"Helping Build Communities"

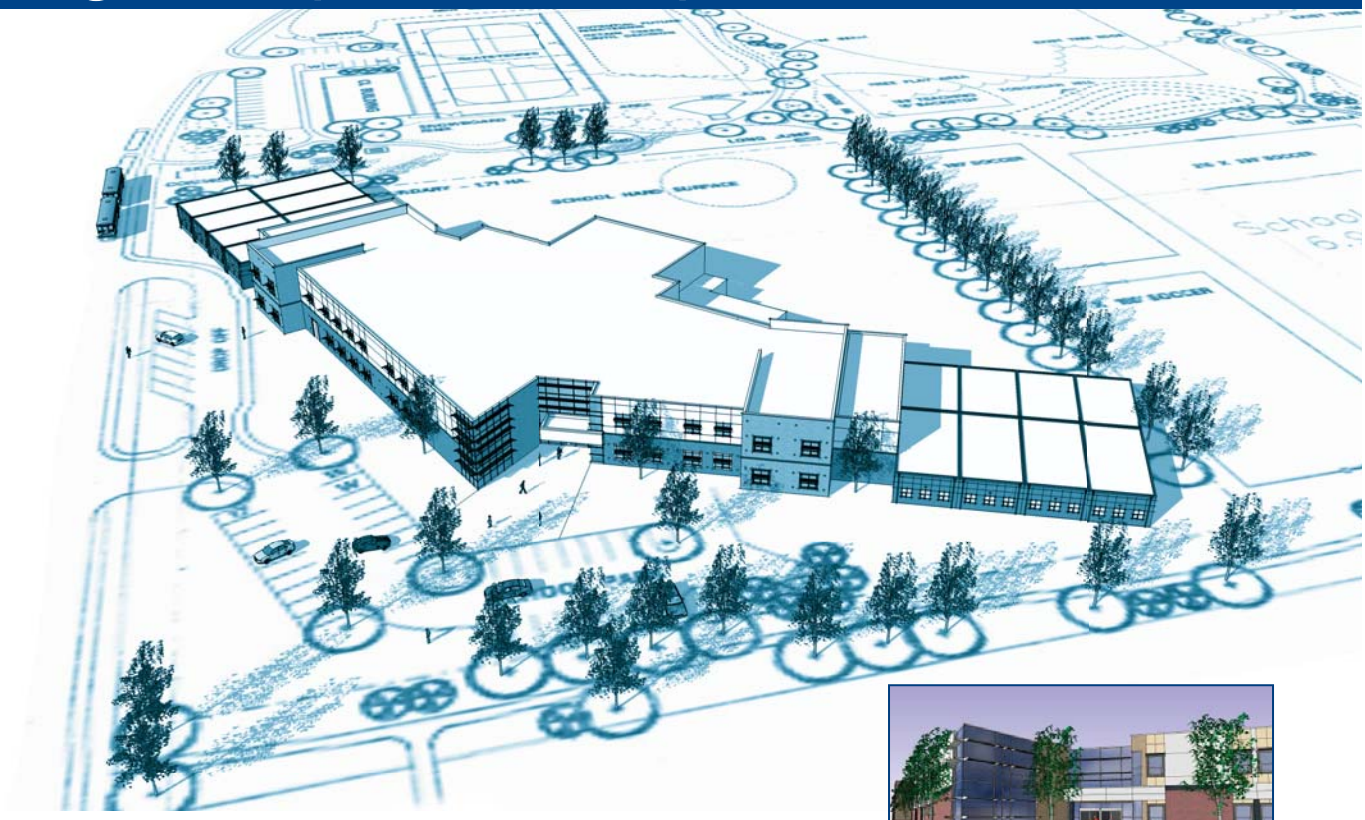
BARR RYDER
ARCHITECTS & INTERIOR DESIGNERS

PROPOSED NEW K-9 (900 STUDENTS) CORE SCHOOL

Project No. 27340

Design Development Short Report

November 12, 2007



Alberta Infrastructure and Transportation

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Project Team

Prime Consultants	Barr Ryder Architects & Interior Designers
Architectural	Barr Ryder Architects & Interior Designers
Structural Engineering	Protostatix Engineering Consultants
Mechanical Engineering	Hemisphere Engineering Inc.
Electrical Engineering	Hemisphere Engineering Inc.
Energy Modeler	Hemisphere Engineering Inc.
Cost Consultant	Hanscomb Limited

1.0 CONTEXT AND FRAMEWORK FOR FACILITY DEVELOPMENT

The design of a prototype school includes design and programmatic challenges that cannot be known prior to utilization of each individual school. To mitigate as many challenges and attempt to anticipate the many variations and opportunities, we have planned the project with the valued input of the various School Boards and incorporated flexibility into the building design.

In the development of the school:

- Assumptions have been made to ensure the footprint of the school allows for site flexibility.
- Project goals and objectives are outlined and have been the basis of the facility design.
- Program area and permanent core space has been adjusted to accommodate a specific programmatic requirement established by the development team.
- Design ratio targets have been pursued and attained with the current design configuration.
- Learning space accommodation area has been maximized in the permanent core and modular relocatable classrooms.
- The building footprint has been rationalized with a central core orientation area and a simple circulation structure.
- LEED® strategies have been identified and analyzed.
- Building has been designed based on the requirements of the Alberta Building Code.
- The school building design has followed:
    - The School Infrastructure Manual (SIM)
    - Design and Construction Standards and Guidelines for School Facilities (Green Book)

2.0 PROJECT GOALS AND OBJECTIVES

The overall planning goal for the standardization of the K-9 elementary/junior high core (900 capacity) school design focused on several key areas:

- Flexible use of space
- Facilities that enhance learning
- Simple and effective structure and systems to ensure “best value” for money
- Safe and accessible environment for learning
- A design that reflects responsible stewardship
- The maximization of community access to community use facilities (i.e. gymnasium)
- Allow provision for expansion of the school

3.0 CONCEPT DESIGN

3.1 Program and Area Summary

Total target 900 capacity (K-9) elementary/junior high core school area:

- **Initial Area**

Space allocation for standard 900 capacity core elementary school	5017 m^2
Modular classrooms (full build out) 24 @ 100 m^2	2400 m^2
Total Build Out Gross Area	**7417 m^2**

- **Site**

Based on the typical 4 acre (1.61 ha) site, Barr Ryder Architects & Interior Designers have established the following fundamental site development guidelines that should be implemented into each site.

.1 The orientation of the building should be towards the street.

- Identifiable presence in the community.
- Ease of identification and orientation.
- Clear sight lines and visibility for security.

.2 Student access should be from the main road.

- Student safety and site security is paramount.

.3 A student drop off area for both cars and buses should be directly off the main road.

- Student drop off area is to be separate from the parking areas.

.4 Student playground areas should be oriented to the rear of the school.

.5 It was also essential to the development of the site, that the orientation of the facility would enhance the sense that this new building was part of the community, and although a school, the community was welcome.

- A community plaza concept in front of the school.
- Accessible facilities within the school.
- Accessible play structures and sports field.
- Safe environment for children.

3.2 Building Design Intent

.1 Site

Early in the school design development process, it was established that the proposed sites for the schools were limited in area. The 900 capacity core school was given approximately a 4 acre generic site in which to be located, and accommodate all of the site development requirements for the school. It became clear early in the design process that a single storey structure could not effectively meet the objectives of the 900 student core school and fit on a 4 acre site. Through the evaluation process, it was established that a two storey solution to the school design would impose a smaller footprint on the site, subsequently allowing more flexibility in the final placement of the facility. Flexibility with the building placement on the site will allow easier incorporation of drop off areas, staff and visitor parking and playground areas onto the site. The placement of the 900 capacity K-9 elementary/junior high core school on the site was not part of the proposed scope of work.

.2 Building Rationale

The design of this project originated with an evaluation of the program requirements and the educational needs for an elementary/junior high school with the full development team as outlined. In the evolution of the school concept, it was established that up to eight of the allocated modular relocatable classrooms needed to be included into the two storey permanent core school. The incorporation of these modular classrooms into the footprint not only helped reduce the overall impact of the building on the site but also allowed a second floor area to match the main floor thus increasing efficiency in the design.

In the evolution of the proposed building configuration, and analysis of the building code, it was established that not only were firewalls required, but also it was practical that the facility was sprinklered. The compartmentalization area constraints without sprinklers were too restrictive to allow the appropriate planning of the facility.

.3 Floor Plan Rationale

General

Programmatically there have been some modifications to the programmed areas, as outlined in the School Infrastructure Manual. However, the total allowable gross area for the core school has not exceeded 7417 m^2. A revised detailed area break down for the school is included in Appendix A.

The overall school concept establishes a central core which is entered through the main entrance of the school. From the central core, the main public areas are accessible and two core instructional wings radiate. The proposed split wing concept for the school radiating from the core orientation/gathering node reinforces a high degree of visual and secured access throughout the school. The modular relocatable classrooms are added at

the ends of the core instructional wings, initially eight per side. The concept for the attachment of the modular classrooms to the core was to use both Type A and Type B units linked to the ends of each wing. The simple configuration of the modular classroom allows each school to stack portables on wings based on individual school populations and facilitate in an appropriate level of flexibility for future demographic changes, at the same time allowing equal access to the school's core functions.

The second floor space planning is similar to the main floor except the central gathering area is the core and the permanent classrooms radiate from the core. No modular relocatable classrooms are located on the second floor.

The separate core educational wings of the school, in combination with the split floors allow for the maximization of program and grade delineations. Our initial concept has ECS Division 1, part of Division 2 on the main floor and Division 3 students on the second floor. Given the number of students and the design, the combination of programmatic variations is extensive.

Central Orientation/Gathering/Focal Area

Based on fundamental philosophical goals established for this project, the design of the core school is clearly oriented around a central orientation/gathering/focal area. The administration area, gymnasium, ECS suite and library were located off the central gathering orientation space for functional access, security and clarity of orientation within the facility.

Administration

It was established that it was essential that the administration suite be visually and physically accessible as one immediately enters the school. The centrality of the core orientation/gathering node not only establishes a sense of welcome but also reinforces a sense of security and control within the facility, as it is overseen by the administration suite.

Community Access

In the development of a community school, it was determined that the gymnasium needs to be easily accessible from the main entry and reinforced as a major focus for the school and the community. It was also established early in the analysis of the programmatic requirements for the school that a second multipurpose room, a Division 1 gymnasium area was required to meet the physical needs of the 900 students. The second gymnasium has been located adjacent to the main gymnasium for ease of access and centralization of programs.

After hours sports programs and community gatherings were all desired uses for the gymnasium so the central accessibility is critical. The ECS suite was also centrally located off the main entrance for ease of access for parents and visibility to the administration suite to ensure the security of the students.

Second Floor

The design of the second floor emulates the main floor and reinforces the philosophical goals previously outlined. Again, the focus for the second floor is a central gathering orientation node, permanent core areas also radiate from the core node allowing for clear lines to security and control.

Breakout Areas

In each wing and on every level, ancillary breakout areas have been provided. These spaces are true flexible spaces in the facility and offer a range of configurations that can be individually incorporated into each wing similarly or uniquely.

Building Scale and Details

As the school is a Kindergarten to Grade 9 facility and two storeys, the design team thought that it was essential that the new core school presented a scale that would be appropriate for the age group and the community. The two storey school requires careful delineation of elements and materials to ensure that one is not faced with overpowering facades and scale especially for the smaller students.

Light views play a significant role in the development of a facility. All teaching and occupied spaces will receive appropriate levels of natural lighting, and all exterior windows would be operable for access to fresh air.

Exterior Elevation Concept

For the design of the two storey core school, it was important that the school reflect a sophisticated level of scaling that would address the three divisions of students in addition to community usage.

Colours and materials would be used to break the scale of the school, reflect the neighbourhood scale, conform to any architectural controls and personify a durability and longevity.

Currently, the modular relocatable classrooms have fairly limited finish options, but can be easily painted or refinished appropriately during the construction process. Our firms building design concept would attempt to use colour and manipulate materials to incorporate the modular units, cohesively with the building design.

4.0 LEED® OVERVIEW

At the onset of the project, it was established by Alberta Infrastructure and Transportation that the standard core elementary schools be designed to target sufficient LEED® points so that once a project site is identified, LEED® Silver under LEED® Canada – New Construction, V1, is attainable.

4.1 Current Project Standing

The LEED® scorecard currently indicates a LEED® Silver standing at 38. This assessment reflects only the content incorporated into the Design Development Report and the credits that appear well within reach assuming current initiatives are completed. Items discussed as potentially viable for this project but which cannot be confirmed from information in the Design Development Report are itemized under the *"may be or ?"* column. There are currently eight credits in this column. A full LEED® checklist has been provided in Appendix B.

5.0 STRUCTURAL

All structural elements will be designed to meet the requirements Part 4 of the Alberta Building Code 1997.

Although there has been no geotechnical evaluation for the proposed sites, based on our experience in the Edmonton area, it would appear that concrete footings supporting a continuous foundation wall would be an acceptable foundation system. If concentrations of soluble sulfates are present in the soil, Portland Cement Type 50 will be utilized.

Main Floor

A reinforced slab on grade will be provided for the main floor. The floor will typically consist of 130 mm reinforced concrete slab unless otherwise required by the geotechnical report. The slab will rest on a full compacted 150 mm clean well graded granular base over native clay till soils. Cast-in-place concrete structural supportive floors will be provided for all exterior stoops at doorways and any other areas that may designated as sensitive to movement.

Second Floor

The second floor structure will consist of a 100 mm thick reinforced concrete topping acting composite with 38 mm steel decking supported by steel beams and joists.

Roof System

The roof structure over the new school will consist of a combination of steel deck supported by steel joist beams and trusses. Exposed steel trusses will be utilized to support the roof over the gymnasium and the atrium.

Wall System

Load bearing masonry walls will be utilized to support the roof and second floor structure. Masonry walls will consist of either 200 mm or 300 mm reinforced concrete block walls.

6.0 MECHANICAL

The scope of the mechanical work for the core space includes heating, ventilation, plumbing, fire protection, control systems sufficient for effective and reliable facility operations. The system design will reflect a prudent blend of life cycle cost considerations including capital costs, utilizing consumption costs and simple straight forward systems that can be understood and operated in an effective manner. Consideration will be given to providing accessibility for maintenance.

Site Service Utilities

New storm and sanitary services are to be provided based on the generic site plans. Lines will be connected to municipal utilities. The site will be subject to local guideline requirements. Storm water ponding may be required in new green spaces adjacent to the new facility for storm water retention or local municipal requirements mandate this need. A new gas service will be provided as required to suit the building loads as well as loads for future modular portable classrooms.

Anticipated service requirements are as follows:

- 150 mm domestic cold water service
- 150 mm sanitary service
- 300 mm storm service
- 2747 kW gas service with line sizes appropriate to the available site connection

Plumbing Systems

All new plumbing systems are to be of the latest design and of the highest degree of water consumption efficiency. The washroom layout and fixture count to be reviewed for code compliance. New lavatories, trim and sinks are proposed along with water conserving faucet sets with the intent of achieving the highest potential LEED® WE credit.

Domestic water piping, sanitary water piping, storm and plumbing vents will be networked throughout the building back to the service connections, to and mechanical plant. Site work is required in terms of service connections, depending upon location and depth of new site service connections.

Domestic hot water for the facility is to be provided by individual high efficiency water heaters installed in the mechanical room. A small domestic hot water recirculation pump will be provided to ensure availability of hot water throughout the facility.

All domestic hot, cold and recirculation piping will be extended to all fixtures. Domestic hot water will be generated for distribution at 54°C.

Reduced pressure backflow preventor assemblies will be provided consistent with the National Plumbing Code Requirements.

A system of sanitary drains and venting will collect sanitary waste and will transfer effluent to the Municipal sewer system. The primary connection point will be a sanitary manhole in the adjacent site prior to termination in the municipal service.

Heating Systems

Heating system for the building will be a combination of perimeter baseboard heating, and/or passive radiant heating panels suspended from the structure. These perimeter elements will be of a two pipe configuration. The perimeter panels will be controlled in concert with air system functions for the building.

The orientation of the heating system will be as follows:

- Two hot water high efficiency heating boilers will be situated in the mechanical room. Two exchangers are provided for the heating system. One of hot water in the radiant panel/perimeter heating loop; and one for the air system glycol heating loop.
- For the respective heating loops, hydronic circulating pumps, expansion tanks and accessories will be installed locally in the mechanical room.
- Network of insulated reversed return hot water supply and return lines running to heating risers and mains will distribute heating water to the facility.
- Radiant panels are zoned on an exposure basis (approx. 30 zones) each zone is controlled by thermostats and valves with individual room control where appropriate.
- Entrance unit heaters are ceiling or wall mounted in vestibules and entryways to allow for offsetting of infiltration at door entrances.

Cooling Systems

Mechanical cooling for the entire school will not be provided. Where needed, cooling for the project will be by way of DX split systems or dedicated cooling only AC units.

Ventilation Systems

The main building ventilation systems consist of an indoor air systems situated in the mechanical room. This system will be designed with the premise of providing displacement ventilation at reduced air change rates, and with higher proportions of outdoor air such that fan energy consumption and duct sizes can be reduced. This system tempers the outdoor air to supply the occupied spaces though duct risers and low level supply grilles. The system is equipped with supply and exhaust fans, isolation dampers, filter bank, glycol heating coil supplied from the heat exchangers. All components will be selected for a life expectancy 30 years based on ASRAE standards. The system will further utilize a heat recovery assembly to optimize on every efficiency.

This distribution system would supply air around the perimeter of each floor to afford the minimum ventilation supplied to the spaces.

The air systems will be utilizing heat recovery systems on the facility exhaust air streams to improve operating efficiency and will serve to preheat the outdoor air for the building.

Air systems will be equipped with space temperature feedback to reset the discharge air temperature. Air delivery to classrooms and offices will be constant volume during occupancy, and reduced volume during non-occupancy as scheduled. Air systems are designed to use 100% outdoor air and will provide free cooling when outdoor conditions permit.

Gymnasium unit will be conventional indoor air system with a mixing section and variable speed supply blower and heat recovery wheel; sized for the minimum air change requirements of the space.

Exhaust Systems

Exhaust system for washrooms in the building consist of a network of exhaust ductwork connected the primary exhaust systems. The exhaust requirement be in compliance with Alberta Building Code. Exhaust systems will also be provided for photocopier areas as well as lunch/ kitchenette areas and specific classrooms as dictated by program needs.

Insulation

- General

  Piping, equipment and sheet metal work with surface temperatures greater or less than surrounding air temperature will be insulated to control heat transfer and condensation. Insulation shall meet minimum MNEBC requirements.

- Piping

  Insulation on piping systems will include:

  - Heating water
  - Glycol systems
  - Domestic hot, cold and recirculation
  - Roof drains and a portion or pipe near roof
  - Plumbing vents near roof

- Ductwork

  Insulation on duct systems will include:

  - Outside air ducts/plenum
  - Supply ducts carrying conditioned air
  - Exhaust/relief ducts near louvres
  - Acoustic treatment where required

Humidification Systems

Humidity control will be provided for the core building only. The minimum amount of humidity control to be provided using a gas fired steam injection humidifier in the air systems to maintain a minimum of 15% humidity in the building during the winter months.

Controls

The proposed system of room temperature control is simplistic and affords a reasonable level of temperature control. It is recommended that this system be DDC based, and flexible to function and expandability.

Energy Conservation Measures in Mechanical Systems

Due to the volume of ventilation air that will be exhausted from classrooms, heat recovery will be incorporated into the air system operation.

Minimum 85% efficient boilers will be used.

High efficiency fan and pump motors will be specified. Heating piping and domestic water piping will be insulated. DDC control system will have capacity to allow for future connection of mechanical systems and future building additions.

DDC control of systems will enable exhaust fans and ventilation air units to shut down during unoccupied periods. An unoccupied space temperature setback system will be incorporated to lower room temperatures. On night cycle, the fan systems will be off and room temperatures will be maintained at night setting by the hot water heating system. Controls in the ventilation supply system will allow reset of the mixed air temperatures to minimize the amount of air tempering.

Conclusion

The proposed development of the facility is driven by optimal balance of comfort and efficiency. The intent is to provide a sustainable and environmentally conscious system design for the facility, the following highlights are considered:

- Improvements to plumbing facilities and fixtures to improve water use efficiency and functionality.
- Improvements to heating systems for control and heat distribution management to ensure blanket coverage or exterior zones.
- Addition of mechanical cooling systems in the form of unitary systems where supplemental cooling is required.
- Addition of heat recovery systems to reduce outdoor air heating loads.

- Ventilation systems improvements to ensure low level displacement ventilation air is accurately and unobtrusively delivered to occupied spaces which can be further enhanced by use of operable windows.

- Installation of life safety systems to meet minimum Code requirements.

- Addition on minimal humidification control for the building of occupant comfort.

7.0 ELECTRICAL

The electrical design for the core school shall comply with the current edition of the Alberta Building Code, Canadian Electrical Code and all Provincial and Municipal Codes.

The electrical design shall include features to minimize and control energy consumption consistent with LEED® performance criteria.

Power Service and Distribution

A new 1200 amp service will be provided underground from utility company networked to a pad mounted transformer located adjacent to the building. From this transformer, an underground 120/208 Volt, 3 phase, 4 wire, secondary power service will be provided to the electrical distribution centre located in the main electrical room. Branch circuit panels will be located throughout the school to most effectively serve the various areas of the load concentration. Power, data, security, sound and fire alarm will be provided for in the corridor serving the modular classrooms.

Telephone Service and Distribution

Underground telephone service, 100 mm conduit, will be located in the same trench as the power service. This service will terminate in the computer networking room. An additional 100 mm conduit will be provided for Supernet cable. A cable tray system will be provided throughout the school to serve outlets in offices and classrooms. They will extend down the corridor servicing the modular classrooms.

Sound and Intercommunication System

A sound and PA system will be provided for and will consist of administrative handsets in the general office and library. Intercom systems should also double as a telephone system. Handsets will be provided for in each classroom to allow communication to the general office and classroom to classroom. The system will also control classroom change signal and exterior signals.

Voice Mail and Homework Hotline Features

All corridors and instructional areas will have speakers. A self-contained system will be provided for the gymnasium to allow for independent programs to function within the area without having to tie in through the main school system. Exterior speaker horns will be provided around the

school perimeter to allow paging to bus loading, drop off and playground areas. These horns will be tied into an independent zone controlling the main system to allow paging only in the school if desired.

Clock System

Timex wireless GPS clocks will be utilized in the classrooms and hallways.

Convenience Receptacles

Duplex receptacles will be provided in all areas of the school to facilitate the needs of the staff, students and maintenance.

Lighting

Lighting will be of the fluorescent type with luminaires equipped with energy efficient ballasts and lamps.

Classrooms, corridors, administration and project centres/gathering area luminaires will be of the direct/indirect louvre type with a 70/30 distribution, cable suspended.

Gymnasium luminaires will be pendant mounted totally enclosed/wire guard complete with six 54 watt T5 high output fluorescent lamps – 2 level switch.

Storage/Mechanical/Electrical Rooms luminaires will be surface pendant mounted strip type complete with wire guards.

Change/washroom luminaires will be recessed, 300 x 1220 mm lensed type.

All luminaires will be controlled by occupancy sensors. Daylight sensors will be incorporated to reduce illumination levels in high ceiling areas, corridors and classrooms taking into account the natural light content.

Night lighting will be provided in corridors on operation of the security system keypad.

The lighting design will be such as to achieve a “lighting power density” of less than 10 watts per square metre.

Exterior Lighting

Site lighting shall be designed to the illumination levels as set forth by the Illuminating Engineering Society of North America. Site lighting luminaires shall be dark sky compliant to limit “sky glow” and shall be situated to prevent “light trespass” to the surrounding area. Exterior luminaires shall be controlled by photocells/time clock and the building management (DDC) system if applicable.

Emergency & Exit Lighting

Emergency and exit lighting shall be located to conform to the requirements of the Alberta Building Code.

Fire Alarm & Smoke Detection

The fire alarm and smoke detection system will be of the addressable type utilizing the latest technologies. Fire alarm devices shall be located to conform to the requirements of the Alberta Building Code.

Security System

An intrusion detection system will be provided within the school. A numerical keypad will be located at the main and staff entrances to the school. Motion sensors of the passive infrared type will be installed in all corridors, instructional space containing computers and in the administration area. The system shall be equipped with provisions for connection to an outside monitoring facility.

Cable Television System

A television distribution system comprised of RG6-FT4 cable will be rerouted on J-hooks through the ceiling to wall jacks located in classrooms, project centres, breakout rooms, conference rooms, staff lounge and gymnasium.

Car Parking Receptacles

Car parking receptacles will be provided in pre-manufactured posts, two cars per circuit to accommodate staff vehicles. Parking receptacles will be controlled by thermostat and time clock, as well as the DDC system.

Modular Classrooms

Provisions will be made to connect power, fire alarm, security, television, sound and intercommunication to each proposed modular from the school proper.

Energy Conservation Features

In an effort to minimize and control energy consumption and provide a sustainable efficient functional system for the facility, which is consistent with LEED® criteria, it is proposed that the following special features be incorporated into the electrical system of the school:

- Energy efficient lamps and ballasts
- Multi-level lighting
- Local lighting and controllability
- DDC control of car park receptacle operation

- Time clock control of exterior parking lot lighting
- Use of fluorescent T8 and T5 technology
- Occupancy sensor control of lighting in all washrooms, daylight control of corridors

Conclusion

The design of the electrical system will target a LEED® Silver certified facility.

Appendices

Appendix A – Modified Area Analysis

PROPOSED 900 STUDENT K-9 STANDARD CORE SCHOOL – OPTION A

School capacity 900 students

Alberta Infrastructure Approved Area

900 Students – K-9 Elementary – 7,417 m²

Instructional Area	**Area (m²)**	**Total (m²)**
16 (Modular Portable Classrooms)	100	1600
6 Classrooms	varies	51.6
2 ECS	85.1	170.2
2 Junior High Science Classrooms	79.25	158.5
2 Elementary Science Classrooms	82.4/80	162.4
1 Large Ancillary Classroom	130	130
4 Ancillary Classrooms	varies	395.7
2 Information Services	78.8/76.25	155
1 Gymnasium	700	700
1 Gymnasium Storage	50	50
1 CTS	203	203
1 Library	360	360
Subtotal		**4636.4**

Non-Instructional Areas

Principal	18
Vice Principal	12.4
Administration Office	24
Counselor's Office	23.9
General Administration	73
Conference Room	18.2
Staff Room	166.3
Staff Work Room	42
Men's	8
Women's	12
Infirmary	20
Kitchen	15
Mechanical	215
Subtotal	**647.8**

Physical Education	76
Storage	155
Wiring Network	28
Washrooms	206
Subtotal	**465**
Building Gross Up (circulation, wall areas, flexible space)	1667.8
TOTAL	**7417 m²**
Total Core School Area (Including Portables)	7,417 m²
Total Core School Area (Excluding Portables)	7417 m² - 1600 m² = 5817 m²

PROPOSED 900 STUDENT K-9 STANDARD CORE SCHOOL – OPTION B

School capacity 900 students

Alberta Infrastructure Approved Area

900 Students – K-9 Elementary – 7417 m²

Instructional Area	**Area (m²)**	**Total (m²)**
16 (Modular Portable Classrooms)	100	1600
7 Classrooms	varies	627.8
2 ECS	85.1	170.2
2 Junior High Science Classrooms	79.25	158.5
2 Elementary Science Classrooms	82.4/80	162.4
1 Large Ancillary Classroom	130	130
1 Inf. Services (combined 4 rooms)	varies	110.9
1 Information Services	95.7	95.7
4 Ancillary Classrooms	varies	95.7
1 Large Ancillary Classroom	113	113
1 Gymnasium	700	700
1 Gymnasium Storage	50	50
1 CTS	203	203
1 Library	360	360
Subtotal		**4877.2**

Non-Instructional Areas

Principal	18
Vice Principal	12.4
Administration Office	24
Counselor's Office	23.9
General Administration	73
Conference Room	18.2
Staff Room	166.3
Staff Work Room	42
Men's	8
Women's	12
Infirmary	20
Kitchen	15
Mechanical	215
Subtotal	**647.8**

Physical Education	76
Storage	155
Wiring Network	28
Washrooms	206
Subtotal	**465**
Building Gross Up (circulation, wall areas, flexible space)	**1427**
TOTAL	**7417 m²**
Total Core School Area (Including Portables)	7417 m²
Total Core School Area (Excluding Portables)	7417 m² - 1600 m² = 5817 m²

Appendix B – LEED® Checklist

LEED CHECKLIST

Project Name - K-9 Core School (900 Students)
Project # - 27340
Date - 03/10/2007
Prepared By - SB

Credit Tally Y	?	N	Category	Title	Points Available	Responsible Professionals Primary	Secondary	Comments
Y	**?**	**N**	**Sustainable Sites**					
Y			Prereq 1	**Erosion & Sedimentation Control**	0	Contractor	Arch	Silt fencing, Sediment traps
1			Credit 1	**Site Selection**	1	Owner/Client	Arch	Client responsiblilty
		1	Credit 2	**Urban Redevelopment**	1			
		1	Credit 3	**Brownfield Redevelopment**	1			
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1	Arch		Confirm Public transit access
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	Arch		22 bike stalls and 1 shower req'd
		1	Credit 4.3	**Alternative Transportation**, Hybrid & Alternative Fuel Vehicles	1	Arch	Owner/Client	
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1	Arch		Provide Parking Stalls
1			Credit 5.1	**Reduced Site Disturbance**, Protect or Restore Open Space	1	Contractor	Arch	Arch to provide reqmts to Contractor
1			Credit 5.2	**Reduced Site Disturbance**, Development Footprint	1	Arch	Contractor	Arch to provide reqmts to Contractor
1			Credit 6.1	**Stormwater Management**, Rate and Quantity	1	Mech	Arch	
		1	Credit 6.2	**Stormwater Management**, Treatment	1	Mech	Arch	
	1		Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands** Non-Roof	1	Land	Arch	
1			Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands** Roof	1	Land	Arch	Energy star Roof
1			Credit 8	**Light Pollution Reduction**	1	Elec	Arch	
9	1	4	**Subtotal**	Possible Points	14			

Y	?	N	Water Efficiency					
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1	Land	Arch	
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1	Land	Arch	
	1		Credit 2	**Innovative Wastewater Technologies**	1	Mech		
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1	Mech		
1			Credit 3.2	**Water Use Reduction**, 30% Reduction	1	Mech		
4	1	0	**Subtotal**	Possible Points	5			

Credit Tally			Category	Title	Points	Responsible Professionals		
Y	?	N			Available	Primary	Secondary	Comments
Y	**?**	**N**	**Energy & Atmosphere**					
Y			Prereq 1	**Fundamental Building Systems Commissioning**	0	Comm	Mech/Arch	
Y			Prereq 2	**Minimum Energy Performance**	0	Mech	Elec	
Y			Prereq 3	**CFC Reduction in HVAC&R Equipment**	0	Mech		
4		6	Credit 1.1	**Optimize Energy Performance**	10	Mech, Elec	Arch	min 29% Energy Reduction
		1	Credit 2.1	**Renewable Energy**, 5%	1	Arch	Mech, Elec	
		1	Credit 2.2	**Renewable Energy**, 10%	1	Arch	Mech, Elec	
		1	Credit 2.3	**Renewable Energy**, 20%	1	Arch	Mech, Elec	
	1		Credit 3	**Additional Commissioning**	1	Comm		
1			Credit 4	**Ozone Depletion**	1	Mech		
1			Credit 5	**Measurement & Verification**	1	Mech	Elec	
		1	Credit 6	**Green Power**	1	Client		Client Action
6	1	10	**Subtotal**		Possible Points 17			

Y	?	N	Materials & Resources					
Y			Prereq 1	**Storage & Collection of Recyclables**	0	Contractor	Arch	
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1	Arch		
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Shell	1	Arch		
		1	Credit 1.3	**Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1	Arch		
1			Credit 2.1	**Construction Waste Management**, Divert 50%	1	Contractor	Arch	Contractor
	1		Credit 2.2	**Construction Waste Management**, Divert 75%	1	Contractor	Arch	Contractor
	1		Credit 3.1	**Resource Reuse**, Specify 5%	1	Arch		Under investigation
	1		Credit 3.2	**Resource Reuse**, Specify 10%	1	Arch		
1			Credit 4.1	**Recycled Content**, Specify 25%	1	Arch		Product specification
		1	Credit 4.2	**Recycled Content**, Specify 50%	1	Arch		
1			Credit 5.1	**Local/Regional Materials**, 10% Manufactured Locally (steel/concrete)	1	All		
		1	Credit 5.2	**Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1	All		
	1		Credit 6	**Rapidly Renewable Materials**	1	Arch		
		1	Credit 7	**Certified Wood**	1	Arch	Struct	
1			Credit 8	**Durable building**	1	Arch		research CSA S478-95(R2001)
4	4	6	**Subtotal**		Possible Points 14			

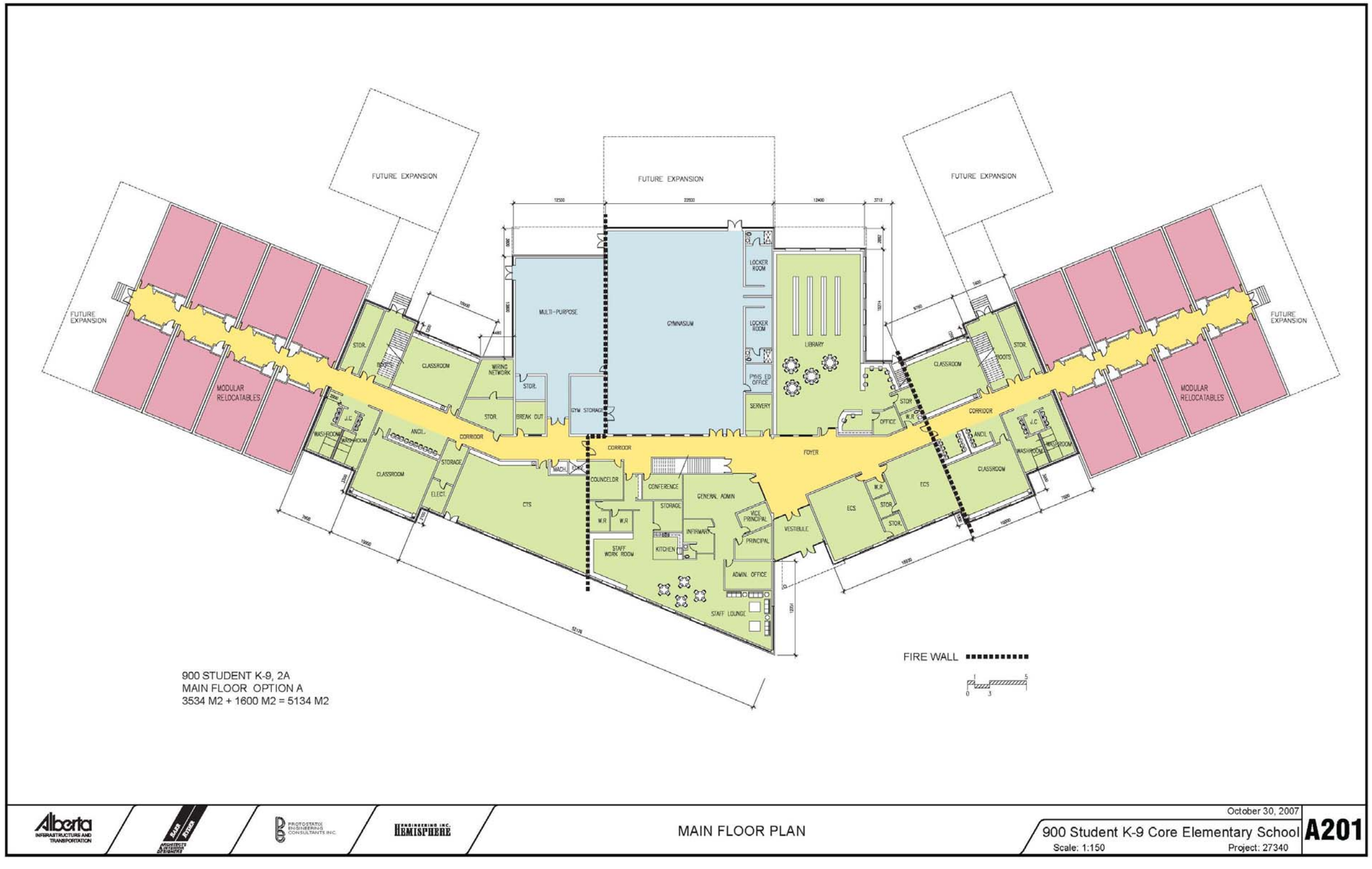
Credit Tally Y	Credit Tally ?	Credit Tally N	Category	Title	Points Available	Responsible Professionals Primary	Responsible Professionals Secondary	Comments
Y	**?**	**N**		**Indoor Environmental Quality**				
Y			Prereq 1	**Minimum IAQ Performance**	0	Mech		
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	0	Contractor	Owner	By Arch/Owner
1			Credit 1	**Carbon Dioxide** (CO_2) **Monitoring**	1	Mech		
1			Credit 2	**Increase Ventilation Effectiveness**	1	Mech	Arch	
1			Credit 3.1	**Construction IAQ Management Plan** During Construction	1	Contractor	Mech	Contractor - outline in spec.
1			Credit 3.2	**Construction IAQ Management Plan** Before Occupancy	1	Contractor	Mech	Contractor - outline in spec.
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	Arch		specifications
1			Credit 4.2	**Low-Emitting Materials**, Paints	1	Arch		specifications
1			Credit 4.3	**Low-Emitting Materials**, Carpet	1	Arch		specifications
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood	1	Arch		specifications
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1	Mech	Arch	Foot Grilles, Full height walls, P. copier?
	1		Credit 6.1	**Controllability of Systems**, Perimeter	1	Arch	Elec	research window locn's, light controls
	1		Credit 6.2	**Controllability of Systems**, Non-Perimeter	1	Mech	Arch	research window locn's, light controls
1			Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1	Mech		Heating, cooling, vent, and humidification monitored and maintained at set levels.
1			Credit 7.2	**Thermal Comfort**, Permanent Monitoring System, DDC	1	Mech		DDC system will provide monitoring and system control capability
1			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1	Arch	Elec	research window locn's, light controls
1			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces/regularly occupied	1	Arch	Elec	research window locn's, light controls
13	2	0	**Subtotal**	Possible Points	15			

Y	?	N		Innovation & Design Process				
1			Credit 1.1	**Innovation in Design**: Green Products Housekeeping	1	Client		Open for discussion
		1	Credit 1.2	**Innovation in Design**: Education Feature	1	Arch		Open for discussion
		1	Credit 1.3	**Innovation in Design**: Water Performance: Cistern connection	1	Mech		Open for discussion
		1	Credit 1.4	**Innovation in Design**: 95% Construction Waste Management	1	Contractor		Open for discussion
1			Credit 2	**LEED™ Accredited Professional**	1	Arch		ACHIEVED
2	0	3	**Subtotal**	Possible Points	5			

38	5	23	**Total Project Score**	Possible Points	70		**SILVER**

Certified 26 to 32 points **Silver** 33 to 38 points **Gold** 39 to 51 points **Platinum** 52 or more points

Appendix C – Floor Plans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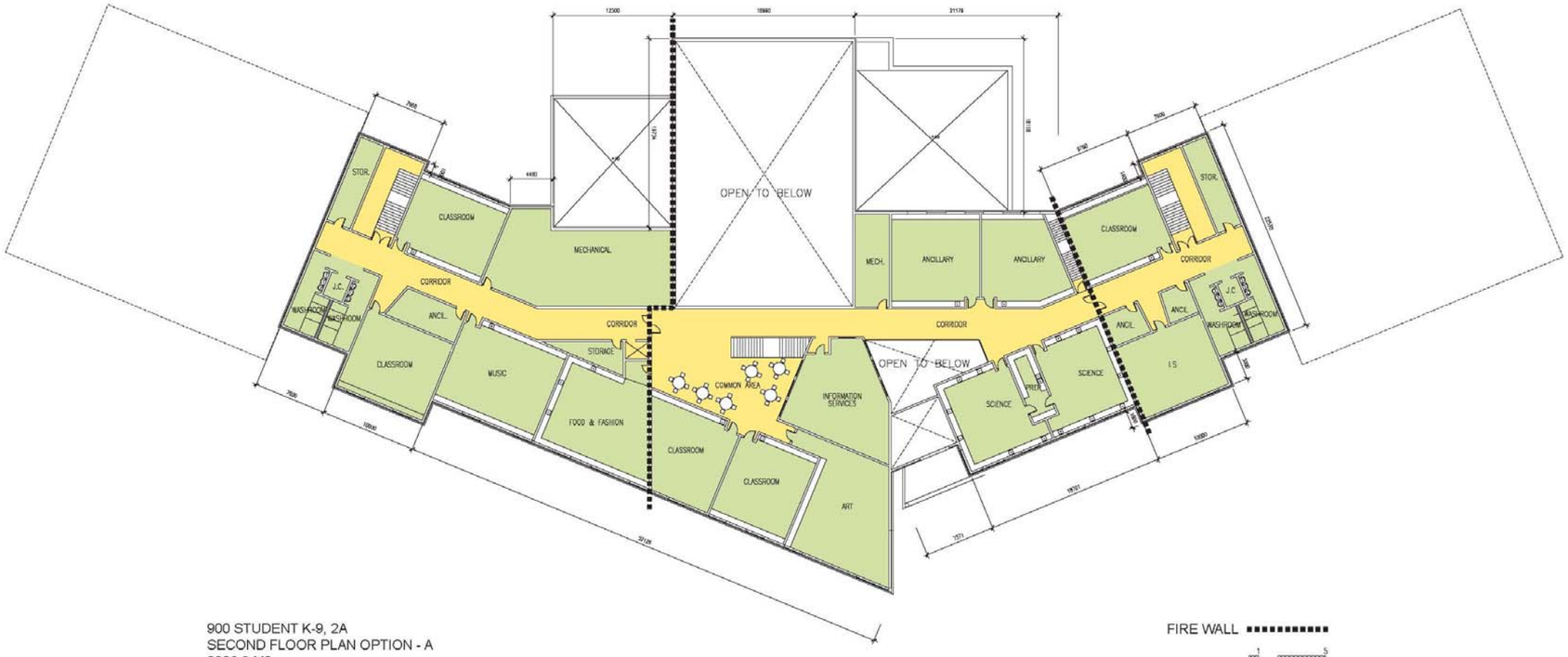
FUTURE EXPANSION
FUTURE EXPANSION
FUTURE EXPANSION
MODULAR RELOCATABLES
MODULAR RELOCATABLES
MULTI-PURPOSE
GYMNASIUM
LOCKER ROOM
LOCKER ROOM
LIBRARY
PHYS ED OFFICE
SERVERY
STOR.
CLASSROOM
WIRING NETWORK
BREAK OUT
GYM STORAGE
CORRIDOR
FOYER
OFFICE
BOOTS
CLASSROOM
ANCIL.
WASHROOM
J.C.
CLASSROOM
STORAGE
ELECT.
CTS
MACH.
COUNCELOR
CONFERENCE
STORAGE
GENERAL ADMIN
W.R
W.R
STAFF WORK ROOM
KITCHEN
INFIRMARY
VICE PRINCIPAL
PRINCIPAL
ADMIN. OFFICE
STAFF LOUNGE
VESTIBULE
ECS
ECS
CLASSROOM
CORRIDOR
ANCIL.
WASHROOM
J.C.
CLASSROOM
FIRE WALL
900 STUDENT K-9, 2A
MAIN FLOOR OPTION A
3534 M2 + 1600 M2 = 5134 M2
MAIN FLOOR PLAN
October 30, 2007
900 Student K-9 Core Elementary School
Scale: 1:150
Project: 27340
A201



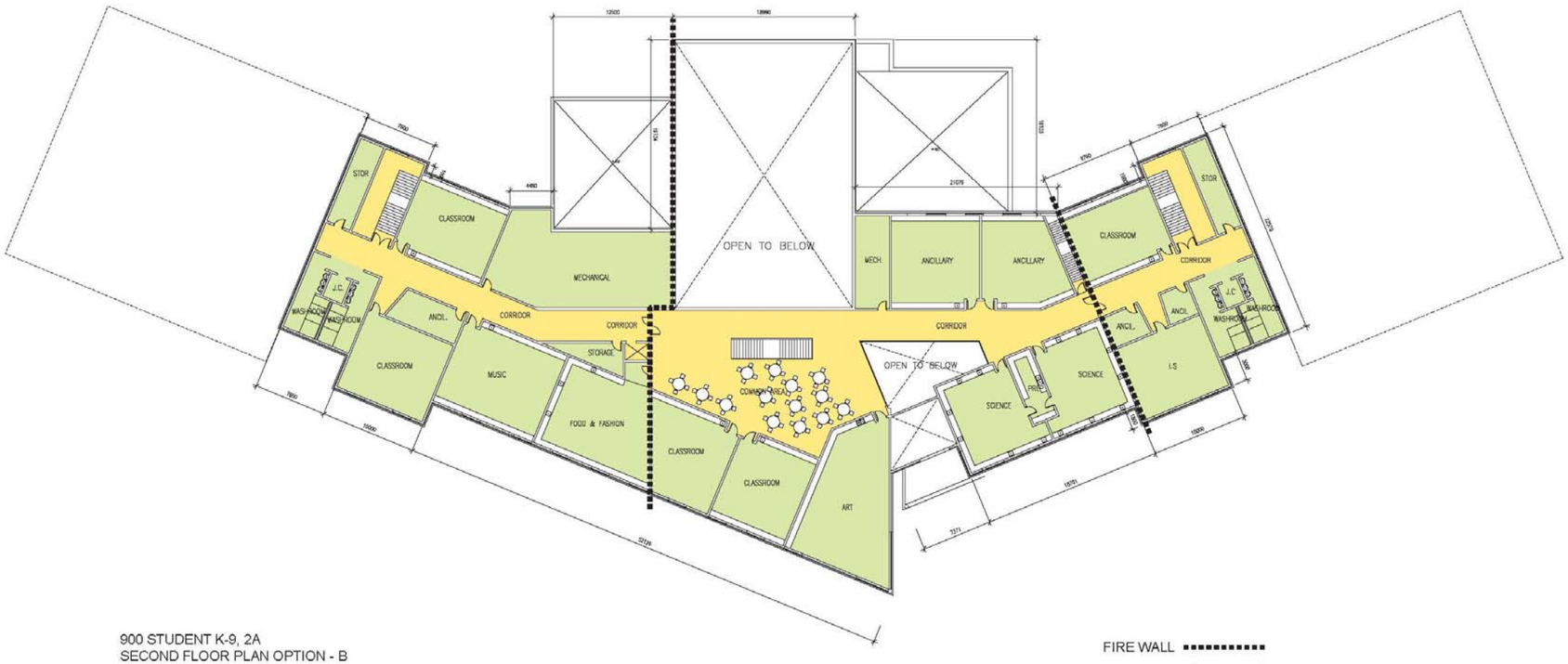
900 STUDENT K-9, 2A
SECOND FLOOR PLAN OPTION - A
2306.8 M2

FIRE WALL

SECOND FLOOR PLAN OPTION - A

October 30, 2007
900 Student K-9 Core Elementary School
Scale: 1:150 Project: 27340

A204



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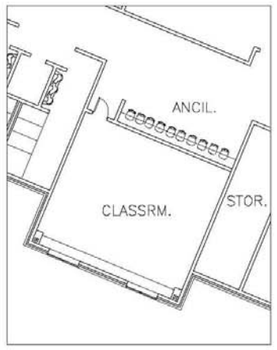
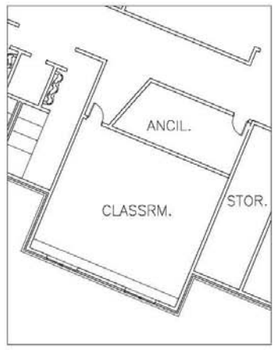
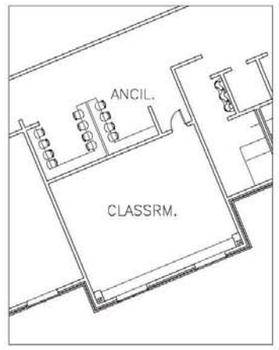
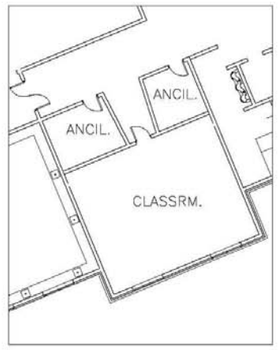
SECOND FLOOR PLAN OPTION - B

October 30, 2007
900 Student K-9 Core Elementary School
Scale: 1:150 Project: 27340
A202









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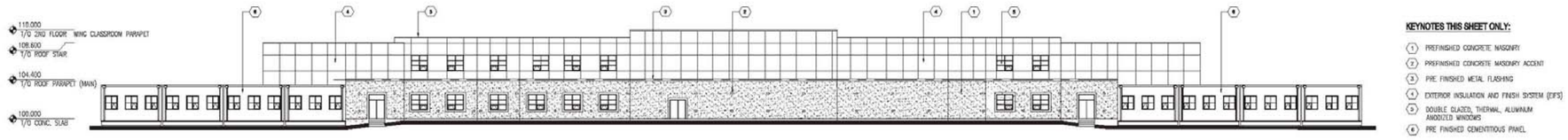
BREAKOUT AREA OPTIONS

October 30, 2007
900 Student K-9 Core Elementary School
Scale: NTS Project: 27340
A203

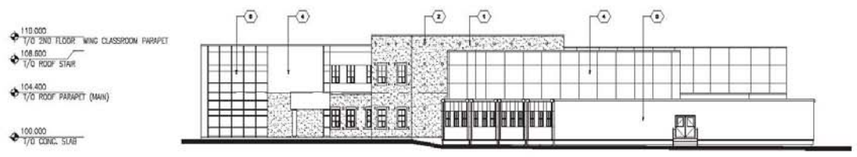
Appendix D – Sections and Elevations



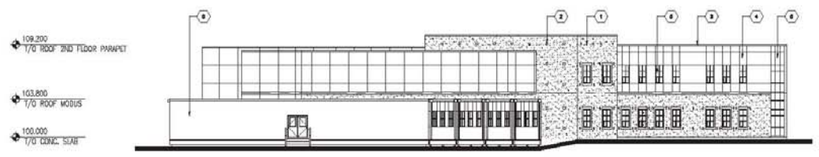
BACK ELEVATION

KEYNOTES THIS SHEET ONLY:

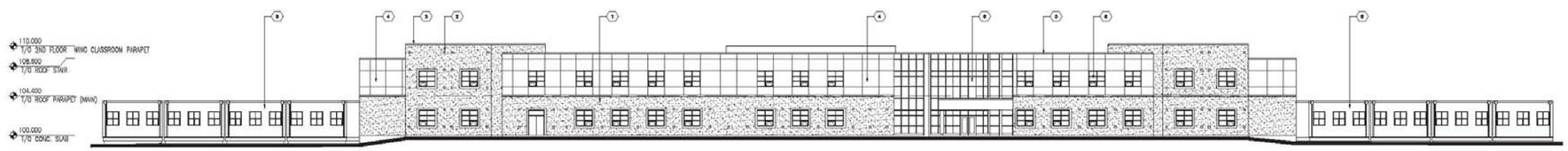
1. PREFINISHED CONCRETE MASONRY
2. PREFINISHED CONCRETE MASONRY ACCENT
3. PRE FINISHED METAL FLASHING
4. EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)
5. DOUBLE GLAZED, THERMAL, ALUMINUM ANODIZED WINDOWS
6. PRE FINISHED CEMENTITIOUS PANEL



RIGHT ELEVATION



LEFT ELEVATION



FRONT ELEVATION

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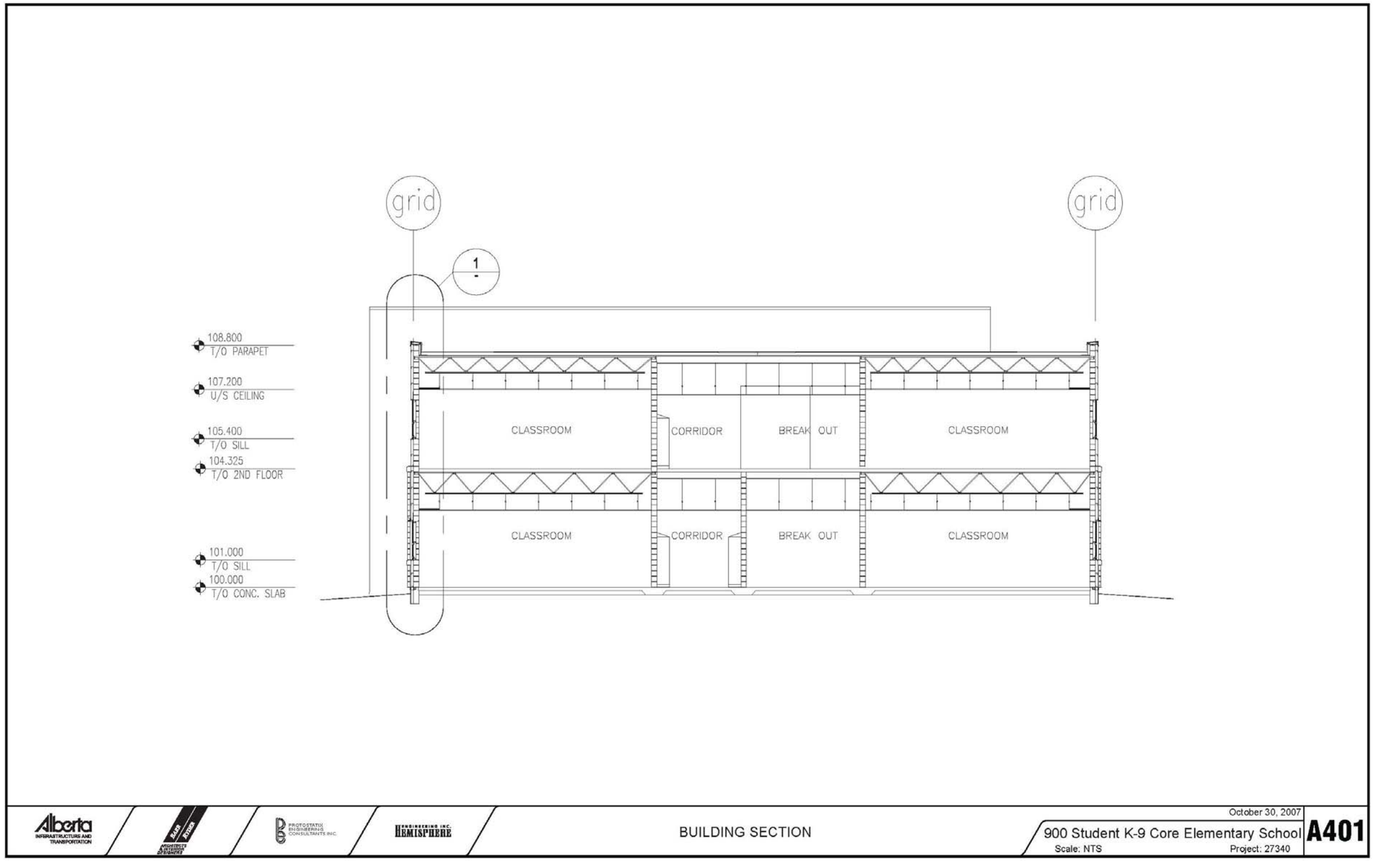
Barr Ryder Architects & Interior Designers | Prototatix Engineering Consultants Inc. | Hemisphere Engineering Inc.

ELEVATIONS

October 30, 2007
900 Student K-9 Core Elementary School
Scale: NTS Project: 27340

A301



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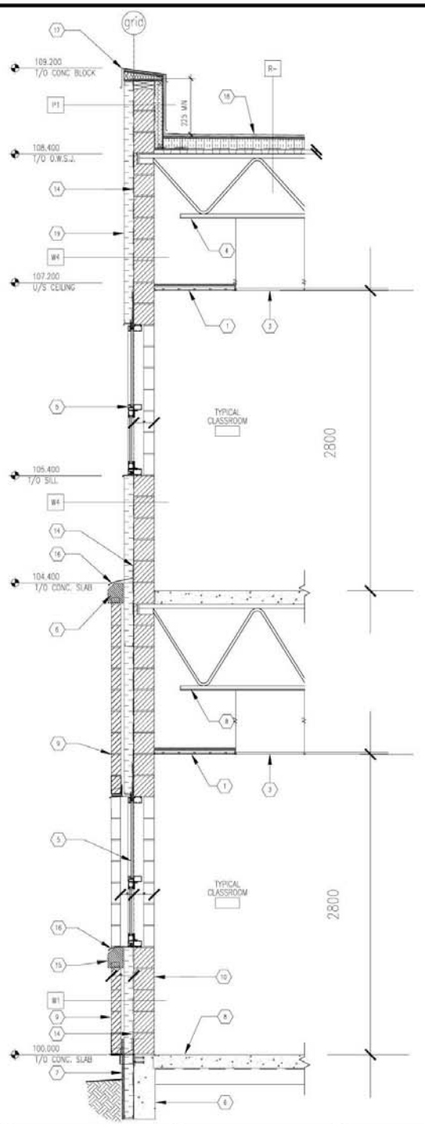
BUILDING SECTION

October 30, 2007
900 Student K-9 Core Elementary School
Scale: NTS Project: 27340

A401



KEYNOTES THIS SHEET ONLY:

1. SUSPENDED RADIANT HEAT PANEL
2. CABINET
3. SUSPENDED ACOUSTIC TILE CEILING
4. ROOF STRUCTURE SEE STRUCTURAL DRAWINGS
5. DOUBLE GLAZED THERMALLY BROKEN CLEAR ANOD. ALUM. CURTAINWALL FRAME WINDOW W/OPERABLE AWNING UNIT
6. CONCRETE GRADE BEAM ON CAISSONS
7. 16mm CEMENT BOARD ON 50mm Z-BIRS, 50mm RIGID INSULATION, AIR/VAPOUR BARRIER TO FACE OF GRADE BEAM
8. FLOOR STRUCTURE SEE STRUCTURAL DRAWINGS
9. 90mm CONCRETE BLOCK VENEER
10. 190mm CONCRETE BLOCK
11. 125 mm RIGID INSULATION
12. 140 mm CONCRETE CHAMFER BLOCK SILL
13. 50mm STIFFENED METAL PANEL ON 19mm GALV. STL BATTENS ON Z BAR FRAMING
14. AIR/VAPOR BARRIER
15. 150mm CHAMFER BLOCK SILL
16. PREFINISHED METAL FLASHING
17. PREFINISHED METAL CAP
18. TPO ROOF MEMBRANE ON FIBERBOARD/POSITIVE SLOPE INSULATION
19. EIFS STUCCO ON 90mm RIGID INSULATION

ROOF TYPES:

R1 SBS ROOF MEMBRANE
25mm FIBRE BOARD
POSITIVE SLOPED RIGID INSULATION
(WHERE INDICATED SEE ROOF PLAN)
150mm MIN. RIGID INSULATION ON
VAPOUR BARRIER MEMBRANE
13mm GYPSUM BOARD SHEATHING
38mm STEEL ROOF DECK ON
STEEL STRUCTURE SLOPED TO DRAIN

WALL TYPES:

W1 90mm ARCHITECTURAL BLOCK VENEER
30mm AIR SPACE
90mm RIGID INSULATION
AIR/VAPOUR BARRIER MEMBRANE
190mm CONCRETE BLOCK

W2 90mm ARCHITECTURAL BLOCK VENEER
30mm AIR SPACE
90mm RIGID INSULATION
AIR/VAPOUR BARRIER MEMBRANE
190mm CONCRETE BLOCK

W4 EIFS RAINSCREEN SYSTEM
ACRYLIC STUCCO FINISH ON
100mm RIGID INSULATION c/w
MOISTURE DRAINAGE CHANNELS
AIR/VAPOUR BARRIER MEMBRANE
190mm CONCRETE BLOCK

W5 PRE-FINISHED STIFFENED 50mm ALUMINUM PANELS ON 19 mm SUBFRAMING ON GALV. Z BAR FRAMING, 100mm POLYISOCYANURATE INSULATION PEEL AND STICK AIR-VAPOUR AIR/VAPOUR BARRIER MEMBRANE 190mm CONCRETE BLOCK

PARAPET TYPES:

P1 PREFINISHED METAL COPING FLASHING INCLUDING COUNTERFLASHING. CARRY SBS ROOF MEMBRANE FROM ROOF TO TOP OF WOOD COPING. 190 CONCRETE BLOCK AIR/ VAPOUR BARRIER 50mm STIFFENED METAL PANEL ON 19 mm GALV. STEEL BATTENS AND Z CRT FRAMING 100mm RIGID INSULATION c/w MOISTURE DRAINAGE CHANNELS AIR/VAPOUR BARRIER MEMBRANE 190 CONCRETE BLOCK

P2 PREFINISHED METAL COPING FLASHING INCLUDING COUNTERFLASHING. CARRY SBS ROOF MEMBRANE FROM ROOF TO TOP OF WOOD COPING. WOOD COPING TO CONSIST OF 12mm EXT. GRADE PLYWOOD ON PRESSURE TREATED WOOD BLOCKING ON 16mm EXTERIOR GRADE PLYWOOD FILL VOID WITH INSULATION. FASTENED TO EXTERIOR 13mm GYPSUM SHEATHING TO TOP TRACK OF METAL STUD. 38mm X 89mm PRESSURE TREATED WOOD BLOCKING FASTENED TO SHEATHING. 90mm ARCHITECTURAL BLOCK 30mm AIR SPACE AIR/VAPOUR BARRIER MEMBRANE 12mm EXT. GYPSUM BOARD SHEATHING 152mm STEEL STUDS @ 400mm O.C. R20 BATT INSULATION 16mm ABUSE RESISTANT GYPSUM BOARD 38mm X 38mm PRESSURE TREATED WOOD STUD @ 400 O.C. FILL VOID W/ RIGID INSULATION ON 13mm EXTERIOR GRADE PLYWOOD TPO ROOF MEMBRANE

Alberta Infrastructure and Transportation | Barr Ryder Architects & Interior Designers | Protostatic Engineering Consultants Inc. | Hemisphere Engineering Inc.

WALL SECTION

October 30, 2007
900 Student K-9 Core Elementary School
Scale: NTS Project: 27340
A403

Appendix E – ABC 1997 Building Code Review

APPENDIX E – ABC 1997 BUILDING CODE REVIEW

Group A, Division 2, up to 6 Storeys, Any Area, Sprinklered (3.2.2.4)

1) A building classified as Group A, Division 2, that is not limited by building area, is permitted to conform to Sentence (2) provided:

   a) except as permitted by Sentences 3.2.2.7(1) and 3.2.2.18(2), the building is sprinklered throughout, and

   b) it is not more than 6 storeys in building height.

2) Except as permitted by Article 3.2.2.16., the building referred to in Sentence (1) shall be of noncombustible construction, and

   a) floor assemblies shall be fire separations with a fire-resistance rating not less than 1 hour,

   b) mezzanines shall have a fire-resistance rating not less than 1 h, and

   c) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

Group A, Division 2, up to 3 Storeys, Increased Area, Sprinklered (3.2.2.26)

1) A building classified as Group 1, Division 2 is permitted to conform to Sentence (2) provided:

   a) except as permitted by Sentences 3.2.2.7(1) and 3.2.2.18 (2), the building is sprinklered throughout,

   b) it is not more than 3 storeys in building height, and

   c) it has a building area not more than

      i) 4800 m^2 if 1 storey in building height,
      ii) 2400 m^2 if 2 storeys in building height, or
      iii) 1200 m^2 if 3 storeys in building height.

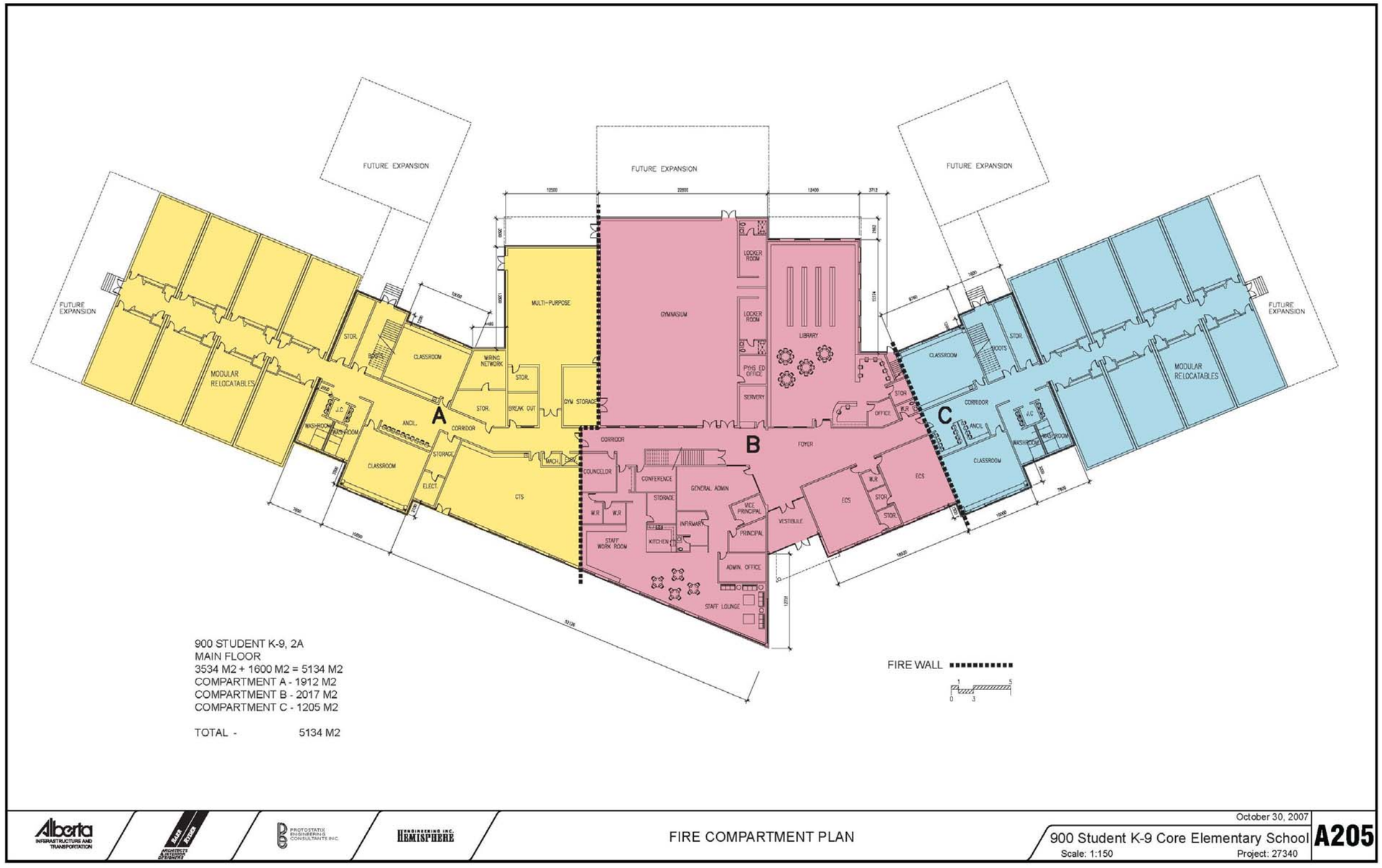
2) the building referred to in Sentence (1) is permitted to be of combustible construction or non-combustible construction used singly or in combination, and

   a) floor assemblies shall be fire separations and, if of combustible construction, shall have a fire resistance rating not less than 45 min,

   b) mezzanines shall have, if of combustible construction, a fire resistance rating not less than 45 min, and

   c) loadbearing walls, columns and arches supporting an assembly required to have a fire resistance rating shall

      i) have a fire resistance rating not less than 45 min, or
      ii) be of non-combustible construction.


FUTURE EXPANSION
FUTURE EXPANSION
FUTURE EXPANSION
FUTURE EXPANSION
MODULAR RELOCATABLES
CLASSROOM
STOR.
BOOTS
WASHROOM
J.C
ANCIL.
CORRIDOR
STORAGE
ELECT.
CTS
WIRING NETWORK
STOR.
BREAK OUT
GYM STORAGE
MULTI-PURPOSE
GYMNASIUM
LOCKER ROOM
LOCKER ROOM
PHYS ED OFFICE
SERVERY
LIBRARY
STOR.
OFFICE
W.R
FOYER
CORRIDOR
COUNCILLOR
CONFERENCE
STORAGE
GENERAL ADMIN
W.R
W.R
INFIRMARY
VICE PRINCIPAL
PRINCIPAL
VESTIBULE
STAFF WORK ROOM
KITCHEN
ADMIN. OFFICE
STAFF LOUNGE
ECS
ECS
STOR.
STOR.
CLASSROOM
BOOTS
CORRIDOR
ANCIL.
J.C
WASHROOM
WASHROOM
CLASSROOM
MODULAR RELOCATABLES
FUTURE EXPANSION
A
B
C
900 STUDENT K-9, 2A
MAIN FLOOR
3534 M2 + 1600 M2 = 5134 M2
COMPARTMENT A - 1912 M2
COMPARTMENT B - 2017 M2
COMPARTMENT C - 1205 M2
TOTAL - 5134 M2
FIRE WALL
Alberta INFRASTRUCTURE AND TRANSPORTATION
BARR RYDER ARCHITECTS & INTERIOR DESIGNERS
PROTOSTATIX ENGINEERING CONSULTANTS INC.
HEMISPHERE ENGINEERING INC.
FIRE COMPARTMENT PLAN
October 30, 2007
900 Student K-9 Core Elementary School
Scale: 1:150
Project: 27340
A205

Appendix F – Design Ratios

Project Identification

Project Name:	Standard Core Elementary/ Jr. High School – 900 Capacity	Building Type:	School
Location:	Base Case – Edmonton	Project Start Date:	N/A
School Board:	N/A	Completion Date:	N/A
Architect:	BARR RYDER ARCHITECTS	Market Condition:	April 2007 Constant $
Constructor:		Geographic Location Factor:	Edmonton Base Rate

DESCRIPTION OF BUILDING

2 Storey. Fnd Drilled Conc Piles, Grade Beams dependent on Soil conditions. Loadbearing Blk , Ext wall Cladding 4.5 m Ht Masonry Veneer, Upper Walls above 4.5m EIFS, Double glz thermally broken Alum Windows, Alum. Curtain Wall at Entry, Roof Modified SBS 2-ply Flat Roof, Int. Partitions Conc Blk (GB/SS Admin.). Floors VCT (Carpet Library/Admin) Wood @ Gym, Ceramic Tile Washrooms, Ceilings Acoustic Tile/GB, Walls Pt/Ceramic Tile Washrooms, Millwork, Mech-Heat w/t Perimeter Radiant Ceiling Panels c/w Gas Fired Finned-Tube Hot Water Boilers

Outline Specification

A10 Foundation:
Piles with grade beams and pile caps for isolated columns, 125 slab on grade based on soils condition in area

B10 Superstructure:
Load bearing concrete block, steel beam interior structure, concrete second floor system.

B20 Exterior Enclosure:
Wall Cladding is 4.5m of masonry veneer, Fascia, upper walls EIFS system, Alum Double glz thermally broken windows, Curtain Wall At Entry.

B30 Roofing: 2 Ply SBS Modified Membrane

C10 Interior Construction:
Concrete block partitions, GB/SS partitions at Admin. Area.

C30 Interior Finishes:
Vinyl composite tile flooring, ceramic tile @ washrooms, carpet Library, admin and staff lounge, wood floor in gym, ceilings are a combination of painted drywall and acoustic tile, wall finish are predominantly paint, ceramic wall tiles at showers, urinals and mop sink.

D30 HVAC, Fire Protection:
System utilizes interior air handling units and boilers, perimeter radiation utilized for heating, air conditioning– excluded, building sprinklered, mechanical system controlled using digital controls.

Building Area and Volume

	Core	Built-out
Gross Floor Area:	5817 m²	7417 m²
Net Floor Area:	5270 m²	6689 m²
Volume:	29877m²	36465m²
Exterior Cladding:	2716 m²	3497 m²
Roof Area:	3560 m²	5160 m²
No. of stories above grade:	2 no.	2 no.
Modular Classrooms Built Out:	N/A	16 no.

Ratios

	Core	Built-out
Net Floor Area/GFA:	.90:1	.90:1
Exterior Cladding Area/GFA:	.51:1	.52:1
Window Area/GFA:	.09:1	.09:1
Roof Area/GFA:	.61:1	.77:1

Capacities

Percentage exterior wall glazed: 18 %
Soil characteristics:
Density plumbing fixtures:
Heating capacities:
Cooling capacities:
Ventilation Capacities:
Lighting intensity:

Floor Area (by type)

No.	Type	Core	Built-out
	Ancillary Classrooms/CTS	852.2 m²	n/a m²
	Permanent Core Classrooms	1133.9 m²	n/a m²
	Gymnasium	844.5 m²	n/a m²

Project Identification				
D50 Electrical: Main Service size of 1200 amps at 120/208 volts, Data, Voice and TV systems included using conduit & cable trays, security system included, public address system included, connections to allow for future portables.		Library Administration/Staff Storage Mech/Elect/Maintenance	342 m^2 448 m^2 190.8 m^2 262.3 m^2	n/a m^2 n/a m^2 n/a m^2 m^2
Capital Cost of Permanent Core per m^2 (April 2007$)		Circulation	1145 m^2	m^2
		Other Modular Classrooms Built out	112.3 m^2` N/A	m^2 1600 m^2
	Gross Floor Area		5817m^2	7417m^2