Drive. It is the form of an underground fed padmount transformer with a 277/480V secondary. The utility service and transformer are maintained and serviced by the electrical utility. The transformer appears to be adequately sized for the building and should meet all current and foreseeable future needs based on the buildings current intended use.

**Recommendation:** The utility service and transformer are maintained and serviced by the electrical utility and therefore no recommendations are offered.

## 4.2 MAIN DISTRIBUTION BOARD

The main distribution board is a Federal Pioneer main distribution panel type assembly with moulded case circuit breakers and a main fused disconnect switch. The main distribution board is fed from the electrical utility transformer via underground secondary feeder. The main electrical service is 277/480volt, 1200 ampere, 3 phase, 4 wire. The main distribution board currently has adequate available space for additional breakers. The facility operators mentioned that they cannot run all three of their compressors in the ice plant out of fear they will trip the main breaker. They system was installed new at building opening in 1976 and has breakers that are not available for parts or servicing any longer. In front of the main board is a distribution transformer which infringes on the CEC required distance of 1m clear working space.
**Recommendation:** The board appears to be servicing the needs of the site however it is passed the expected life of the equipment and should be considered for replacement.

The transformer proximity to the main board is causing a code violation which should be rectified. Recommend reviewing the overall demand of the building through utility bills to determine future spare capacity of the system.

## 4.3 SUB-DISTRIBUTION EQUIPMENT

The sub distribution system comprises of 277/480 volt feeders to sub electrical panels, splitters, and motor control centres located throughout the facility. The major sub distribution exists in electrical rooms on the main floor in the ice rink area and an electrical room next to the gymnastics gym. Some of the distribution in each room is newer while the majority is original construction. The branch circuit 120/208 volt panelboards located throughout the facility range in age from 5-7 years old to original construction period. The recently installed panel boards are in good condition with adequate space for future expansion. The branch circuit panel boards installed at or near original construction are nearing the end of their life cycle.

Solar photovoltaic panels are mounted at roof level facing south. These panels are not currently integrated into the building electrical system and are not producing useable electricity.

**Recommendation:** Complete thermal scan analysis, cleaning/maintenance of all sub-distribution components. Replace the original branch circuit panelboards and sub-distribution boards. Connect solar panels to building electrical system.

## 4.4 LIGHTING

### 4.4.1 Interior Lighting

The interior lighting is in the form of various types of fluorescent, LED and high intensity discharge luminaires. The majority of fluorescent luminaries in the un-renovated and original areas of the building are T12 type lamps and T8 technology or LED in recently renovated areas.

The curling rink and hockey rink currently have 400W Metal Halide type fixtures controlled by lighting contactors. The lighting in these areas is not uniform and appears dark in some areas. This technology is dated and is inefficient.

The existing gymnasium utilizes recessed 2x4 fluorescent type fixtures in conjunction with conventional incandescent theatrical lighting fixtures for special events. The theatrical lighting dimming system is located on the stage and appears to be functional. The system is quite old and might be difficult to maintain moving forward.

**Recommendation:** Interior lighting modernization and energy efficiency upgrade as outlined in the areas where T12 type lamps are being utilized. Consider switching to LED

technology throughout combined with local occupancy sensor control to reduce overall energy consumption. If the curling and hockey rinks are converted to LED the lighting consideration should be given to revising the control to 0-10V dimming to allow greater flexibility of the space for other types of events.

### 4.4.2 Exterior Lighting

The exterior lighting is in the form of mainly wall mounted luminaires along the building. This lighting is controlled by a time clock and photocell arrangement. The exterior lighting is a mixed arrangement of LED and high pressure sodium type fixtures. The luminaires appear to be in overall good condition.

**Recommendation:** Replace the high pressure sodium wall mounted luminaires with new LED type to match the new addition wall mounted fixtures.

## 4.5 LIFE SAFETY SYSTEMS

### 4.5.1 Fire Alarm System

The fire alarm system is a Simplex 4010 addressable type system which is externally monitored and the system is in operational condition. The panel is brand new in 2015 along with new devices such as manual release pull stations at the exits and heat or smoke detectors as required. The signaling is achieved by combination horn/strobes. The signaling devices appear to be properly spaced throughout.

**Recommendation:** The system appears to be operational and up to code. Nothing recommended at this time.

### 4.5.2 Emergency Power Systems

The building has a 75kVA exterior emergency diesel generator complete with a belly tank newly installed in 2011. The generator services various critical loads in the building including emergency lighting and mechanical loads. The distribution systems are not isolated as per CSA 282 code requirements of separating “Life safety” and “Non-Life Safety loads”. Some emergency battery packs / remote head combination fixtures exist throughout the facility however it is unclear if they are all operational.

**Recommendation:** Emergency system appears to be in good working condition however should be brought up to current code standards. A review of emergency egress lighting should be conducted to ensure adequate coverage.

### 4.5.3 Exit Lighting

The exit lighting presently is supplied by incandescent and LED illuminated exit signs located above exit doors and along exit routes. The present coverage appears adequate. A few of the exit lights within the facility are damaged. The exit lighting is fed from the emergency distribution connected to the generator.

**Recommendation:** Replace remaining existing exit signs with LED lamp technology and test all exit lighting circuitry. Further review of exit sign locations and routing should be completed by an architectural consultant.

## 4.6 COMMUNICATION SYSTEMS

### 4.6.1 Cabling

The main communications service enters the building through an underground conduit to the local service provider's pedestal. The main communications feed is a copper cable which is terminated in the basement floor electrical room adjacent to the main distribution. Device cabling is distributed throughout the building by means of conduit and free air cabling. The facility has category 5e cabling throughout. The Meridian telephone system head end key switch is located in the main electrical room in the basement. The telephone system appears to be in good working condition with some room for expansion.

A data rack exists on the main floor in a small IT closet. The cabinet has poor cable management. The infrastructure seems to be servicing the needs of the facility.

**Recommendation:** Tidy existing wiring and terminations. Consider adding cable management systems to the existing data cabinet.

### 4.6.2 Sound Systems

There are three localized sound systems in the facility; one in the hockey rink, one in the gymnasium, and one in the fitness studio in the basement. All three sound systems appear to be in good working condition and are achieving the user's needs. The systems do not appear to be tied into the fire alarm system. The existing TOA intercom system appears to be in good working condition.

**Recommendation:** Consider tying the sound systems into the fire alarm system to shut the speakers off during an alarm.

### 4.6.3 Security Systems

The intrusion system in the building has been decommissioned due to many false alarms. As an alternate security measure CCTV cameras have been installed. The DVR and monitor are located in the Director's office.

**Recommendation:** The owner seems to be satisfied with the level of security in the building. Consider installing a card access system to reduce the amount of keyed doors throughout the facility.

## 4.7 MOTOR CONTROL & ICE PLANT

The motor control centre that services the ice plant is in poor condition. The starters in the MCC can no longer be serviced due to discontinued parts. The ice plant does not comply with the current B52 codes. Some items to consider are the location of the ammonia detection panel and emergency purging exhaust switch should be located in the vestibule to the refrigeration room. Refer to mechanical report for further information.

**Recommendation:** A replacement of the original ice plant MCC is recommended. The ice plant should be upgraded as required to meet B52 code requirements.


The wiring methods and condition of the existing wiring within the facility is a mix of conduit, BX and open air wiring. The state of the wiring in some cases is contrary to the Canadian Electrical Code.

**Recommendation:** A thorough review of the wiring within the facility and replacement of some wiring within is recommended.

## 9.0 List of Recommendations

The recommendations from all disciplines are summarized in table 1 below. The items identified are shown on the attached drawings A1.1, A1.2 and A1.3

**Recomendations for Jasper Activity Centre**

Group2 ARCHITECTURE INTERIOR DESIGN

| | Discipline | Reccomendation | Notes |
|---|---|---|---|
| 1.9 | A | Refridgeration plant | Relocate refridgeration plant and replace/refurbish equipment |
| 1.11 | A | Hockey boards | Replace existing boards with flexboards |
| 1.10 | A | New Changerooms | Arena function requires new and increased size change rooms |
| 1.13 | A | Arena Seating | upgrade stairs and exiting in arena to ensure code compliance |
| 2.15 | A | Replace Waterslide | Fiberglass slide is aging and presenting injury risk replacement is required |
| 2.16 | A | Family dressing rooms | Revise location and access to family dressing rooms replace water damaged walls and finshes |
| 3.12 | A | Basement Dorms | upgrade finishes of basement dorm rooms |
| 3.13 | A | Multipurpose room | upgrade finishes of multipurpose room, including flooring and operable wall |
| 3.14 | A | Meeting space | additional and better quality meeting space for conferences |
| 3.15 | A | Admin office | expansion and unification of adminstration offices |
| 3.16 | A | Main entrance | activate entrance and increase relatioship with street |
| 3.17 | A | Accesibility | Increase accesibility to all areas |
| 1.12 | A | Zamboni room | New larger and better located zamboni room required |
| 2.1 | E | Panel boards | analysis, cleaning, placement of sub-distrabution components |
| 2.2 | E | Lighting control | Replace low voltage lighting control panel |
| 2.3 | E | Exterior Lighting | Replace high pressure Sodium Luminaires with LED |
| 2.4 | E | Emergency Lighting | Replace incandescent Remote Heads with LED |
| 2.5 | E | Exit signs | Replace incandescent Exit signs with LED |
| 2.6 | E | Pool Sound system | Investigate and repair existing non-functional sound system |
| 2.7 | E | Motor Control Centre | Replacement of original MCC |
| 2.8 | E | Wiring in pool area | Review and replacement of wiring in pool area. |
| 3.1 | E | LED lighting | Switch to LED fixtures throughout |
| 3.2 | E | Main distribution | Code infraction of clearances in front of panels, Board is past service life |
| 3.3 | E | LED lighting | Switch to LED fixtures throughout |
| 3.4 | E | Exterior Lighting | Replace high pressure Sodium Luminaires with LED |
| 3.5 | E | Exit signs | Replace incandescent Exit signs with LED |
| 1.1 | M | Ice Plant | Replace original Ice plant to achieve code compliance and eliminate safety concerns |
| 1.3 | M | Arena Ventilation | HVAC upgrading to include Gas fired dessicant dehumidifier |
| 1.4 | M | Refrigeration Condenser | repair leaking and relocate |
| 1.5 | M | Refridgeration piping | Piping Insulation should be replaced |
| 1.6 | M | Hockey refridgerated Slab | Replacement of slab required due to heaving, problems with underfloor heating |
| 1.7 | M | Curling refridgerated Slab | Replacement of slab suggested due to age of systems |
| 1.8 | M | Ventilation of Ice Plant | not adequelty exhausted, not provided with make up air |
| 2.12 | M | Chlorination system | upgrade Chlorination system to sodium hypochlorite liquid system |
| 2.13 | M | UV decontamination | Consider upgrading pool systems with UV decontamination system |
| 2.14 | M | Steam generator | Replacement of steam generator for steam room is suggested within 3-5 years |
| 3.7 | M | Curling sheets | Upgrade with dehumidifier |
| 3.8 | M | Basement Ventilation | noise issues, return air path, replace ventilation unit due to age |
| 3.9 | M | Arena lobby | heat/cool roof top unit should be replaced |
| 3.10 | M | Squash court heat | replace unit original from 1972 |
| 3.11 | M | Kitchen Make-up air | Make-up air unit should be installed for kitchen space to offest kitchen exhaust hoods |
| 1.2 | S | Roof Water Staining | Investigate roof planks for deterioration |
| 2.9 | S | Steel column Corrosion | Significant corrosion around majority of steel columns |
| 2.10 | S | Water Slide Stair | Replace corroded stair with stair more suited to wet environment |
| 2.11 | S | Roof girder Bolts | Bolt spacing on roof girder connection appear to be less than minimum, Engineer of record to comment |
| 3.6 | S | Fire spray | Confirm fire rating required and apply fire protective spray as neccesary |

table 1, Recommendations

RECOMMENDATIONS

- X.x ARCHITECTURAL
- X.x STRUCTURAL
- X.x MECHANICAL
- X.x ELECTRICAL





2 A1.1 MEZZANINE FLOOR PLAN 1:200

1 A1.1 MAIN FLOOR PLAN 1:200

REVISIONS

| NO | DATE | REVISION | BY |
|---|---|---|---|

ISSUED

SEAL


www.group2.ca E: general@group2.ca
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Edmonton T: 780.447.2990 Saskatoon T: 306.979.2935


PROJECT TITLE
JASPER RECREATIONAL FACILITIES

DRAWING TITLE
MAIN AND MEZZANINE FLOOR PLAN

| CHECKED | DRAWN | DATE |
|---|---|---|
| RC | MT | 2016-1-6 |

| 15092 | A1.1 | 0 |
|---|---|---|
| FILE | DRAWING | REVISION |

RECOMMENDATIONS

X.x ARCHITECTURAL

X.x STRUCTURAL

X.x MECHANICAL

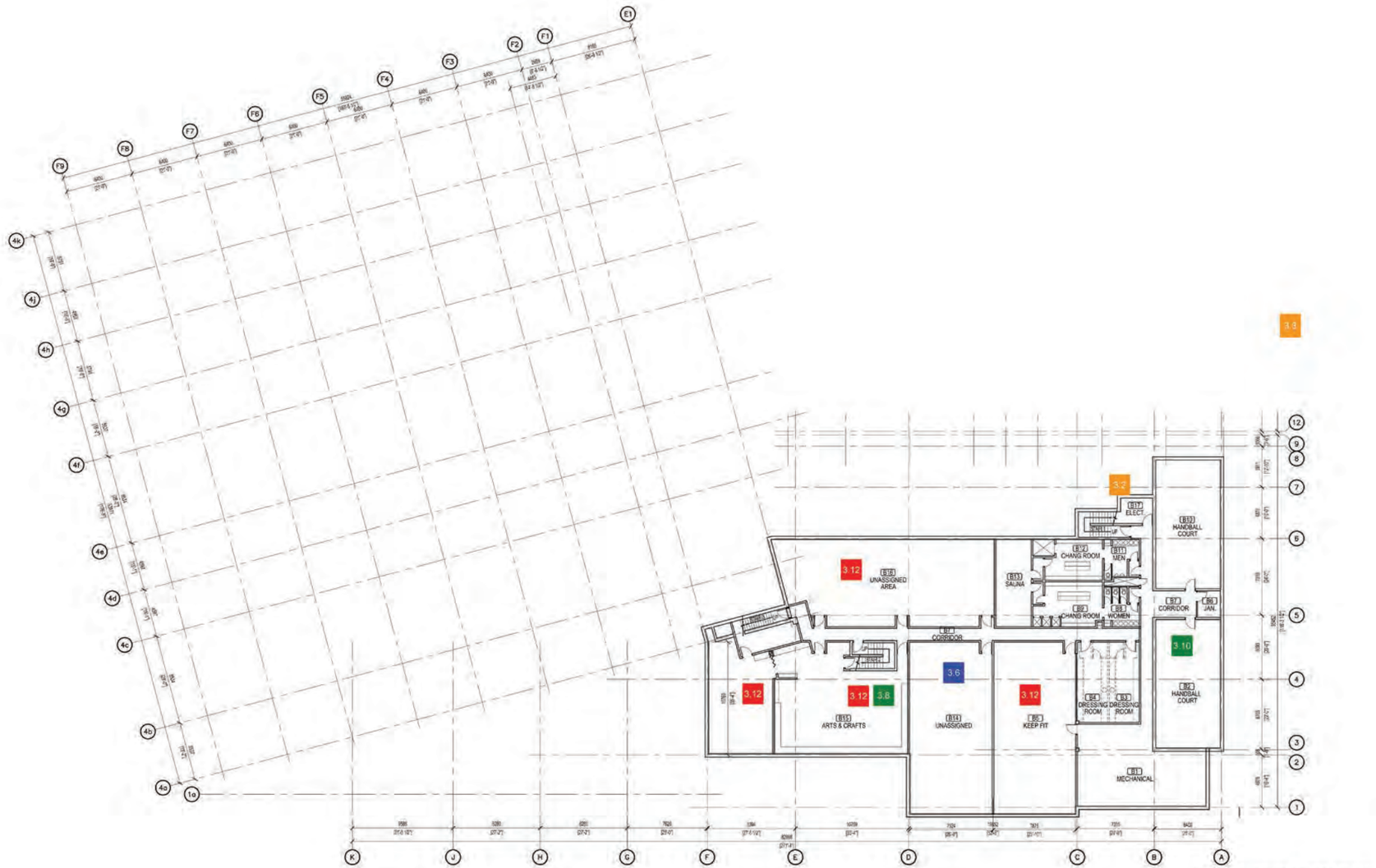
X.x ELECTRICAL

REVISIONS

| NO. | DATE | REVISION | BY |
|---|---|---|---|

ISSUED

SEAL




1 BASEMENT FLOOR PLAN
A1.1 1:200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PROJECT TITLE
JASPER RECREATIONAL FACILITIES

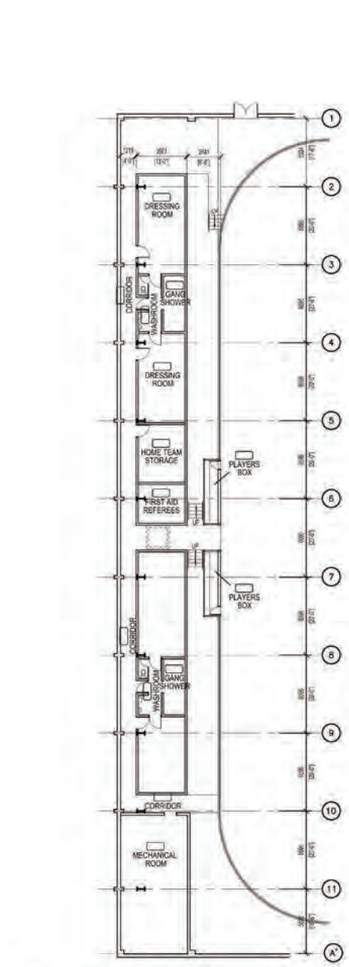
DRAWING TITLE
ACTIVITY CENTRE - BASEMENT FLOOR PLAN

| CHECKED | DRAWN | DATE |
|---|---|---|
| RC | MT | 2016-1-6 |

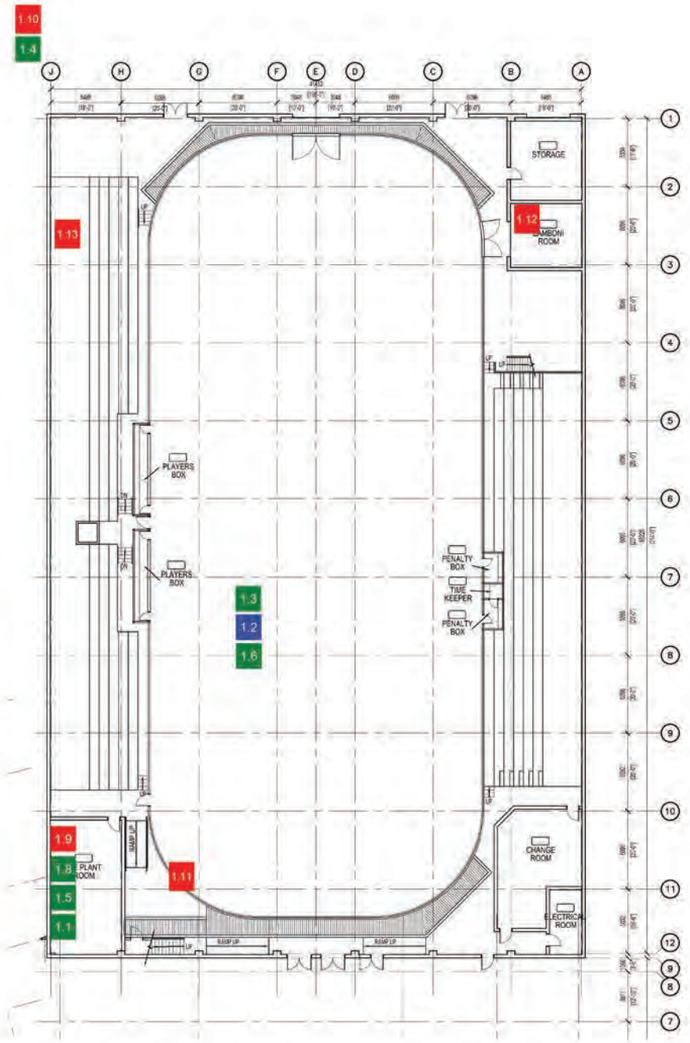
| 15092 | A1.2 | 0 |
|---|---|---|
| FILE | DRAWING | REVISION |

RECOMMENDATIONS

- X.x ARCHITECTURAL
- X.x STRUCTURAL
- X.x MECHANICAL
- X.x ELECTRICAL




2 A1.1 FLOORPLAN (BELOW BLEACHERS)
1:200




1 A1.1 MAIN FLOOR PLAN
1:200

REVISIONS

| NO. | DATE: | REVISION | BY: |
|---|---|---|---|

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PROJECT TITLE
JASPER RECREATIONAL FACILITIES

DRAWING TITLE
ARENA FLOOR PLANS

| CHECKED | DRAWN | DATE |
|---|---|---|
| RC | MT | 2016-1-6 |

| FILE | DRAWING | REVISION |
|---|---|---|
| 15092 | A1.3 | 0 |

## 10.0 Drawings Referenced

Jasper Activity & Fitness, Centre construction set, 10.03.12 (All disciplines)

Jasper Aquatic Centre, issued for tender, 88.07.18 (structural only)

Jasper Arena Renovation, March 1995 (architectural plan only)

Jasper Arena (no date on drawings, architectural and structural information)

Gymnasium/Arena for Jasper School District, June ‘60 (structural and architectural)

Jasper Activity Centre, issued for tender, April 15, 75 (All disciplines)

# APPENDIX A.1
BP REVIEW

# Parks Canada, National Parks Building Permit & Application

**Jasper National Park, Box 10 Jasper, AB T0E 1E0, Tel: (403) 852-6162**

**Development Permit No:** JNP-09-51 **Date Plans Received:** _____

**Project Title:** Jasper Act. Ctr./Aquatic Ctr. Renos

Location (Park, Townsite, Access Road) JNP -

Block ___ Lot ___ Plan ___ Parcels C+R10

Zoning, Land use (both) if applicable): I

Renovation ✓ Construction ___ Relocation ___ Demolition ___ Other _____

Scope (height, type of construction): 11.5 m

Area: _____ Estimated Cost $ 4 M

Building Code Classification: _____

Starting Date: 29 MAR 2010 Completion: 29 MAR 2011

Leaseholder: Jasper Municipal Leasehold Assets Society

Box 520, Jasper | AB | T0E 1E0 | (780) 931-0015

Address: | Prov. | Postal Code | Phone:

Building Owner: - SAME -

Address: | Prov. | Postal Code | ( ) - Phone:

Architect: Toker + Associates

#1180-340 12th Ave SW, Cal, AB | T2R-1C5 | (403) 245-3039

Address: | Prov. | Postal Code | Phone:

Engineer: Williams

3015 5th Ave NE, Cal, AB | T2R-1H5 | ( ) - Phone:

Address: | Prov. | Postal Code

Contractor: DOMINION CONSTRUCTION

2ND FLOOR, 12604-126 ST EDMONTON | AB | T5L 0X6 | (780) 454-9444

Address: | Prov. | Postal Code | Phone:

Inspection Agency: SUPERIOR SAFETY CODES

14613-134 AVE EDMONTON | AB | T5L 4S9 | (780) 439-4777

Address: | Prov. | Postal Code | Phone:

I/We hereby make application for a Building Permit under the Provisions of National Park Building Regulations, Townsite Regulations, Fire Regulations, National Park Management Plans, local Guidelines, and Canadian Environmental Assessment Act that apply.

20 Jan 2010 _____

Date of application: Signature:

**Decision:** _____ APPROVED with specific conditions (see attachments)

_____ REFUSED

All construction must be in accordance with the above Regulations, Acts, Policies and Guidelines which include the National Building Code and where not part of the NBC, the Alberta Building Code. All contractors and trades persons must obtain separate permits. This permit is valid for a period of 12 months from the date of issue of the Park Superintendent.

Dated this ____ day of ____ 19__ _____

Superintendent

*This permit is authorized under National Parks and is therefore G.S.T. Exempt*

# Parks Canada, National Parks Development Permit & Application

**Jasper National Park,** Box 10 Jasper, AB T0E 1E0, Tel: (403) 852-6162

**Development Permit No.** JNP-09-51 **Notice of Decision**

**Project Title:** fitness centre + pool / Act. Ctr. renovations

Location (Park, Townsite, Access Road) JNP

Legal Description: Parcels CW + R10 Block ___, Lot ___, Plan ___

Zoning, Land use (both if applicable): I

**Leaseholder:** Jasper Municipal Leasehold Assets Society

Box 520, Jasper, AB, T0E 1E0, ___ ___ ( ) ___ - ___

Address: Prov. Postal Code Phone:

**Applicant:** C. Read

___ ___ ( ) ___ - ___

Address: Prov. Postal Code Phone:

Relationship to Leaseholder: project manager

**Decision:**

__ APPROVED (see conditions below)

__ APPROVED (with specific conditions; see below and attached)

__ REFUSED (see below appeal process)

Oct. 21/09 — Date of Decision

Oct 15/09 — Date of Issue of Notice of Decision

Signature for Park Superintendent

**DEVELOPMENT PERMIT**

This permit is issued subject to the following conditions:

a. That the development or construction on the said land(s) will not begin until 14 days after the Date of Issue of Notice of Decision and application and issuance of a building permit.

b. That the building permit application shall comply with the conditions of the decision herein contained or attached.

c. That the development or construction will be carried out in accordance with the approved plans and application.

d. That this permit shall be invalid should any appeal be made against the decision.

e. This permit is valid for a period of 6 months from the date of issue. If at the expiry of this period a building permit has not been applied for, then this permit shall be invalid.

You may wish to appeal the decision of the Development Officer. Such an appeal shall be made in writing and shall be delivered either in person or by mail so as to reach the Office of the Superintendent, Jasper National Park Box 10, Jasper, AB., T0E 1E0 NOT LATER THAN 14 DAYS AFTER THE DATE OF ISSUE OF NOTICE OF DECISION

Dated this 21 day of 10 1/05

Development Officer

notes

# MUNICIPALITY OF JASPER

## ORDER FORM

SUPPLIER MUST STATE THIS NUMBER ON INVOICES **Q2201**

Supplier's Name

Superior Safety Inc
14613 - 134 Avenue NW
Edmonton AB
T5L 4S9

Ship to: Jasper Aquatic Centre
Municipality of Jasper
401 Pyramid Lake Road, PO Box 1539
Jasper, AB T0E 1E0

Dept. **Aquatic Centre**

Date Jan 25 2010

**INSTRUCTIONS TO SUPPLIER**

Please quote Purchase Order number on all correspondence.
Cancel orders not deliverable within 90 days.
All orders over $2000 must have two signatures.

Submit TWO copies of invoice for payment to:
MUNICIPALITY OF JASPER
Box 520, Jasper, Alberta T0E 1E0

TO ANSWER QUESTIONS REGARDING THIS ORDER PLEASE CONTACT:
PHONE NUMBER: 780-852-6520
FAX NO.: 780-852-4479
EMAIL ADDRESS: aquatic@town.jasper.ab.ca

| QUANTITY | CAT. NO. | CODE | DESCRIPTION | PRICE | EXTENSION |
|---|---|---|---|---|---|
| 1 | | | RJP B 0001 10 ED - Building permit | | 350000 |
| | | | RJP B 0002 10 ED Building permit | | 350000 |
| | | | 6-72-08-00-201 | | |
| | | | | Total | 700000 |

Received 25 Jan/10 per.

Signature

Approved

Municipal Authorization (On orders over $2000)

WHITE-SUPPLIER GREEN-ACCTS. CLERK YELLOW-DEPT.
PINK-RETURN TO ACCTS. CLERK WHEN MERCHANDISE RECEIVED

PARKS CANADA

SUPERIOR SAFETY CODES INC.
PERMITS & INSPECTIONS

SUPERIOR SAFETY CODES INC.

LABEL #PJP B 0001 10 ED

**BUILDING INSPECTION SERVICE REQUEST**

**Application Date (M/D/Y):** 12/30/2009 **Development Permit Number:** _____

**INSPECTION FEES**

| | |
|---|---|
| Building discipline for residential | $4.00 per $1,000 value of construction |
| Building discipline for all other | $3.50 per $1,000 value of construction |
| Minimum fee in the building discipline | $100.00 |
| Fee for re-inspections (if required by Parks Canada) | |
| 0 - $ 100,000 value | $100.00 |
| $ 100,000 - $ 250,000 | $200.00 |
| $ 250,000 - $1,000,000 | $400.00 |
| $1,000,001 and over | $500.00 |

**Type:** ☐ Single Family ☒ Renovation ☐ Demolition ☐ Commercial ☐ Foundation ☐ Industrial
☐ Mobile ☐ Relocation ☐ Off Site Manufacturer ☐ Repair ☐ Occupancy
☐ Deck ☐ Garage ☐ Multifamily ☒ Other Institutional

Project Description: interior renovations to approximately 1000m2 of existing activity centre.

Construction Value as per Parks Canada approved building permit $ $1 Million

1. Name of Park Jasper Town site Jasper
2. Address/Access Road (if applicable) 401 Pyramid Lake Road R.P.#
3. Legal Description: Lot Number Block Number Plan Number
4. Leaseholder Name/Address: Municipality of Jasper (Jasper Municipal Assets Leasehold Society) Box 520 Jasper AB T0E 1E0
5. Building Owner/Address: As Above
6. Premises occupied by As Above

Applicant Name Municipality of Jasper (Jasper Municipal Assets Leasehold Society) Box 520 Jasper AB T0E 1E0
Contractor Name N/A - Owner Applying: contact Christopher Read, Project Manager
Address: Box 520 - 303 Pyramid Ave City Jasper Postal Code T0E 1E0
Phone Number 780-931-0015 Fax Number 780-852-4479 Signature

**Payment Method:**
☐ Visa ☐ MasterCard ☐ Cash ☐ Cheque ☐ Other

Card # / Cheque #:
Expiry Date:
Name of Cardholder:
Signature of Cardholder:
Construction Value 1,000,000
Fee $ 3500.00 Invoice 10004

**AUTHORIZATION**

Issuing Officer Eugene deLoon
Date Issued JAN 19/2010

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Calgary | 25, 2015 – 32 Avenue NE | T2E 6Z3 | Ph: 403.717.2344 | Toll Free Ph: 1.888.717.2344 | Fax: 403.717.2340 | Toll Free Fax: 1.888.717.2340 |
| Edmonton | 14613 – 134 Avenue | T5L 4S9 | Ph: 780.489.4777 | Toll Free Ph: 1.866.999.4777 | Fax: 780.489.4711 | Toll Free Fax: 1.866.900.4711 |
| Fort McMurray | 165, 101 Signal Road | T9H 4N6 | Ph: 780.715.7726 | Toll Free Ph: 1.877.715.7726 | Fax: 780.715.7731 | Toll Free Fax: 1.877.815.7731 |
| Grande Prairie | 1st Floor 10525 – 100 Avenue | T8V 0V8 | Ph: 780.882.8777 | Toll Free Ph: 1.877.882.8777 | Fax: 780.882.7677 | Toll Free Fax: 1.877.882.8775 |
| Lloydminster | Bay 1, 2914 – 50 Avenue | T9V 2S5 | Ph: 780.870.9020 | | Fax: 780.870.9036 | |
| Red Deer | 3, 6264 – 67A Street | T4P 3E8 | Ph: 403.358.5545 | Toll Free Ph: 1.888.358.5545 | Fax: 403.358.5085 | Toll Free Fax: 1.866.358.5085 |

SUPERIOR
SAFETY CODES INC.

14613-134 Avenue
Edmonton, AB T5L 4S9
Ph: (780) 489-4777 Fax: (780) 489-4711
Toll Free Ph: 1-866-999-4777
Toll Free Fax: 1-866-900-4711

# PLANS REVIEW REPORT

Date: January 21, 2010

Project File No. PJP 0001 10 ED

Applicant: Municipality of Jasper (Jasper Municipal Assets Leasehold Society)
Box 520 Jasper, Alberta T0E 1E0
Contractor: Same (Contact: Christopher Read, Project Manager)
Owner: Same

Project Location:
Civic Address: 401 Pyramid Lake Road
Municipality: Jasper, Alberta

**RE: New Fitness Centre**

The drawings have been reviewed for compliance with the Alberta Building Code 2006.

**General Conditions:**
- All zoning and development requirements are to be satisfied.
- All work and materials shall comply with the Alberta Building Code 2006.
- All requirements of Plumbing, Gas, Electrical, and Fire Codes are to be satisfied.
- A set drawings and a copy of plans review report must be available at the jobsite.

**New Fitness Centre / Existing Aquatic Centre**
Building Classification: A2/A3 (A2 Governs) Article 3.2.2.26.
Building Area: 2308 m² Total (approximate)
Building Height: 1 storey
Building Facing: 1 street
Construction: Combustible or noncombustible or combination
Fire4 protection: Sprinkler and fire alarm system

**Comments:**
**2.4.3.1. Schedules**
Before beginning of construction, the consultants shall submit to the authority having jurisdiction letters in the forms set out in Schedules A-1, A-2, B-1 and B-2.

**2.4.3.2. Authority having Jurisdiction**
Upon completion, before issuing an occupancy permit, the authority having jurisdiction shall received Schedules C-1/C-2 from the coordinating register professional/registered professional of record assuring that the building to be occupied complies with the code.

**2.2.13.1. Safety During Construction**
Where a building is undergoing construction, alteration or demolition, measures shall be taken at the building construction site in conformance with Part 8 of Division B of the Alberta Building Code, and the Alberta Fire Code.

**2.6.6.3. Fabrication and Erection of Steel**
All fabricators and erectors of welded construction for buildings constructed under Part 4, are certified by the Canadian Welding Bureau. (Submit CWB Certificate)

**3.2.4.5. Installation and Testing of Fire Alarm Systems**
Fire alarm and voice communication systems shall be installed in conformance with CAN/ULC-S524-M, "Standard for the Installation of Fire Alarm Systems," and shall be tested in conformance with CAN/ULC-S537-M, "Standard for the Verification of Fire Alarm Systems," to ensure satisfactory operation.

**3.2.5.13.Automatic Sprinkler Systems**
Automatic sprinkler system shall be designed, constructed, installed and tested in conformance with NFPA 13, "Standard for the Installation of Sprinkler Systems."

Under this classification 3.2.2.26., the new fitness centre must be sprinklered. The existing aquatic centre is excempt from this requirements as per Article 3.2.1.7.

**3.2.5.16. Fire Department Connections**
The fire department connection for a standpipe system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed. The fire department connection for an automatic sprinkler system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.**and** shall be located no closer than 3 m and no further than 15 m from the principal entrance to the building.

**3.1.9.1. Fire Stopping of Service Penetrations**
1) Piping, tubing, ducts, chimneys, optical fibre cables, electrical wires and cables, totally enclosed noncombustible raceways, electrical outlet boxes and other similar building services that penetrate a membrane forming part of an assembly required to have a fire-resistance rating, or a fire separation, shall be

a) tightly fitted, or
b) sealed by a fire stop system that, when subjected to the fire test method in CAN4-S115-M, "Standard Method of Fire Tests of Firestop Systems," has an F rating not less than the fire-protection rating required for closures in the fire separation

**3.3.1.25. Storage Rooms**
A storage room more than 1 m2 in area serving a care or detention occupancy or an assembly occupancy, shall be separated from the remainder of the building by a fire separation having a fire-resistance rating not less than 1 h, except that the fire-resistance rating may be reduced to 45 min if the fire-resistance rating of the floor assembly is permitted to be less than 1 h.

**2.4.4.1. Responsibility for Compliance**
Neither the issuance of a permit, nor inspections made by the authority having jurisdiction, shall in any way relieve the owner (or the owners representative) of a building from full responsibility for carrying out the construction in accordance with the requirements of the Safety Codes Act.

**Inspection required:**

a) Framing/Insulation/vapour barrier/HVAC/fire protection prior to drywall.
b) Final prior to occupancy.

Should any assistance with these items be required, please call our office at 780.489.4777.

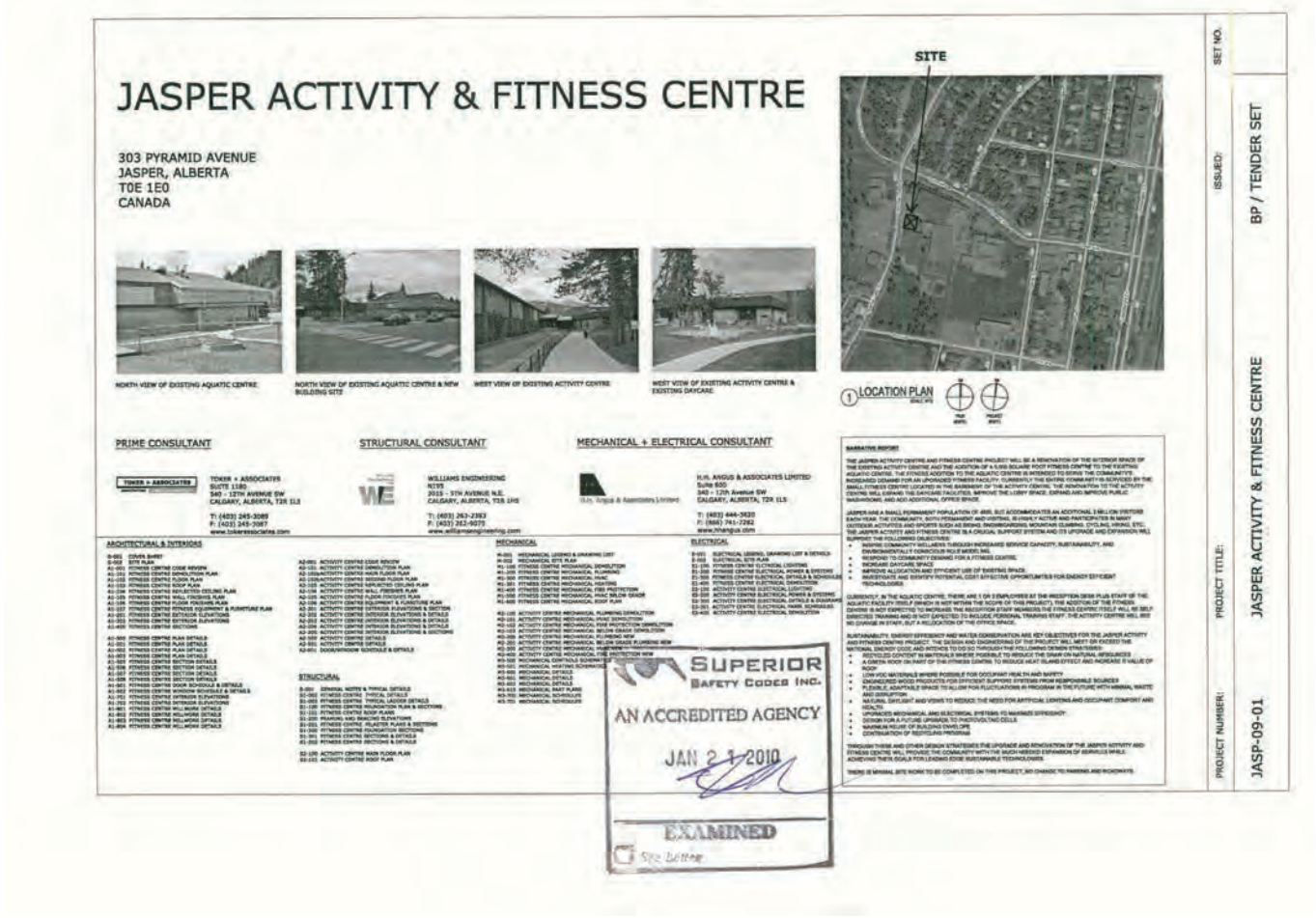
Yours truly,

Eugene de Leon
Building Safety Codes Officer

# APPENDIX A.2

## DRAWINGS (PLANS)

THIS REPRESENTS A PORTION OF THE DRAWINGS PROVIDED TO THE TEAM FROM THE CLIENT



# JASPER ACTIVITY & FITNESS CENTRE

303 PYRAMID AVENUE
JASPER, ALBERTA
T0E 1E0
CANADA

SITE

NORTH VIEW OF EXISTING AQUATIC CENTRE

NORTH VIEW OF EXISTING AQUATIC CENTRE & NEW BUILDING SITE

WEST VIEW OF EXISTING ACTIVITY CENTRE

WEST VIEW OF EXISTING ACTIVITY CENTRE & EXISTING DAYCARE

1 LOCATION PLAN

PRIME CONSULTANT

TOKER + ASSOCIATES
SUITE 1180
540 - 12TH AVENUE SW
CALGARY, ALBERTA, T2R 1L3

T: (403) 245-3089
F: (403) 245-3087
www.tokerassociates.com

STRUCTURAL CONSULTANT

WILLIAMS ENGINEERING
#235
2015 - 5TH AVENUE N.E.
CALGARY, ALBERTA, T2E 1H5

T: (403) 262-2393
F: (403) 262-9075
www.williamsengineering.com

MECHANICAL + ELECTRICAL CONSULTANT

H.H. ANGUS & ASSOCIATES LIMITED
Suite 600
340 - 12th Avenue SW
CALGARY, ALBERTA, T2R 1L5

T: (403) 444-3820
F: (866) 741-7262
www.hhangus.com

ARCHITECTURAL & INTERIORS

MECHANICAL

ELECTRICAL

STRUCTURAL

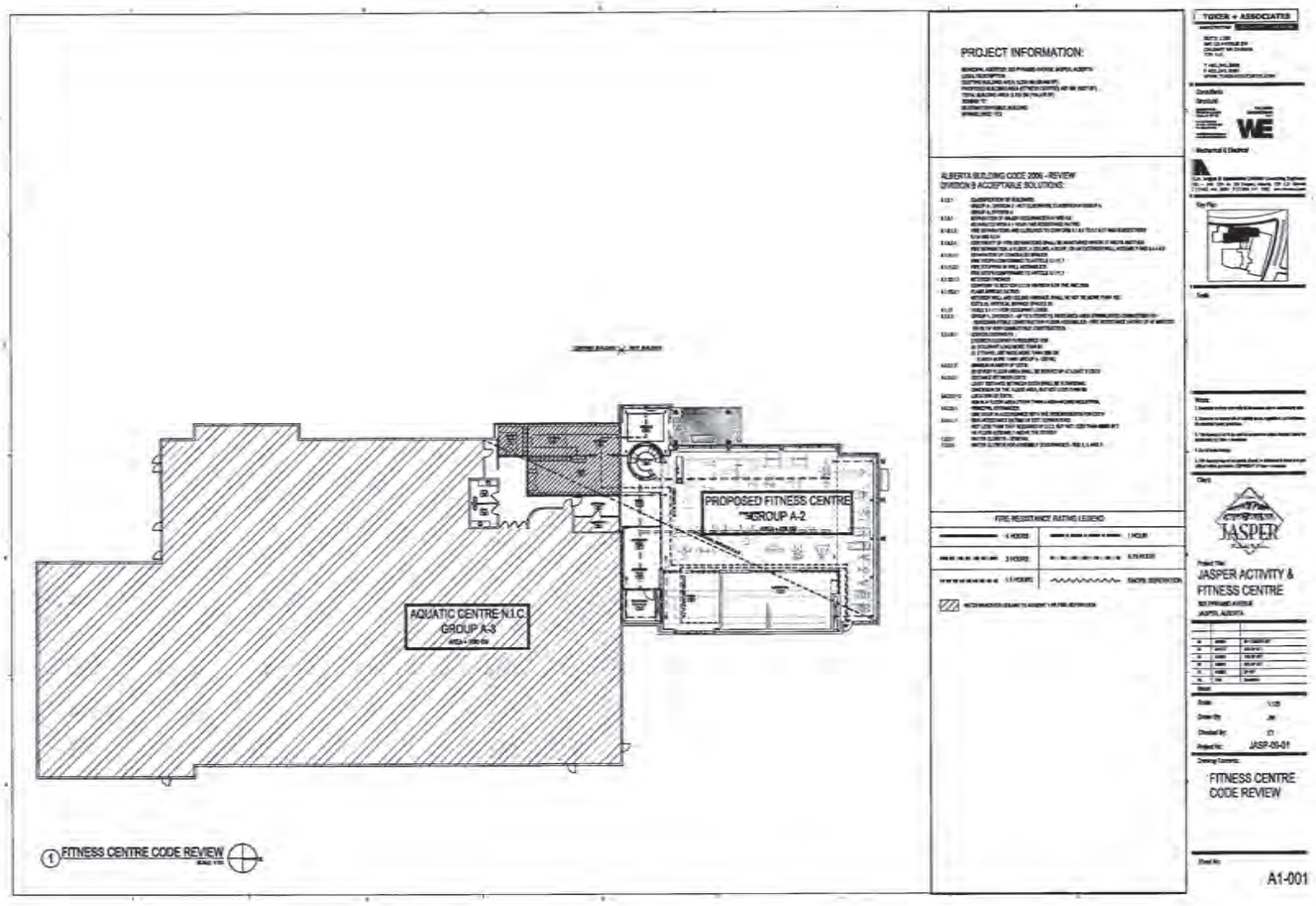
SUPERIOR SAFETY CODES INC.
AN ACCREDITED AGENCY
JAN 21 2010
EXAMINED

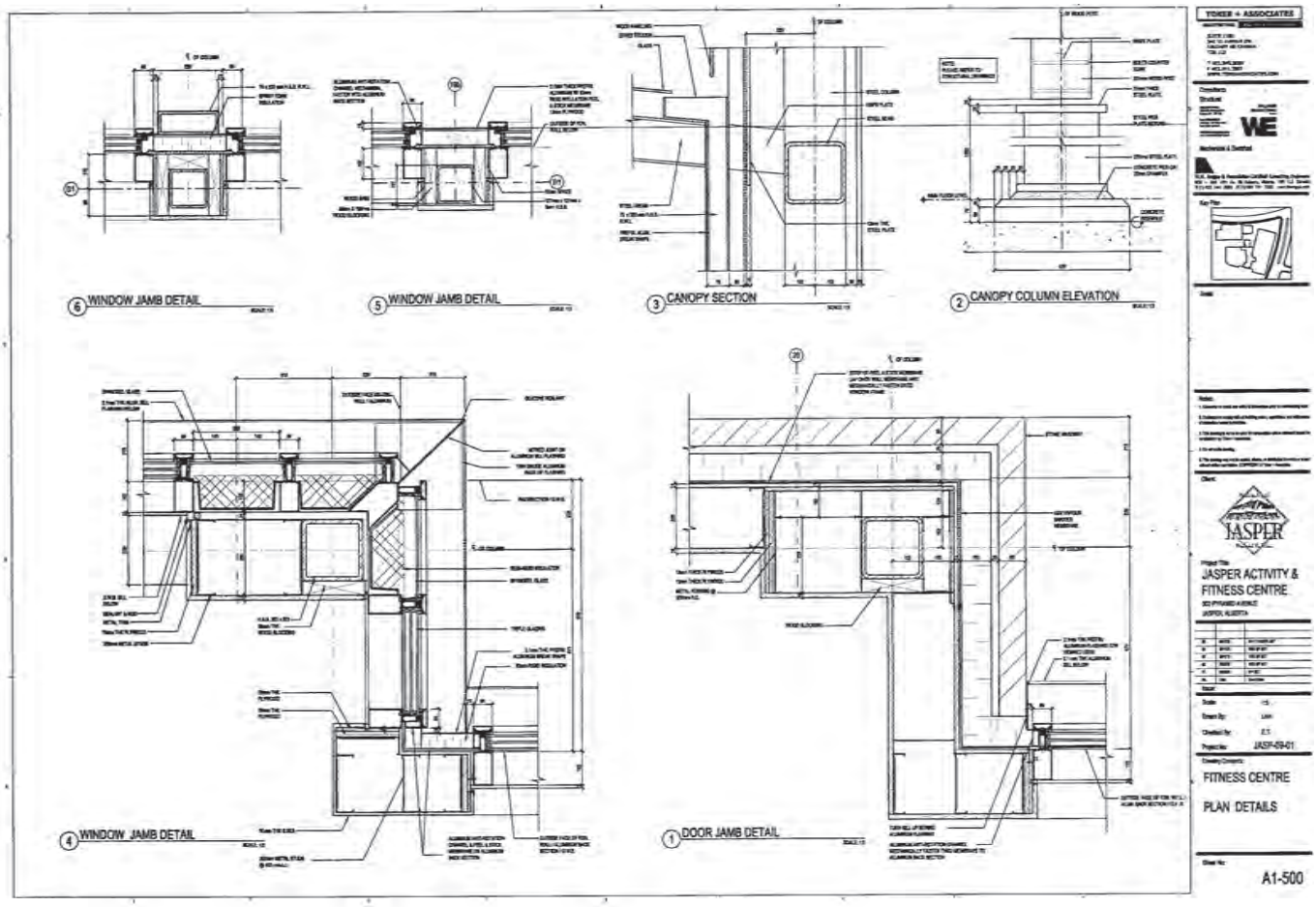
SET NO.

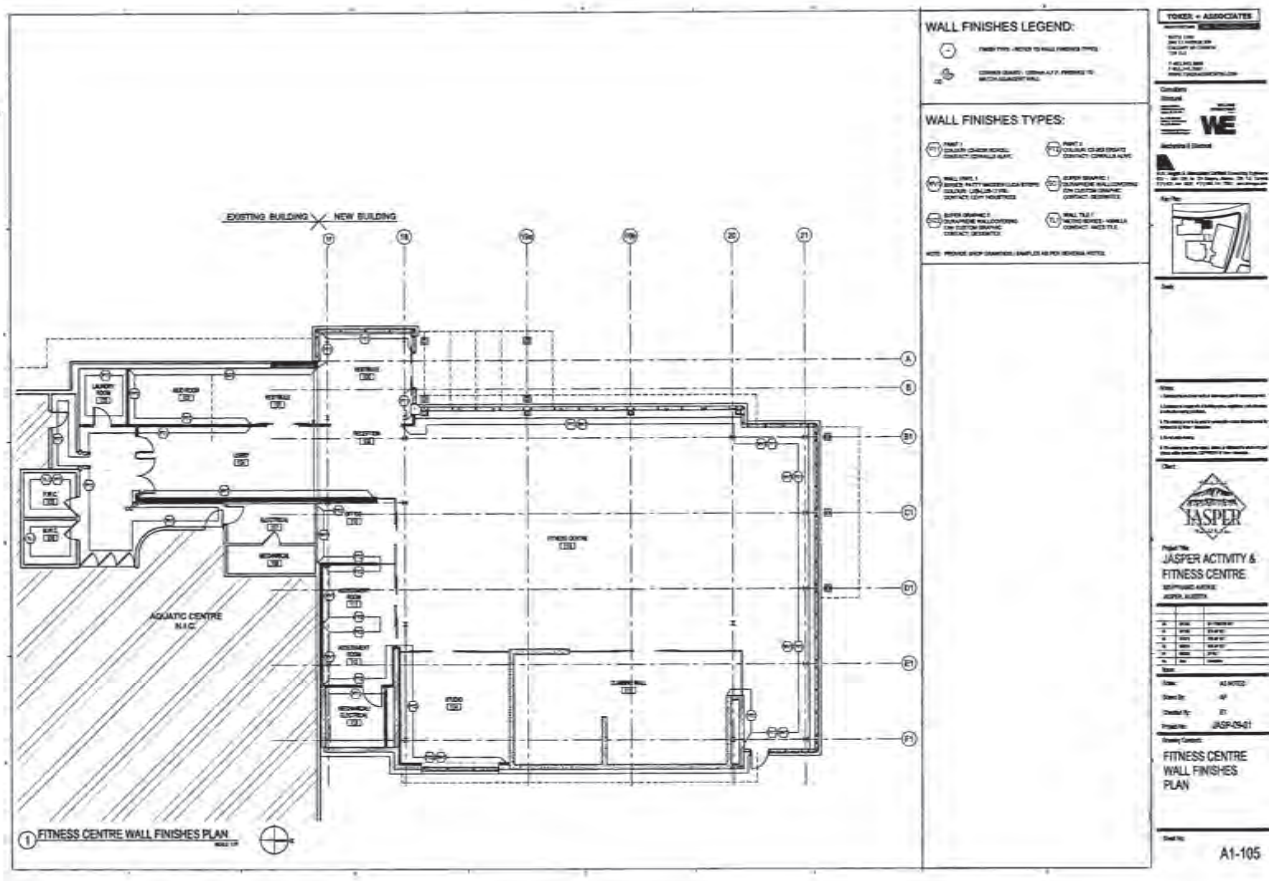
ISSUED: BP / TENDER SET

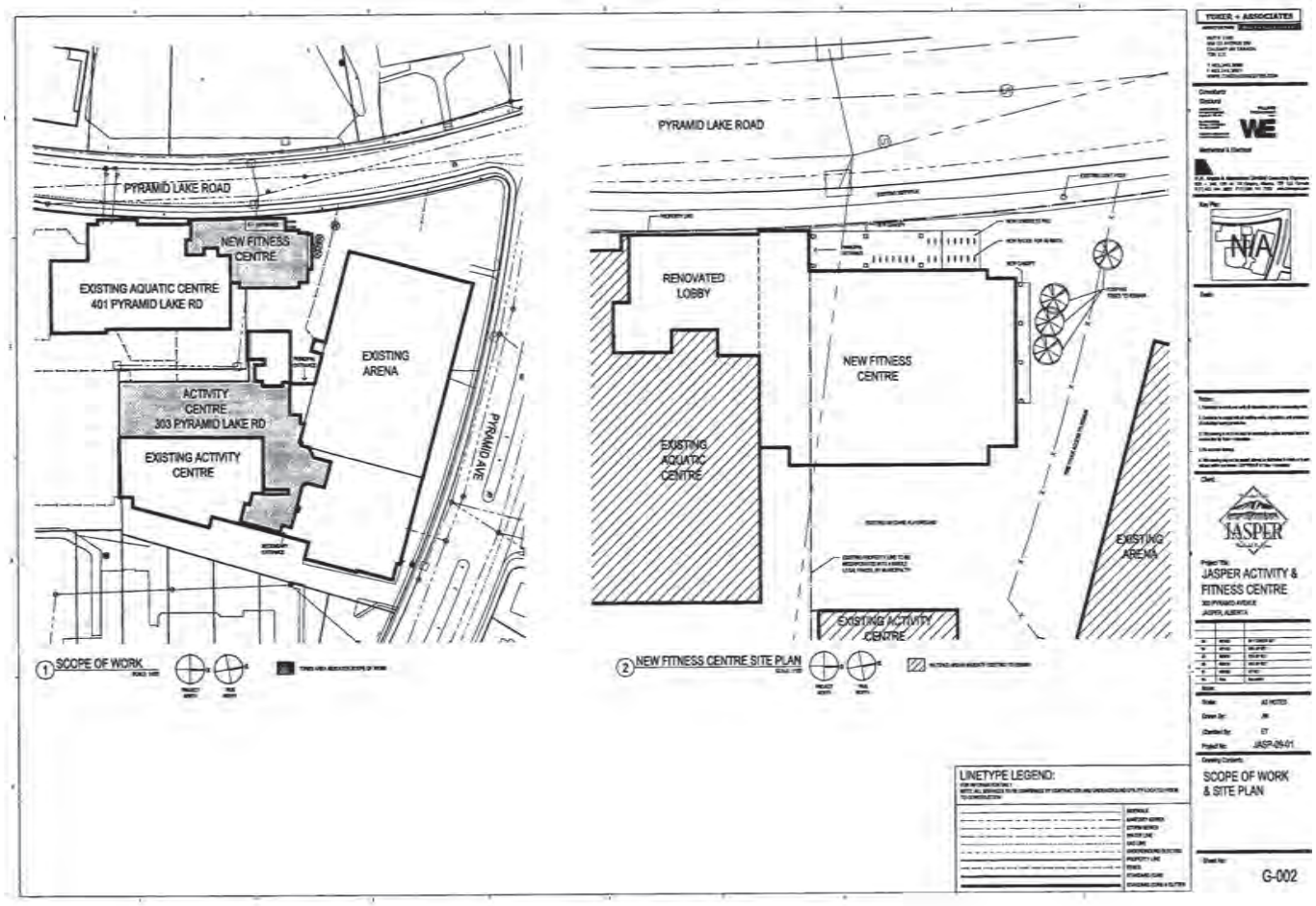
PROJECT TITLE: JASPER ACTIVITY & FITNESS CENTRE

PROJECT NUMBER: JASP-09-01

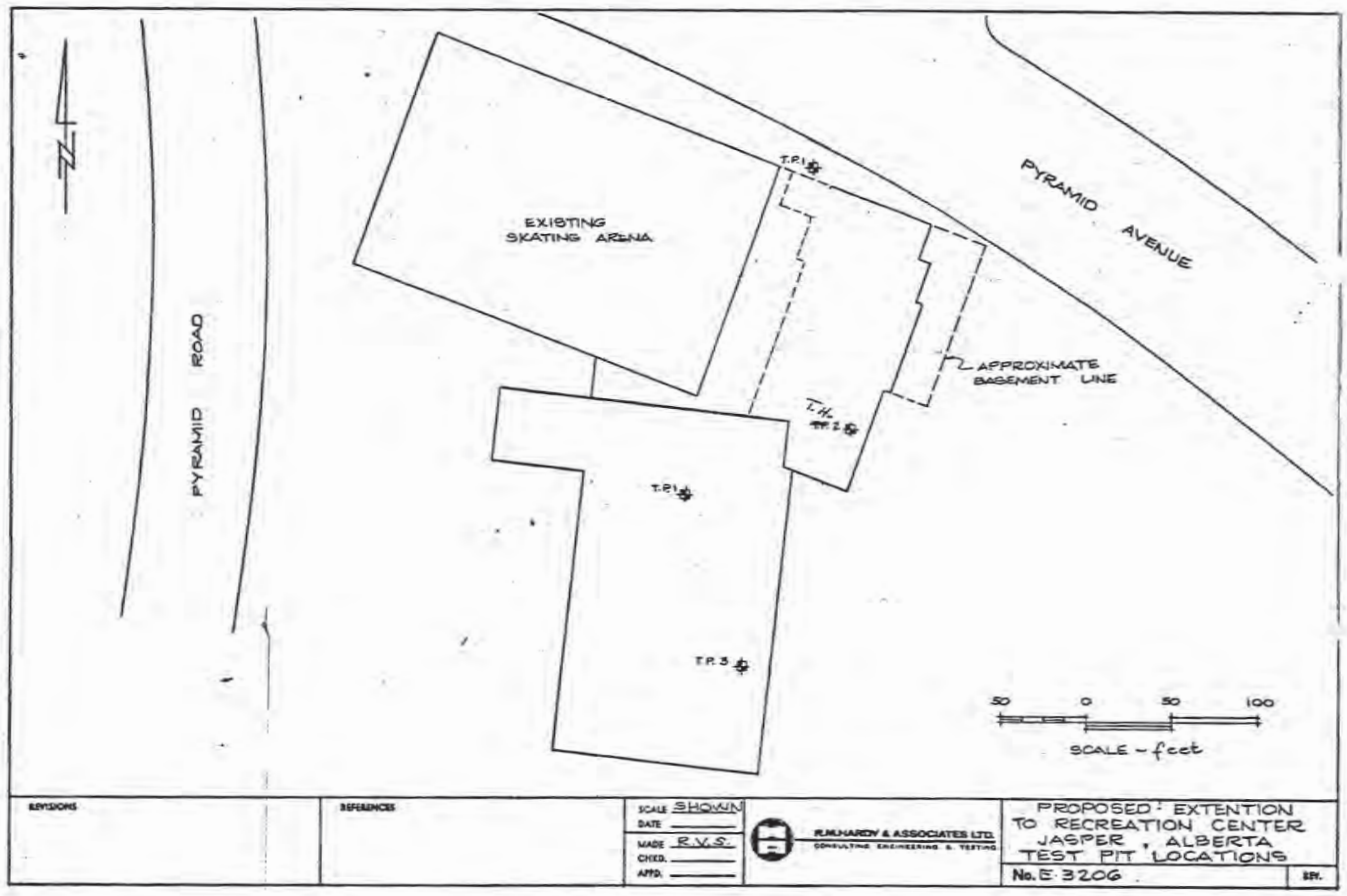

PROJECT INFORMATION:
ALBERTA BUILDING CODE 2006 - REVIEW
DIVISION B ACCEPTABLE SOLUTIONS:
FIRE RESISTANCE RATING LEGEND
PROPOSED FITNESS CENTRE
GROUP A-2
AQUATIC CENTRE N.I.C.
GROUP A-3
1 FITNESS CENTRE CODE REVIEW
TOKER + ASSOCIATES
JASPER
JASPER ACTIVITY & FITNESS CENTRE
FITNESS CENTRE CODE REVIEW
A1-001

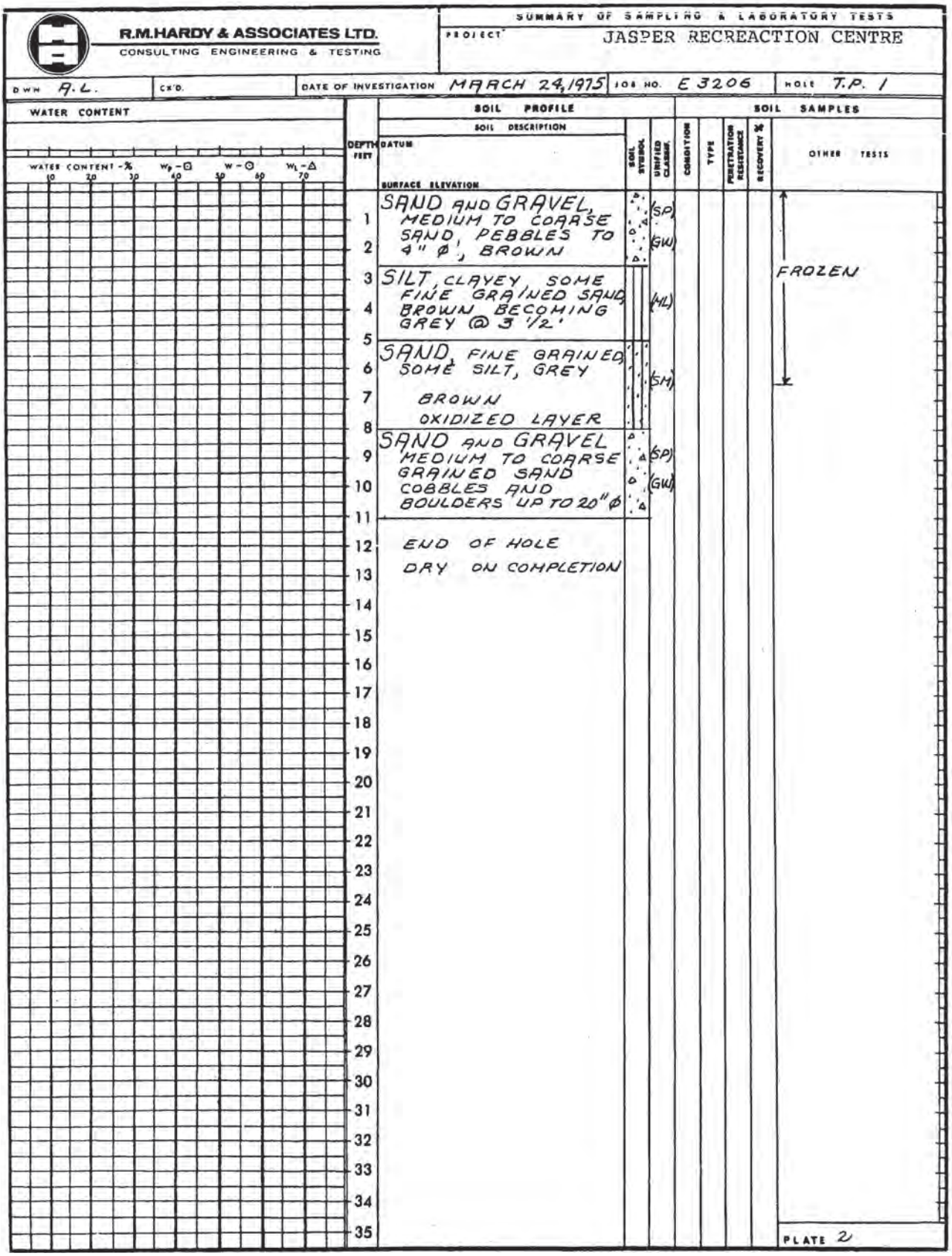

6 WINDOW JAMB DETAIL
5 WINDOW JAMB DETAIL
3 CANOPY SECTION
2 CANOPY COLUMN ELEVATION
4 WINDOW JAMB DETAIL
1 DOOR JAMB DETAIL
TOKER + ASSOCIATES
JASPER ACTIVITY & FITNESS CENTRE
FITNESS CENTRE
PLAN DETAILS
A1-500

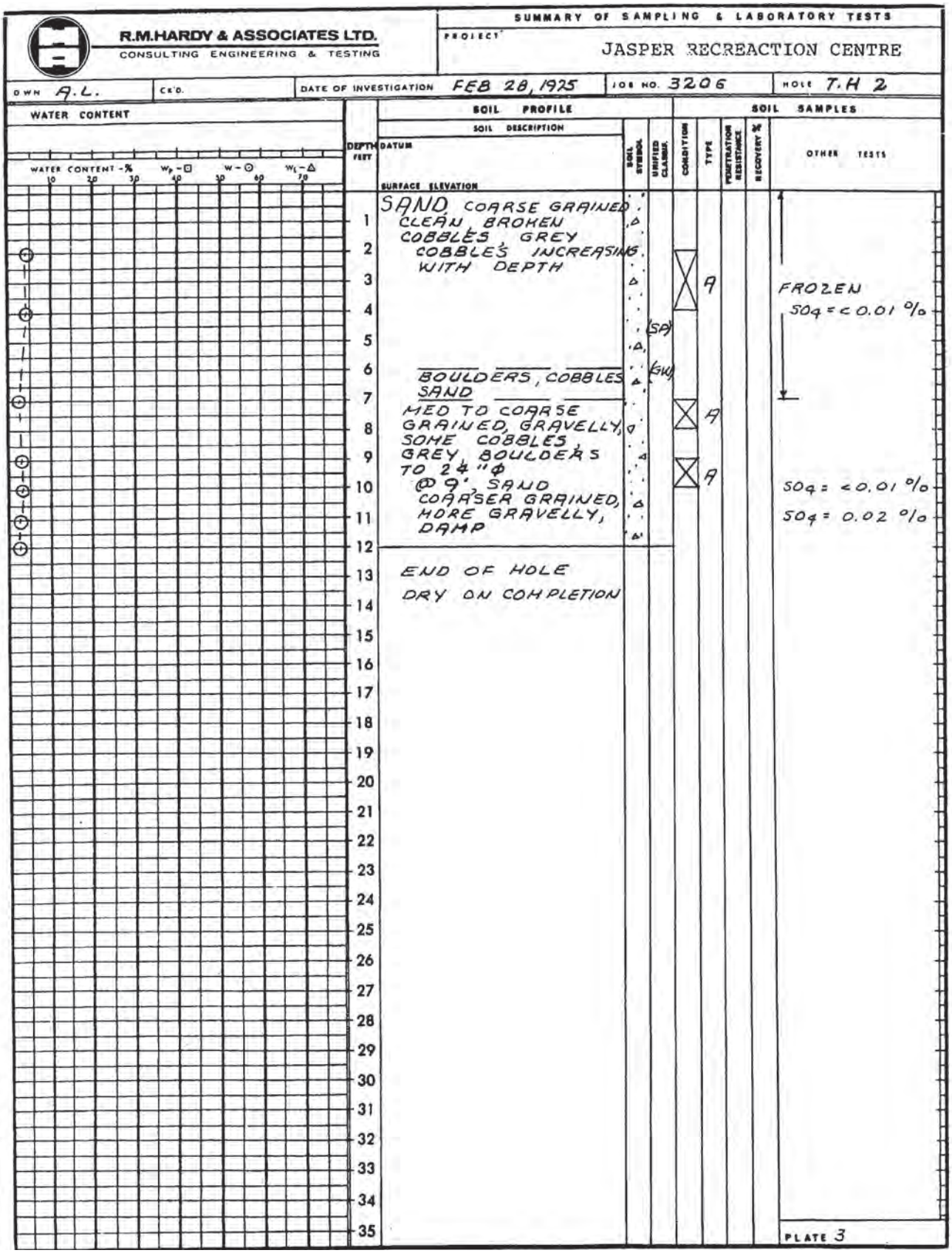

WALL FINISHES LEGEND:
WALL FINISHES TYPES:
EXISTING BUILDING
NEW BUILDING
AQUATIC CENTRE
N.I.C.
1 FITNESS CENTRE WALL FINISHES PLAN
TOKER + ASSOCIATES
JASPER ACTIVITY & FITNESS CENTRE
FITNESS CENTRE WALL FINISHES PLAN
A1-105

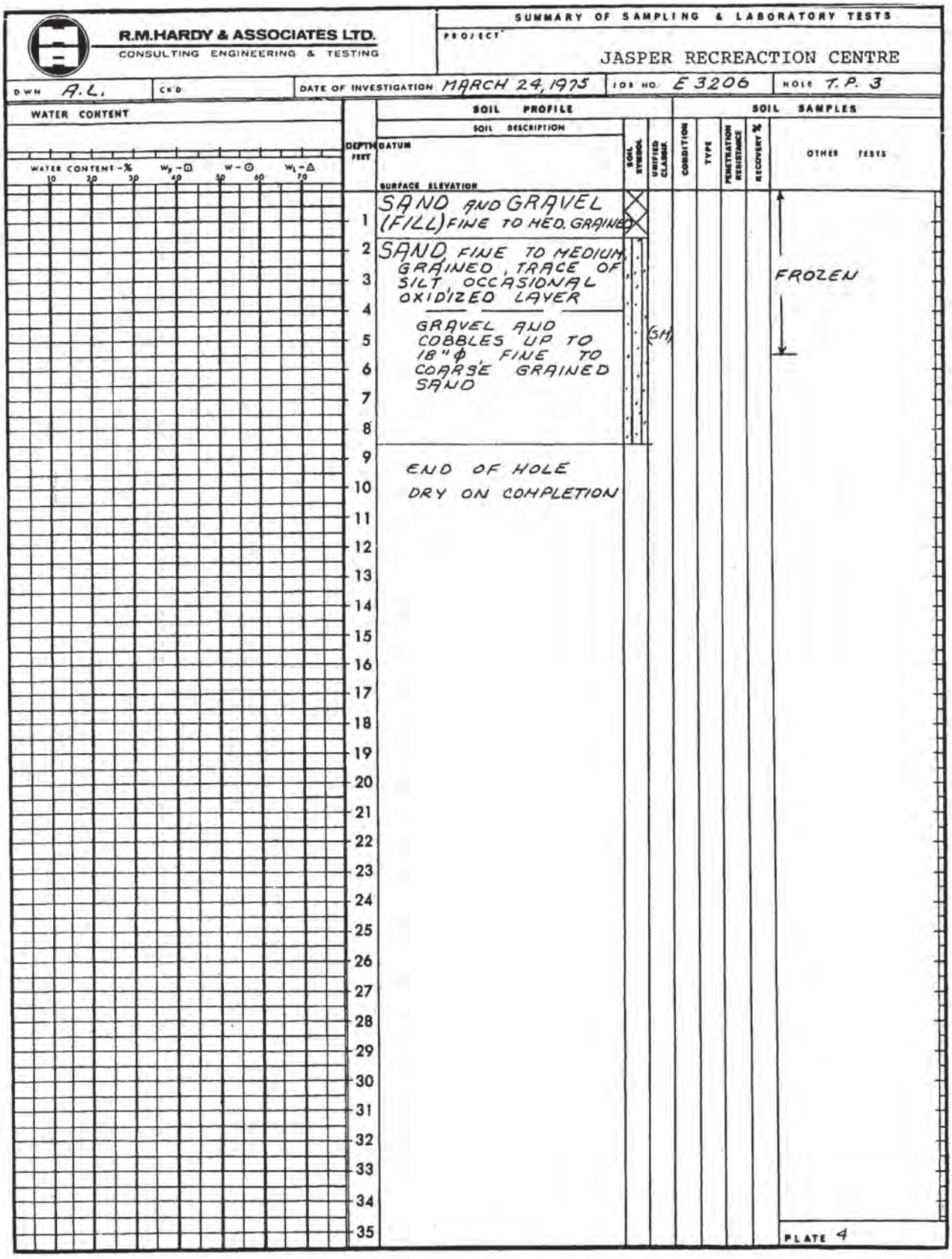

PYRAMID LAKE ROAD
NEW FITNESS CENTRE
EXISTING AQUATIC CENTRE
401 PYRAMID LAKE RD
EXISTING ARENA
ACTIVITY CENTRE
303 PYRAMID LAKE RD
EXISTING ACTIVITY CENTRE
PYRAMID AVE
1 SCOPE OF WORK
PYRAMID LAKE ROAD
RENOVATED LOBBY
NEW FITNESS CENTRE
EXISTING AQUATIC CENTRE
EXISTING ARENA
EXISTING ACTIVITY CENTRE
2 NEW FITNESS CENTRE SITE PLAN
LINETYPE LEGEND:
TOKER + ASSOCIATES
WE
NIA
JASPER
JASPER ACTIVITY & FITNESS CENTRE
JASP-05-01
SCOPE OF WORK & SITE PLAN
G-002

# APPENDIX A.3
TEST PIT LOGS


EXISTING
SKATING ARENA
T.P.1
PYRAMID AVENUE
APPROXIMATE
BASEMENT LINE
T.H.
T.P.2
T.P.1
T.P.3
PYRAMID ROAD
50 0 50 100
SCALE - feet
REVISIONS
REFERENCES
SCALE SHOWN
DATE
MADE R.V.S.
CHKD.
APPD.
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING
PROPOSED EXTENTION
TO RECREATION CENTER
JASPER, ALBERTA
TEST PIT LOCATIONS
No. E 3206
DRY.


R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING
SUMMARY OF SAMPLING & LABORATORY TESTS
PROJECT JASPER RECREACTION CENTRE
DWN A.L.
CK'D.
DATE OF INVESTIGATION MARCH 24, 1975
JOB NO. E 3206
HOLE T.P. 1
WATER CONTENT
WATER CONTENT - % Wp - W - WL -
10 20 30 40 50 60 70
DEPTH FEET
SOIL PROFILE
SOIL DESCRIPTION
DATUM
SURFACE ELEVATION
SOIL SYMBOL
UNIFIED CLASSIF.
SOIL SAMPLES
CONSISTENCY
TYPE
PENETRATION RESISTANCE
RECOVERY %
OTHER TESTS
SAND AND GRAVEL, MEDIUM TO COARSE SAND, PEBBLES TO 4" Ø, BROWN (SP) (GW)
SILT, CLAYEY, SOME FINE GRAINED SAND, BROWN BECOMING GREY @ 3 1/2' (ML)
SAND, FINE GRAINED, SOME SILT, GREY (SM)
BROWN OXIDIZED LAYER
SAND AND GRAVEL MEDIUM TO COARSE GRAINED SAND COBBLES AND BOULDERS UP TO 20" Ø (SP) (GW)
END OF HOLE
DRY ON COMPLETION
FROZEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
PLATE 2


R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING
SUMMARY OF SAMPLING & LABORATORY TESTS
PROJECT
JASPER RECREACTION CENTRE
DWN A.L.
CK'D.
DATE OF INVESTIGATION FEB 28, 1975
JOB NO. 3206
HOLE T.H 2
WATER CONTENT
WATER CONTENT - %
10 20 30 40 50 60 70
DEPTH FEET
SOIL PROFILE
SOIL DESCRIPTION
DATUM
SURFACE ELEVATION
SOIL SYMBOL
UNIFIED CLASSIF.
SOIL SAMPLES
CONDITION
TYPE
PENETRATION RESISTANCE
RECOVERY %
OTHER TESTS
SAND COARSE GRAINED, CLEAN, BROKEN COBBLES GREY
COBBLES INCREASING WITH DEPTH
(SP)
BOULDERS, COBBLES
SAND
(GW)
MED TO COARSE GRAINED, GRAVELLY, SOME COBBLES, GREY, BOULDERS TO 24" Φ
@ 9', SAND COARSER GRAINED, MORE GRAVELLY, DAMP
END OF HOLE
DRY ON COMPLETION
A
A
A
FROZEN
SO4 = < 0.01 %
SO4 = < 0.01 %
SO4 = 0.02 %
PLATE 3



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

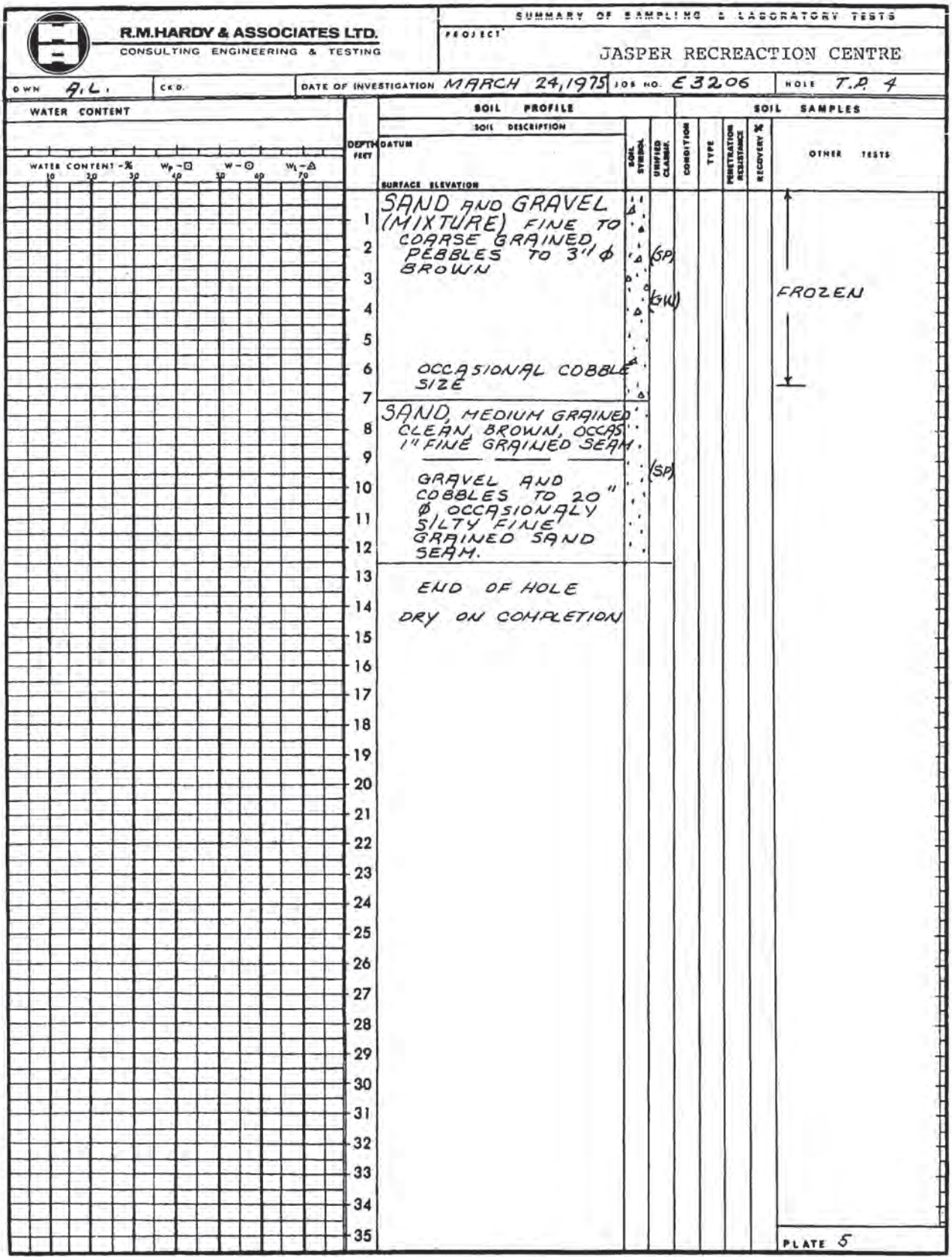
PROJECT: JASPER RECREACTION CENTRE

DWN: A.L. | CK'D: | DATE OF INVESTIGATION: MARCH 24, 1975 | JOB NO.: E 3206 | HOLE: T.P. 3

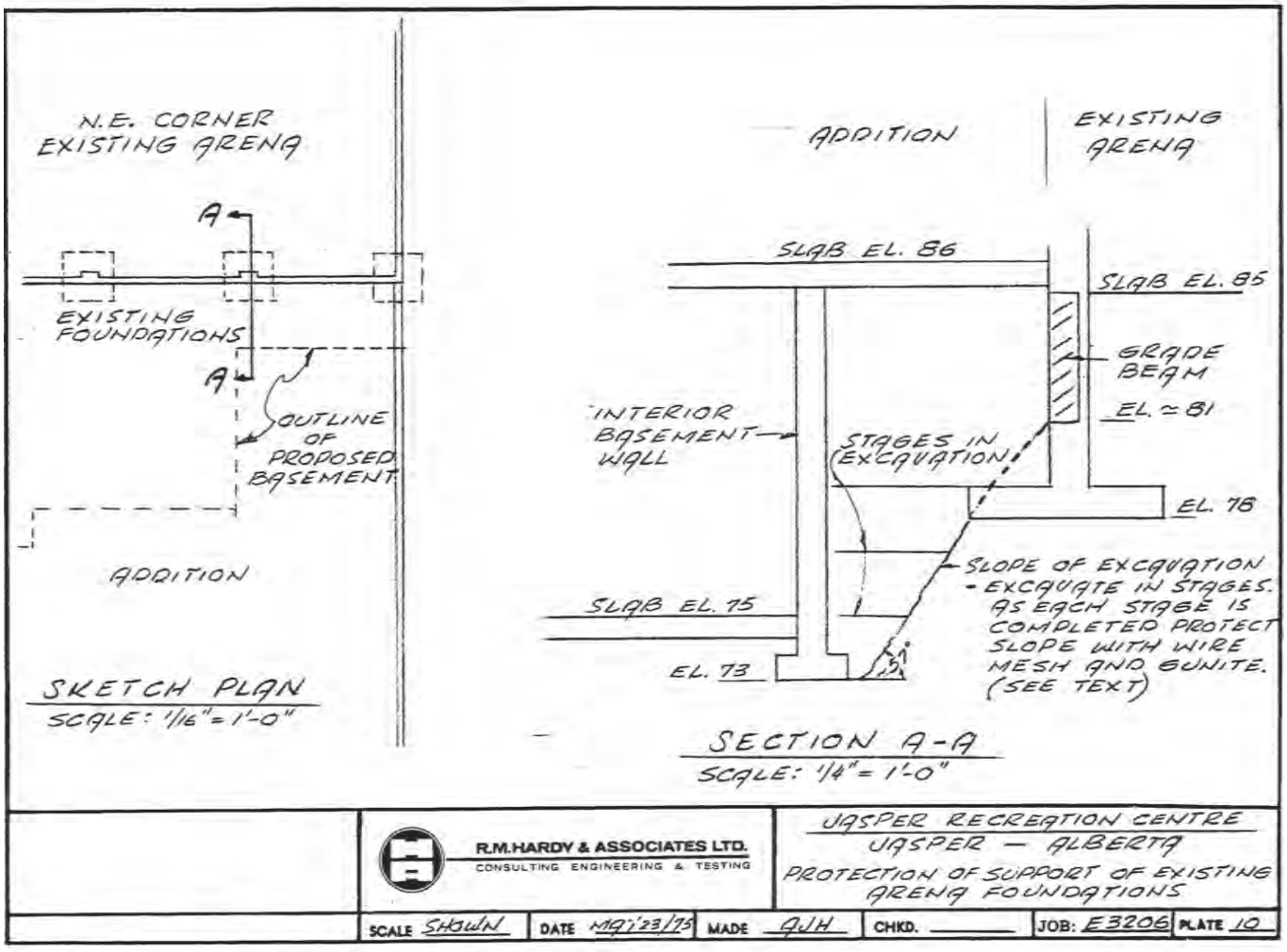
WATER CONTENT — WATER CONTENT - % (10, 20, 30, 40, 50, 60, 70); $W_p$ - □, W - ⊙, $W_L$ - △

| DEPTH FEET | SOIL PROFILE — SOIL DESCRIPTION (DATUM / SURFACE ELEVATION) | SOIL SYMBOL | UNIFIED CLASSIF. | SOIL SAMPLES — CONDITION | TYPE | PENETRATION RESISTANCE | RECOVERY % | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 1 | SAND AND GRAVEL (FILL) FINE TO MED. GRAINED | | | | | | | FROZEN |
| 2 | SAND FINE TO MEDIUM GRAINED, TRACE OF SILT, OCCASIONAL OXIDIZED LAYER | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | GRAVEL AND COBBLES UP TO 18" ϕ FINE TO COARSE GRAINED SAND | | (SH) | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | END OF HOLE | | | | | | | |
| 10 | DRY ON COMPLETION | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |

PLATE 4


R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING
SUMMARY OF SAMPLING & LABORATORY TESTS
PROJECT
JASPER RECREACTION CENTRE
DWN G.L.
CK'D.
DATE OF INVESTIGATION MARCH 24,1975
JOB NO. E3206
HOLE T.P. 4
WATER CONTENT
WATER CONTENT - %
10 20 30 40 50 60 70
DEPTH FEET
SOIL PROFILE
SOIL DESCRIPTION
DATUM
SURFACE ELEVATION
SOIL SYMBOL
UNIFIED CLASSIF.
SOIL SAMPLES
CONDITION
TYPE
PENETRATION RESISTANCE
RECOVERY %
OTHER TESTS
SAND AND GRAVEL (MIXTURE) FINE TO COARSE GRAINED, PEBBLES TO 3" ϕ BROWN
(SP)
(GW)
FROZEN
OCCASIONAL COBBLE SIZE
SAND, MEDIUM GRAINED CLEAN, BROWN, OCCAS 1" FINE GRAINED SEAM.
(SP)
GRAVEL AND COBBLES TO 20" ϕ, OCCASIONALY SILTY FINE GRAINED SAND SEAM.
END OF HOLE
DRY ON COMPLETION
PLATE 5

# APPENDIX A.4
FOUNDATION SUPPORT


N.E. CORNER
EXISTING ARENA
A
A
EXISTING
FOUNDATIONS
OUTLINE
OF
PROPOSED
BASEMENT
ADDITION
SKETCH PLAN
SCALE: 1/16" = 1'-0"
ADDITION
EXISTING
ARENA
SLAB EL. 86
SLAB EL. 85
GRADE
BEAM
EL. ≃ 81
INTERIOR
BASEMENT
WALL
STAGES IN
EXCAVATION
EL. 78
SLOPE OF EXCAVATION
- EXCAVATE IN STAGES.
AS EACH STAGE IS
COMPLETED PROTECT
SLOPE WITH WIRE
MESH AND GUNITE.
(SEE TEXT)
SLAB EL. 75
EL. 73
SECTION A-A
SCALE: 1/4" = 1'-0"
R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING
JASPER RECREATION CENTRE
JASPER — ALBERTA
PROTECTION OF SUPPORT OF EXISTING
ARENA FOUNDATIONS
SCALE SHOWN
DATE MAY 23/75
MADE GJH
CHKD.
JOB: E3206
PLATE 10

# APPENDIX A.5
## CONSTRUCTION RECOMMENDATIONS

## RECOMMENDED CONSTRUCTION PROCEDURES

The following construction procedures are recommended to ensure the satisfactory performance of the structures. The recommendations are to be read in conjunction with the text of the report.

### EXCAVATED FOUNDATIONS

Excavation close to foundation level should be done carefully to avoid disturbance of the soil. It is essential to prevent the soil at foundation level from deterioration due to excessive drying or becoming wet from surface or seepage water. Good drainage both during and after construction is essential.

Sumps if required should be located well away from the foundation area. Softened or overdried soil must be removed and replaced by lean mix concrete or by extending the foundations.

The foundation must be kept from freezing both during and after construction. Unless permitted by the engineer the foundation concrete should not be placed on or against frozen soil.

### PROOF ROLLING

Proof rolling is a method of detecting soft areas in a subgrade for fill, pavement, floor or foundations. The

intent is to detect softened areas not revealed by the test holes or visual examination of the site surface, and is used where normal scarification and compaction procedures would not be successful in detecting and eliminating soft areas. It is usually accomplished with the use of heavy (15 - 25 ton) compaction equipment with high contact wheel pressures on independent axles, although heavily loaded single axle trucks will provide the equivalent result.

The procedure requires two complete passes with the compaction equipment in one direction and then a second series of two passes made at right angles to the first series.

While the passes are being made, any softened, rutted or displaced areas detected should be examined and either recompacted with additional fill or the existing material removed and replaced with better quality material.

BACKFILLING

Backfill around foundations should be placed in such a manner so as to prevent settlement and to be relatively impervious near the surface so that water does not pond against foundations nor be allowed to seep into the soil.

Backfill should not be placed until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction.

All backfill around grade beams, foundation walls,

etc. must be carefully and uniformly compacted. The back-fill should be placed in even layers and no frozen nor organic material should be incorporated into the fill. All lumps of material must be broken down or squeezed together during placing and compaction.

The final grade (allowing for some settlement of the backfill) should shed water away from the structure.

During construction, precautions should be taken to prevent water ponding in grade beam excavations thereby acting as a source of water to soften the soil under the floor slab area or providing a source of water for frost action if the building is not heated during freezing weather.

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