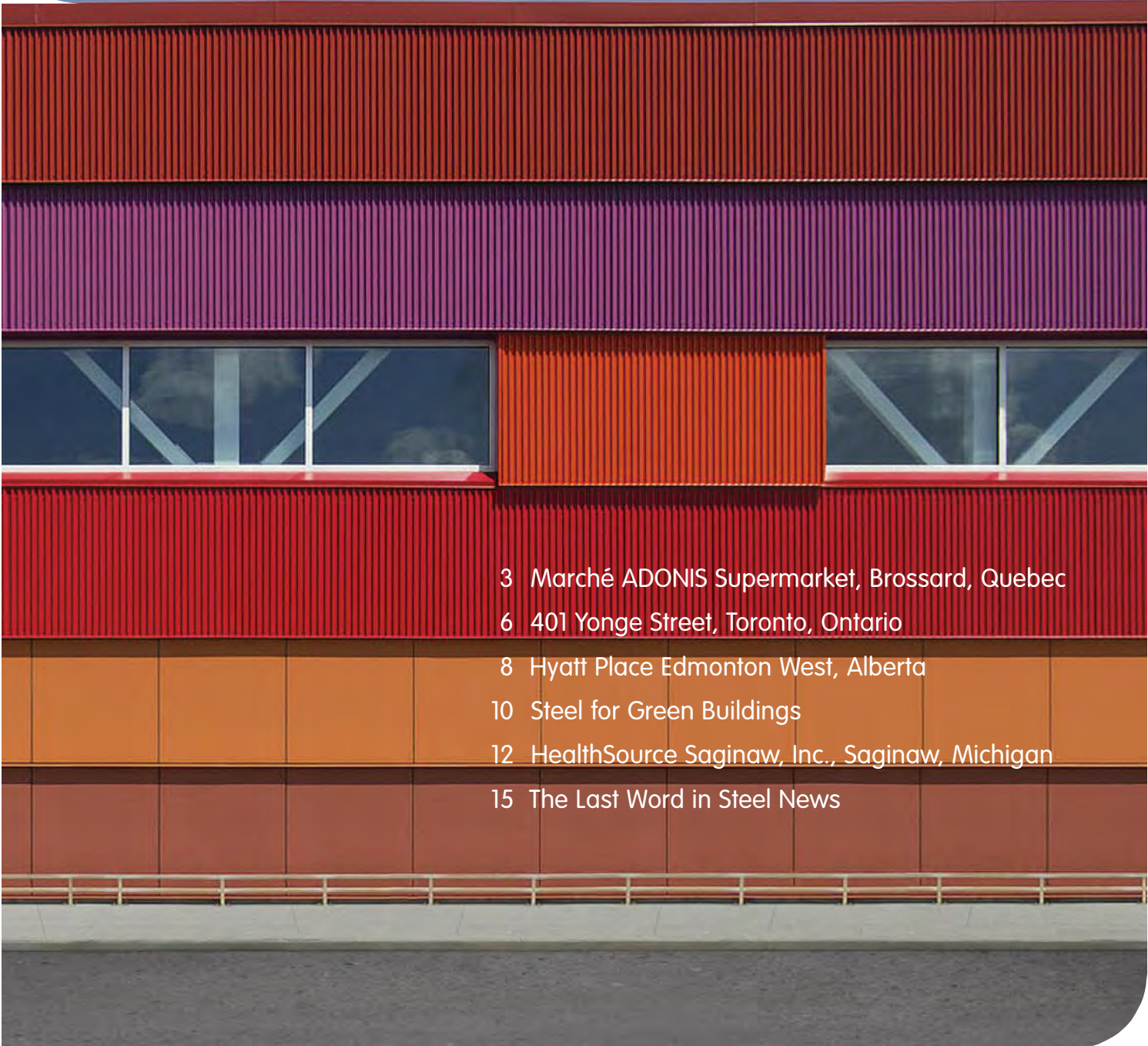




ArcelorMittal

steel design

FALL 2016 | VOLUME 48 | NO. 2

- 
- 3 Marché ADONIS Supermarket, Brossard, Quebec
 - 6 401 Yonge Street, Toronto, Ontario
 - 8 Hyatt Place Edmonton West, Alberta
 - 10 Steel for Green Buildings
 - 12 HealthSource Saginaw, Inc., Saginaw, Michigan
 - 15 The Last Word in Steel News

PROJECT SUBMISSIONS

Do you have a project using sheet steel that you would like to see in *Steel Design*? The editor welcomes submissions of completed buildings – commercial, institutional, industrial, recreational and residential – using components made from steel, including cladding, steel decking, light steel framing, steel roofing, steel doors, steel ceiling systems and steel building systems.

The Editor, *Steel Design*
1039 South Bay Road
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CHANGE OF ADDRESS, NEW SUBSCRIPTIONS

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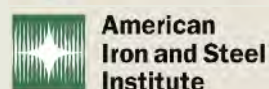
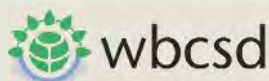
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COVER PHOTO: Marché ADONIS Supermarket, Brossard, Quebec

PHOTOGRAPHER: Robert Etcheverry



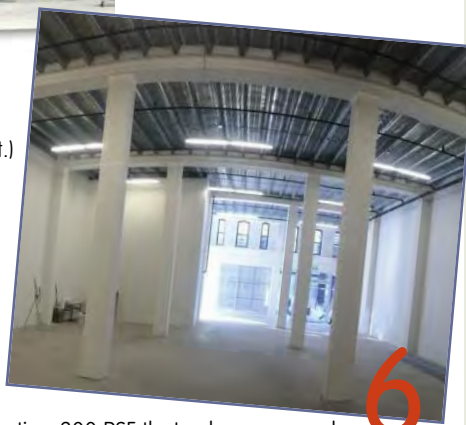
transforming tomorrow



3

3 Marché ADONIS Supermarket, Brossard, Quebec: Eye catching pre-painted Galvalume Steel announces store beside busy autoroute

The building is clad with approximately 2,100m² (22,605 sq. ft.) of pre-painted AZM150 Galvalume steel cladding. Behind the cladding is a layer of fibre cement panels, for shock resistance. The roof system uses 4,500 m² (48,440 sq. ft.) of Multi Layer, Suprema on the corrugated steel decking.



6

6 401 Yonge Street, Toronto: Speed, Strength, Simplicity, Steel.

"The client wanted to create a new retail space with a ground floor structure capable of supporting 200 PSF that, when exposed, needed no additional material for fire rating and with a minimal number of columns."

8 The Cold Hard Facts – Steel and Hyatt Place Edmonton West

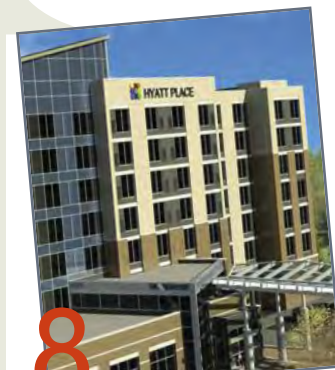
Pre-engineered prefabricated components provide a high level of quality control and avoid clutter and waste on-site. Their use not only facilitates speedy erection but also vastly reduces the labour component required.

Benefits accruing to the project owners include a one-source quality framing solution, reduced construction schedule and builders' insurance premiums, non-combustible construction, and a fast ROI.

10 Steel for Green Building Solutions

As society mobilizes to reduce our ecological footprint, pressure is building up on the construction industry to increase its contribution to environmental sustainability. And for good reason, the amount of energy required for lighting, heating and air conditioning a building over time far exceeds the energy used to build it.

8



10



12 HealthSource Saginaw, Inc. Saginaw, Michigan

A variety of Steel Roof and Wall Panel Systems satisfy the architect's vision

The new and improved HealthSource Saginaw project added more than 14,865m² (160,000 sq. ft.) of new patient, resident and client-care facilities, while renovating nearly 4,645m² (50,000 sq. ft.) of the existing building structure. The hospital features a total of 19,510m² (210,000 sq. ft.) of steel panel roofing and a ballast roofing system.



12

15 The Last Word in Steel News

- Granite® Deep Mat Organic Coated Steel.
- GHG/CO₂ Emissions.
- Light Steel Framing – Dimensional Stability.
- Pauingassi First Nation Community K4 to Grade 9 School.

Standard Colours	QC
Chocolate Brown	60034
Graphite Grey	60035
Umber Red	60036
Chrome Green	60037
Terra Rosso	60038
Jet Black	60039
Sepia Brown	60041
Oxide Red	60042
Copper Brown	60043

Marché ADONIS, which has grocery stores in Ontario and Quebec, chose pre-painted Galvalume for its lightness, the large inventory of colour choices, minimum maintenance and longevity. Speeding along Autoroute 10 on Montreal's South Shore in Brossard, it is hard to miss the brightly coloured supermarket on the edge of the Quartier DIX30 shopping complex. Because of its location, the "speed" question was a key challenge in ensuring the visibility of the building alongside the A-10.



Eye catching pre-painted Galvalume Steel announces store beside busy autoroute

To this end, the supermarket's exterior sports five Vicwest .76mm (.0299") 22.2mm (7/8") corrugated steel, pre-painted cladding colours: QC 16066 Tile Red, QC 16080 Bright Red, Sico 4054-63 Hyacinthe purple, QC 6063 Orange and NU359 Red Ruby. According to Raouf Boutros, with Atelier Raouf Boutros Architecte, the colours were chosen to attract the attention of drivers on the A-15, day and night.

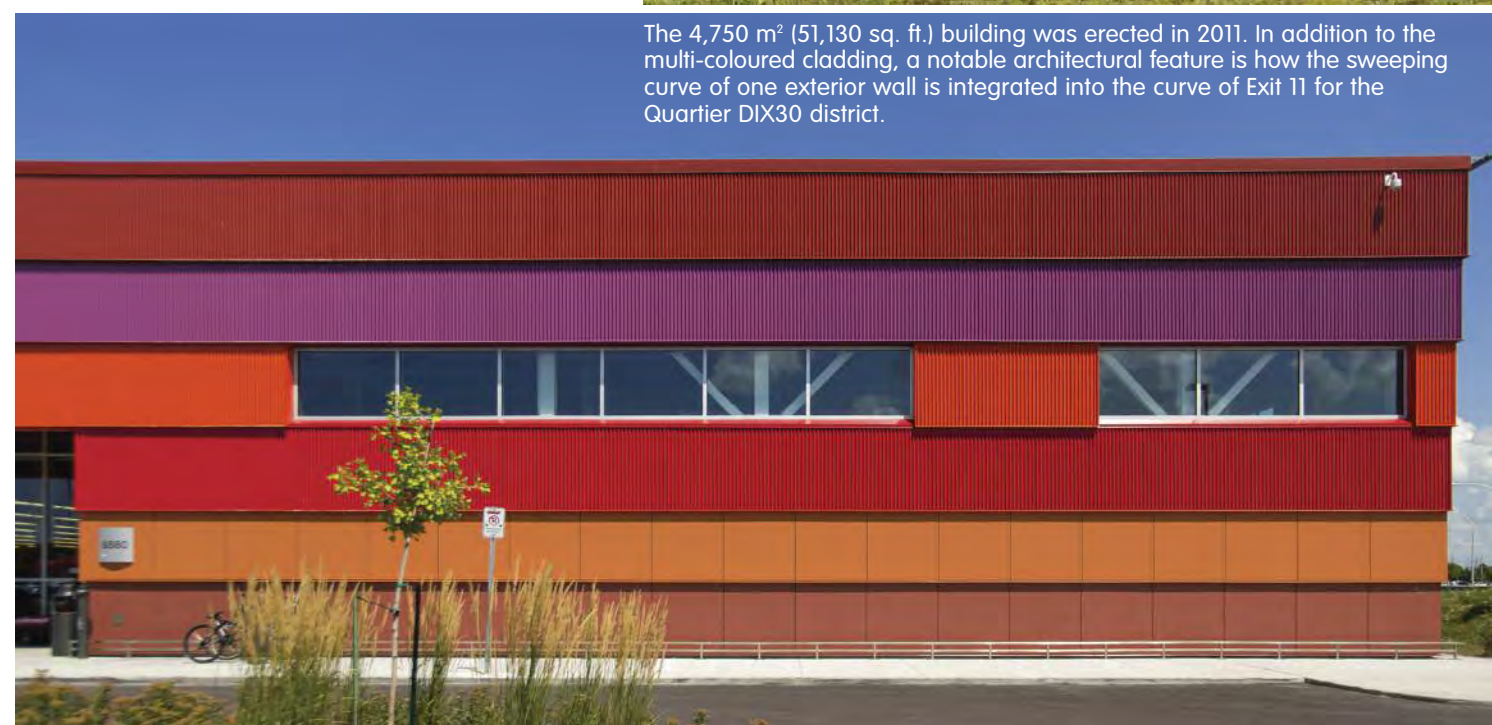
"The abundant night lighting illuminates the dazzling façade curving along the Autoroute..." reads a presentation prepared on the grocery store project.

The 4,750m² (51,130 sq. ft.) building was erected in 2011. In addition to the multi-coloured cladding, a notable architectural feature is how the sweeping curve of one exterior wall is integrated into the curve of Exit 11 for the Quartier 10x30 district.

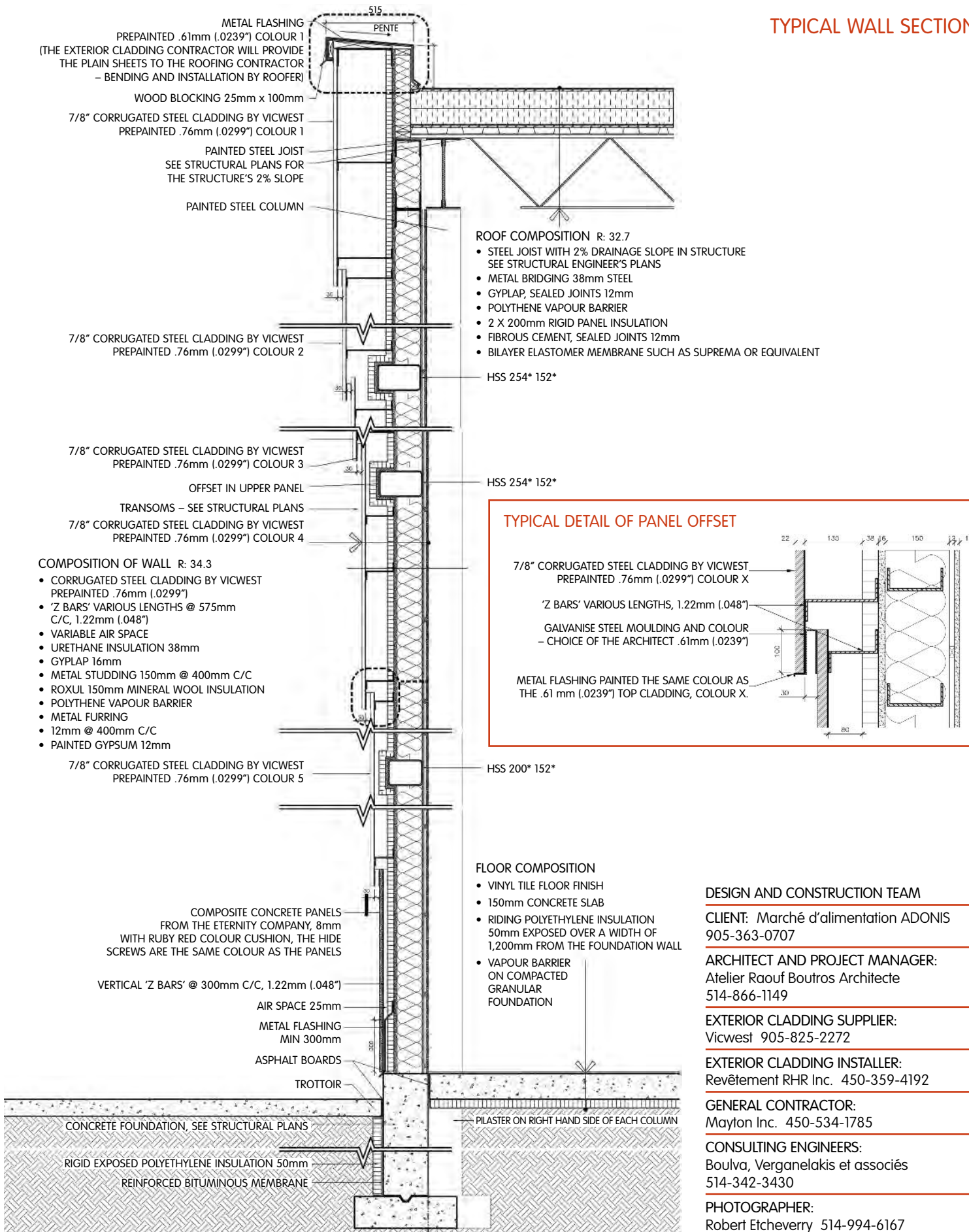
The building is clad with approximately 2,100 square metres (22,605 sq. ft.) of pre-painted AZM150 Galvalume steel cladding. Behind the cladding is a layer of fibre cement panels, for shock resistance. The roof system uses 4,500m² (48,440 sq. ft.) of Multi Layer, Suprema on the corrugated steel decking.



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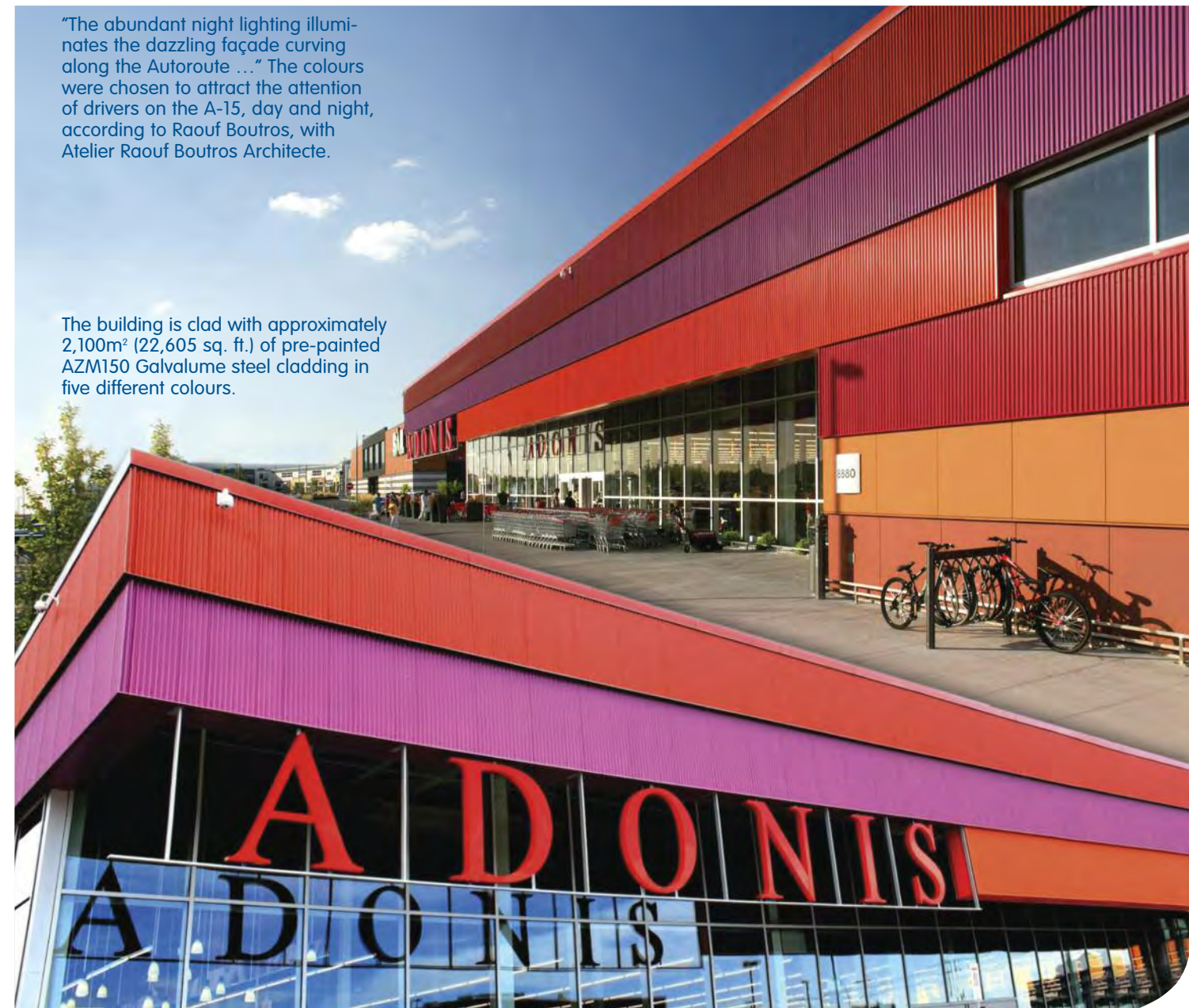


TYPICAL WALL SECTION



"The abundant night lighting illuminates the dazzling façade curving along the Autoroute ..." The colours were chosen to attract the attention of drivers on the A-15, day and night, according to Raouf Boutros, with Atelier Raouf Boutros Architecte.

The building is clad with approximately 2,100m² (22,605 sq. ft.) of pre-painted AZM150 Galvalume steel cladding in five different colours.



When facing a renovation in prime Toronto real estate with tight operating space, a client-mandated strong but lightweight exposed floor system with a 2-hour fire rating, and an aggressive time schedule, you need a solution as unique as the challenges. Such was the situation at 401 Yonge Street in Toronto. The existing building was a 3-storey wood structure with wood demising walls and a historically significant brick façade.

Speed, Strength, Simplicity = Steel

Thus a structure providing lateral support was necessary first, in effect, build a new building behind the existing façade.

Consulting engineers Atkins + Van Groll Inc. of Toronto provided the structural design for the new building and temporary structures, as well as assisting with sound and fire rating requirements. Founding partner Raymond Van Groll adds, "The client wanted to create new retail space with a ground floor structure capable of supporting 200 PSF that when exposed needed no additional material for fire rating, and with a minimal number of columns. Also a 2nd floor and room structure with the capability of adding a rooftop patio."

The solution? ComSlab®, a unique decking system combining steel and concrete cured together and bonded

structurally as one element. Compared to traditional cast-in-place concrete floors, ComSlab can save up to 40% concrete, 50% steel rebar, and 50% in shoring costs. Being stronger and lighter than other floor systems it allows for shallow floor depths from 27cm (10.5") and clear spans of 10m (33'). In this project .036" galvanized was used for the 20cm (8") deep ComSlab and topped with 11cm (4.5") of concrete for a slab depth of 32cm (12.5") with clear spans of 6m (20'). About 1,208m² (13,000 sq. ft.) of ComSlab was used. It was installed using a structural steel grid configuration of approximately 6m x 6m (20' x 20').

The previously 3-storey structure became two storeys plus lower level storage space. ComSlab's attributes allow for higher ceilings, in this case about 6.825m (22') between ground floor and 2nd floor, and 3.389m (11') 2nd

A strong but lightweight exposed floor system with a 2-hour fire rating and new structural steel, allowed for the construction of a new building behind a historically significant brick façade.



Construction of new structural steel and ComSlab.



ComSlab at ground floor, ready for concrete.

floor to ceiling. Bailey's ComSlab system obtained its first UL listed 2-hour unprotected fire rating early in 2014 for a 32cm (12.5") slab and later for a 32cm (12.25") slab, providing a unique exposed slab 2-hour fire separation between ground level retail and second level office space.

Bailey Metal Products Ltd. manufactured and supplied the ComSlab and provided detailed shop drawings for installation, carried out by Trancon Installations. Bailey's National Director, Business Development, Tony Di Giovanni says ComSlab's maneuverability, light weight and quickly installed self-positioning interlocking system made it a 'natural' for this project. The extremely tight downtown site meant that the ComSlab be bundled and lifted into place with small machinery.

The year-long project was completed in September 2015. At the time of writing, a mezzanine is being added at a height from the ground floor of about 3.389m (11'), also with a ComSlab floor.

ComSlab

GROUND FLOOR AND ROOF:

0.953mm (0.0375") Z275 (G90) galvanized steel deck (1-hour FRR requirement with 267mm [10.51"] total slab depth).

2ND FLOOR LEVEL:

1.257mm (0.0495") Z275 (G90) galvanized steel deck (2-hour FRR requirement with 317mm [12.48"] total slab depth).

TYPICAL BEAM:

W410 x 54 – ASTM A992, A572 Grade 50

COLUMNS:

W250x73 – ASTM A500 Grade C.



Finished space - ComSlab left exposed for 2-hour fire rating.

DESIGN AND CONSTRUCTION TEAM

PROJECT OWNER: Kingsett Capital 416-687-6700

ARCHITECT:
Goldsmith Borgal & Company Ltd. Architects 416-929-6556

CONSULTING ENGINEER:
Atkins + Van Groll Inc. 416-489-7888

OVERALL PROJECT MANAGER:
Globfin Developments Ltd. 905-403-8306

PROJECT MANAGEMENT & SITE SUPERVISION:
Leeswood Construction 416-309-4482

GENERAL CONTRACTOR:
Leeswood Construction 416-309-4482

COMSLAB SUPPLIER:
Bailey Metal Products Limited 905-738-9267

COMSLAB INSTALLER:
Trancon Installations Ltd. 416-996-0144

PHOTOGRAPHER: R. Van Groll



Edmonton, Alberta anticipates in excess of 3-million visitors a year to its downtown area. The city's Downtown Business Association (DBA) commissioned a report which indicated hotel accommodation was not keeping pace with expected demand. Some of the slack has been taken up by the Hyatt Hotels Corporation, building two hotels since 2014: Hyatt Place Edmonton Downtown and Hyatt Place Edmonton West, both due to open in late 2016.

The Cold Hard Facts – Steel and Hyatt Place Edmonton West

ComSlab is an alternative to conventional concrete slab floor and provides a cast-in-place structurally superior concrete slab. Being stronger and lighter than other floor systems it allows for shallow floor depths.

This article looks at the use of cold-formed steel (CFS) in the Edmonton West project.

Fifteen minutes from downtown the 7-storey Hyatt Place Hotel, now owned and managed by Lighthouse Hospitality Management, features 161 guest rooms and 255m²

(2,750 sq. ft.) of meeting space for social and corporate meetings and events.

The building comprises structural steel columns and cold-formed steel framing (CFS). VanderWal Homes &

Commercial Group of Petrolia, Ontario, designed, engineered and supplied all of the CFS framing and installed it, as well as the structural columns. Alex McGillivray, Sales and Marketing at VanderWal Group says, "Our design objectives were, of course, driven by the key considerations of the owner. They included premium quality, non-combustible prefabricated components allowing speed of installation, reducing the number of contractors and trades necessary, and contributing to a fast ROI."

McGillivray adds that VanderWal Group received the contract at the end of 2014 and were off-site by the end of October 2015. In that period all pre-engineered axial and wind-load bearing CFS wall panels, ComSlab® floors, CFS roof joists, galvaneal steel decking, all necessary bridging, blocking and bracing were completed for a total CFS framing of 28,499m (93,500 ft.). The framing included all CFS gauges from .036" to .108", ASTM A653/A653M, ASTM C1007, and ASTM C955. VanderWal Group provided the engineering for all of its pre-engineered, pre-fabricated components.

The ComSlab decking system was used on six of the seven floors – one was slab on grade and comprised 20cm (8") fluted pans with 9cm (3.5") top concrete for an 29cm (11.5") floor system using welded wire mesh and 20/25mm (0.79/0.98") rebar throughout, accommodating spans of over 8m (26') in multiple locations.

Pre-engineered, prefabricated components provide a high level of quality control and avoid clutter and waste on-site. Their use not only facilitates speedy erection but also vastly reduces the labour component required. Benefits accruing to the project owners include a one-source quality framing solution, reduced construction schedule and builders' insurance premiums, non-combustible construction and a fast ROI.

DESIGN AND CONSTRUCTION TEAM

OWNER: Lighthouse Hospitality Management Inc.
Edmonton 780-224-4521

ARCHITECT:
Axiom Architects, Red Deer 403-358-3311

ENGINEER: Grubb Engineering 587-876-5791

GENERAL CONTRACTOR: Lighthouse Hospitality Management Inc. Edmonton 780-224-4521

COLD FORMED STEEL FRAMING SUPPLIER AND INSTALLER:
VanderWal Homes & Commercial Group 519-882-0721

COMSLAB FLOOR SYSTEM:
Bailey Metal Products Limited 1-800-688-2154

PHOTOGRAPHER: VanderWal Group 519-882-0721



The seven-storey building comprised structural steel columns and cold-formed steel framing (CFS). It is a light weight system providing non-combustible construction, speed of installation and a faster return on investment.

Cold formed steel wall assemblies are lightweight, strong, fire resistant, easy to maneuver and they allow for the structure to be closed in more quickly.





As society mobilizes to reduce our ecological footprint, pressure is building up on the construction industry to increase its contribution to environmental sustainability. And for good reason, since it has been calculated that by 2050, energy savings in construction could easily have a greater impact on global CO2 emissions than the combined environmental efforts of the entire transportation sector. As a major supplier, ArcelorMittal is determined to play a key role in the 'green revolution' in the building industry.

Steel for Green Building Solutions

The use of prefabricated steel elements also speeds up construction while reducing the risks of accidents, pollution and neighbourhood nuisance on the construction site. Thanks to steel's high strength-to-weight ratio, steel construction requires less material than traditional building technologies and contributes to reducing a building's environmental impact, directly or through secondary savings (lighter foundation loads resulting in smaller foundations). Last but not least, steel can help make buildings more energy efficient, less costly and more comfortable. Hence, Arcelor Mittal has very little doubt that steel has a key role to play in today's move towards zero energy buildings.

Steel makes it easier to adapt buildings to new and innovative uses. A steel building, characterized by the absence of load bearing walls, is intrinsically more versatile and flexible than other types of structures.

Focusing on the use phase of buildings

The amount of energy required for lighting, heating and air conditioning a building over time far exceeds the energy used to build it. A high proportion of energy use is devoted to heat control, by artificially heating or cooling the building.

The combination of a steel structure with insulation can drastically reduce energy losses. Combined with double skin systems and/or sandwich panels with pre-painted technology, it is possible to create a thermally efficient envelope, meeting the strictest energy standards. In addition, the outstanding air tightness of steel cladding and roofing systems will eliminate air leakage that contributes to energy waste.

Steel makes it so much easier to adapt buildings to new and innovative uses. A steel building characterized by the absence of load bearing walls is intrinsically more versatile and flexible



Steel, being inorganic, does not support the growth of mould nor does it give off gas, thus contributing to excellent indoor air quality.

than other types of structure. With its prefabricated, lightweight and fast-to-erect components, steel construction means buildings can easily be updated to new construction standards. Steel gives buildings a longer, healthier life. In other words: it helps the construction industry to pursue sustainability.

The environmental advantages of steel as a building material are well documented and widely recognized. Steel is 100% recyclable, infinitely and without quality loss.

The social and environmental footprint of the building industry Today, the building industry provides 5% to 10% of employment worldwide and it generates 5% to 15% of the global Gross Domestic Product. It also accounts for 40% of energy consumption, 40% of CO2 emissions, 30% of the consumption of natural resources, 30% of waste generation as well as 20% of water consumption. From this we may safely conclude that the social and environmental aspects of the construction industry are equally important.





Originally constructed in 1929, HealthSource Saginaw, Inc. was a medical facility desperately in need of some resuscitation. In 2009, an elaborate eight-phase rebuilding project brought new life to the centre in Saginaw, Michigan – and new residents to its doors. “It was really outdated and the client wanted a state-of-the-art skilled care and nursing facility,” recalls Bob Zabowski, Principal Architect with Edmund London & Associates.

Steel was used extensively in the project, including the building’s framing, roof rafters, steel decking, exterior wall steel framing and gable ends. All of the UNA-CLAD roof panels are G90 galvanized steel finished with a Kynar 500®/Hylar 5000® Champagne Metallic PVDF paint finish and is Energy Star® qualified.



“The building has a central spine that runs down the entire length, connecting to the pods,” Zabowski says, adding that this “Main Street” contains a gift shop, a café, theatre, a chapel, multipurpose room, media centre, activity space, library and a barber, along with physical therapy spaces. “Each wing is like a neighbourhood.”

A variety of steel roof and wall panel systems satisfy architects’ vision while providing a durable finish

“The five-storey residency had to be demolished within 6.1m (20 ft.) of the new facility, which was a challenge. A portion of the brick façade actually fell off while we were working. It was a hazard.”

The new and improved HealthSource Saginaw was envisioned as its own village. Five different “pods” are a home for residents with different needs: long-term care, adult psychiatric, adolescent psychiatric, chemical dependency and medical rehabilitation.

“In between each pod along the street line, there are round lounge spaces created out of steel frame, which allows for large expanses of glass. This lets in a lot of light,” says Zabowski. “A steel roof is also very durable. It has much more life expectancy than asphalt shingles.”

The finished project has had great results for everyone involved, from the client to HealthSource Saginaw’s new residents, Zabowski says. “Their population was fairly low due to the antique building they were using. Now it’s almost completely full.”

DESIGN AND CONSTRUCTION TEAM

ARCHITECT & PLANNERS:
Edmund London & Associates Inc.
Southfield, Michigan 248-353-4820

GENERAL CONTRACTOR:
Spence Brothers Inc. 989-752-0400

WALL AND ROOF CLADDING SUPPLIER:
Firestone Building Products:
U.S. 800-428-4442 or 317-575-7000
Canada 888-292-6265

ROOF AND WALL CLADDING INSTALLER:
Beyer Roofing, Saginaw, Michigan 989-754-7741

The construction project added more than 14,865m² (160,000 sq. ft.) of new patient, resident and client-care facilities, while renovating nearly 4,645m² (50,000 sq. ft.) of the existing building structure. The hospital features a total 19,510m² (210,000 sq. ft.) of steel panel roofing and a ballast roofing system with a Firestone RubberGard non-reinforced EPDM membrane over ISO 95+ GL polyiso Insulation.

The renovation involved a multi-phase roof installation, and the clip-less design of the panels greatly increased the efficiency of the project. A custom hairpin hip cap was used on the cone-shaped or small half hexagon roof at the end of each hospital wing to provide a clean transition line from one roof plane to the next.



TECHNICAL SPECIFICATIONS:

END WALLS:
64mm (.0239"), 345mm (13.5-inch) UNA-CLAD UC-2 snap-on batten seam roofing panels

ROOF:
.64mm (.0239"), 450.85mm (17.75-inch) UNA-CLAD UC-4, a self-locking, architectural standing seam metal roof panel that completely eliminates the need for clips.

CONES:
.64mm (.0239") UNA-CLAD UC-7 Tapered snap-on standing seam roofing panels.

ALL MATERIAL:
G90 galvanized steel, painted with a Kynar 500®/Hylar 5000® Metallic PVDF paint finish, a three-coat fluoropolymer paint system.

SIDE WALLS:
Gable Ends; structural steel truss and frame with 15.2mm (.060") steel stud infill, @ 406.4mm (16") o.c.



CLADDING COLOURS:
*Energy Star® qualified

- Yellow UNA-CLAD custom colour CS31733 *
- Orange UNA-CLAD custom colour CS71732 *
- Red UNA-CLAD Regal Red *
- Purple UNA-CLAD custom colour CS61735 *
- Blue UNA-CLAD Electric Blue
- Green UNA-CLAD Tropical Patina *
- Champagne Metallic *



PROJECT PHASES:

PHASE I:
Construction of a new mechanical room including installation of new heating and cooling units, a new 40x80 maintenance/storage garage, a new parking lot and related site work.

PHASE II:
Demolition of the old west lobby to make room for new patient living areas.

PHASE III:
Demolition of existing maintenance and boiler room facilities.

PHASE IV:
Construction of the new Behavioral Medicine Center included 41 inpatient psychiatric beds and 27 inpatient chemical dependency beds, HealthSource's new Behavioral Professional Services office suite and 150 of their 213 long-term-care beds.

PHASE V:
Relocation of patients from existing to newly constructed areas completed in Phase IV. Demolition of the existing central resident wing and the existing psychiatric wing.

PHASE VI:
Construction of the remaining long-term-care beds, the 38 inpatient bed Medical Rehabilitation Center, as well as the remaining 63 long-term-care beds and Main Street areas.

PHASE VII:
This Phase involved the relocation of patients from the existing South building to newly constructed areas and demolition of the remaining portion of the South Building.

PHASE VIII:
Interior renovation of the administrative bank, therapy areas and main dining room. This phase also included necessary site work.

FRAMING IN NEW WINGS:
The new building was constructed of structural steel frame with 15.2mm (.060") exterior wall steel infill stud, @ 406.4mm (16") o.c.

SLOPED ROOF:
Constructed of structural steel roof trusses with 76.2mm (3") steel deck spanning approx. 3.66m (12') between trusses. The main street roof was constructed of curved tube steel trusses @ approx. 3.05m (10 ft.) o.c. with 89mm (3.5") curved acoustical steel decking (exposed).



ArcelorMittal Solutions in Steel™ Granite® Deep Mat Organic Coated Steel. A unique breakthrough design for metal roofing and wall cladding

Granite® Deep Mat, is a pre-painted steel that brings differentiation and originality in roofing and cladding designs for residential and commercial building projects.

Granite® Deep Mat is a textured low-gloss pre-coated steel designed for roofing (non-vertical) as well as sidewall (vertical) applications, in the construction market.

The flexible coating allows for a variety of profiles to be roll formed and stamped. Granite® Deep Mat's low gloss textured surface property, gives it a consistent appearance from any angle or position. The combined use of a high durable resin technology and high grade pigments meet the technical requirement of the roofing market with traditional colours.



Standard Colours	QC	
Chocolate Brown	60034	
Graphite Grey	60035	
Umber Red	60036	
Chrome Green	60037	
Terra Rosso	60038	
Jet Black	60039	
Sepia Brown	60041	
Oxide Red	60042	
Copper Brown	60043	

* please inquire about additional colours
** although care has been taken to reproduce colours, printed colours serve as a guideline only for the Granite® Deep Mat colour palette.

Paint characteristics:

- The exposed surface shall have a dry film thickness of 30 microns (1.2 mils).
- Unexposed (reverse side) dry film thickness will vary in accordance with customer requirements.

Processing:

Granite® Deep Mat's paint system is resilient to cracking and crazing during forming due to its high flexibility.

Performance:

Granite® Deep Mat's film integrity is designed for 40-year performance.

Reduced GHG emissions

Over the years, ArcelorMittal has continued to reduce the ecological impact of its steel manufacturing processes through continuous improvement for waste generation, water use, greenhouse gas emissions and energy use. For example, ArcelorMittal Dofasco has reduced its absolute GHG emissions by 22% since 1990.

ArcelorMittal Dofasco has also improved energy efficiency through the addition of equipment to produce electricity (up to 18 MW) when there is a surplus of by-product fuels generated by the steel-making operations. At the same time, ArcelorMittal continues to contribute to the development of breakthrough technologies, designed to reduce CO2 emissions from steelmaking by 30 – 70% by 2050.



Light Steel Framing – Dimensional Stability

- + Fire, Insect and Mould resistance
- + Recyclable
- = Durability and Sustainability



Pauingassi First Nation Community K4 to Grade 9 School

The roof is split into two heights. The mono-pitch roof is designed to minimize roof drainage into the courtyard. The cone over the entry foyer adds an interesting element to the building and represents a sacred Megis shell.

EDITORIAL INQUIRIES

We would like to hear from you!

If you have comments about this issue or a project you would like to see in an upcoming issue of *Steel Design*, please send a description of the project, include photographs, to:

The Editor, *Steel Design*
1039 South Bay Road, Kilworthy, ON P0E 1G0
Or email: davidfolliis@vianet.ca

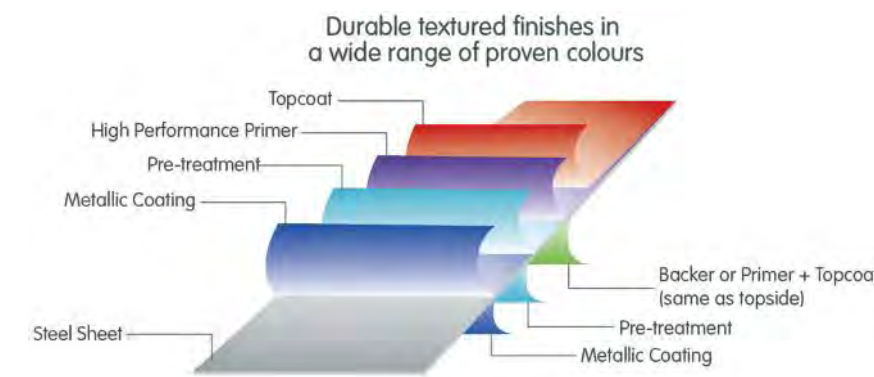


Figure 1 : Prepaint system specification



Steel-intensive home by BONE Structure™

The world is what you make it

Stronger, safer and more sustainable buildings. That's where innovations in steel are taking us. We continue to formulate steel that is lighter, improving an already superior strength-to-weight ratio for more efficient and effective structures. Lighter and stronger steel is also making construction easier – requiring less energy to move and assemble, and needing less extensive foundations. The result is stunning design, performance and sustainability.

See how we're transforming the construction sites of tomorrow at dofasco.arcelormittal.com

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