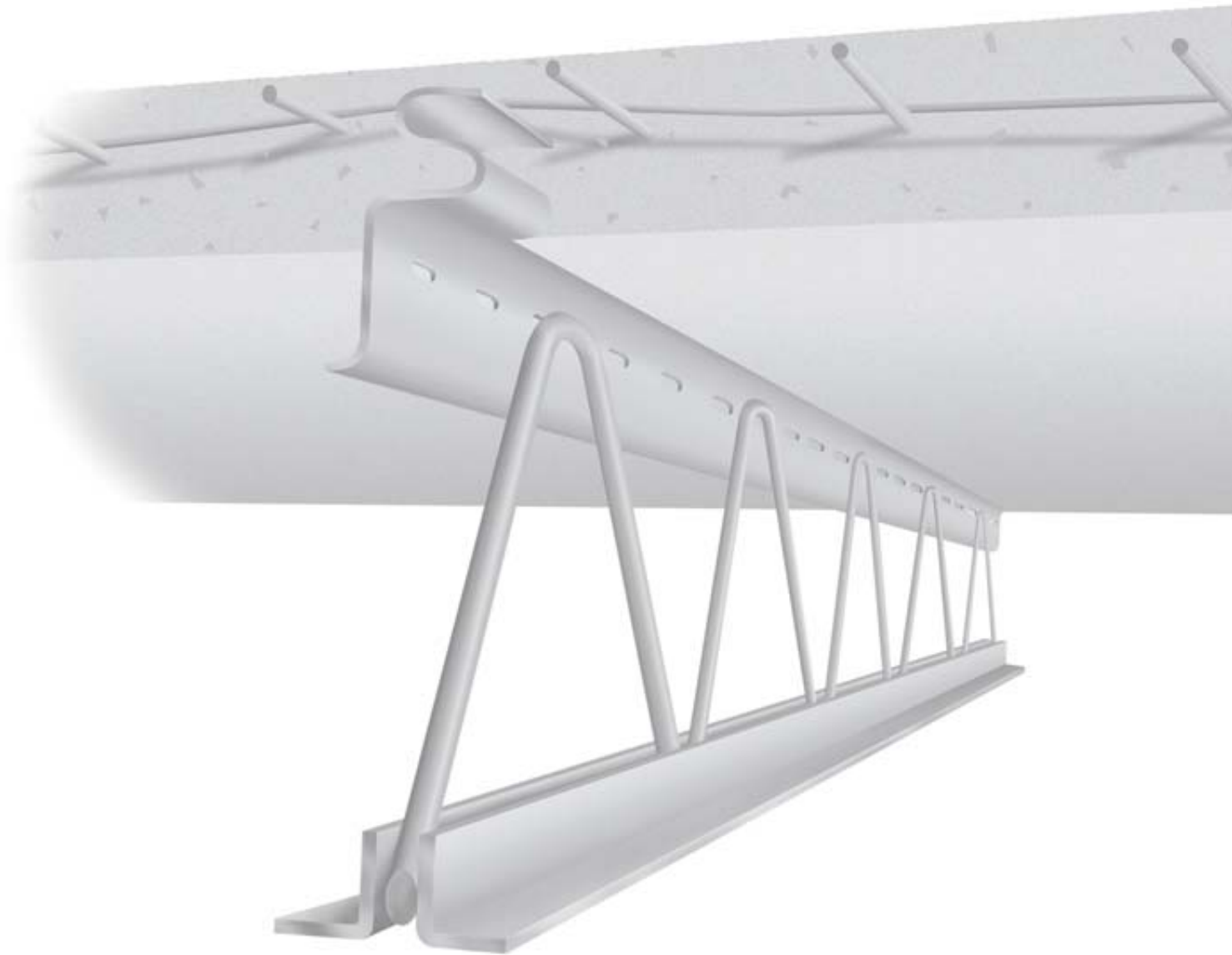




# D500™



**HAMBRO®**  
Proven Concrete Floor System



SPC No. 05260  
(05 21 00)

# COMPOSITE FLOOR SYSTEM



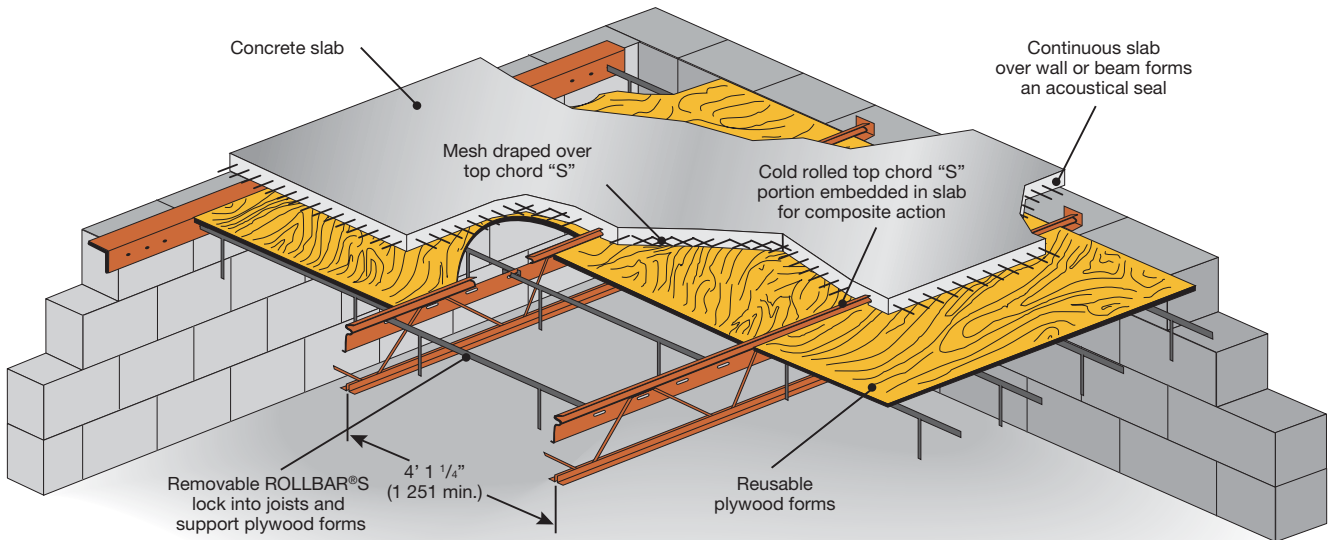
## Advantages

Simplicity:	Fast and simple to install
Rigidity:	Composite design
Maximum Duct Openings:	Allows chasing of mechanical, electrical and plumbing
Non-Combustible:	UL/ULC/cUL Ratings with PVC plumbing and duct openings without fire dampers
Acoustical Properties:	STC 57 / IIC 30
Versatility:	Applicable to all types of framing
Service:	Fast delivery, design assistance, value engineering
Long Spans:	Less concrete and reinforcing steel required, more economical

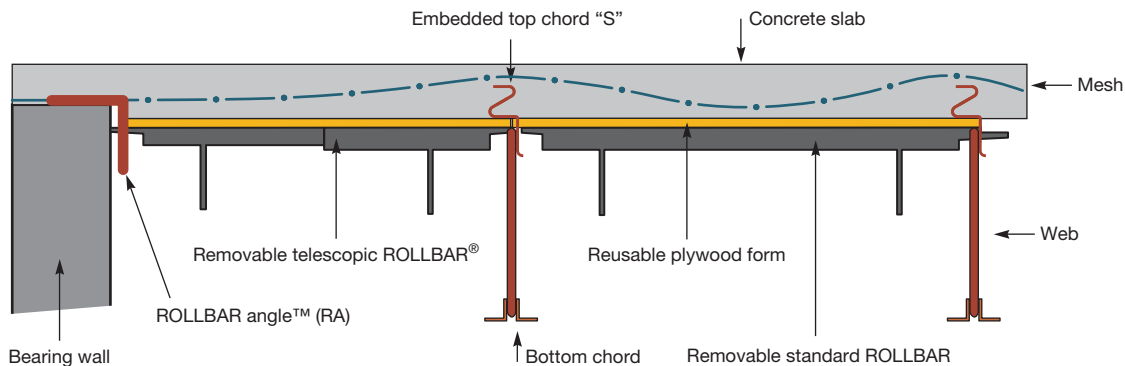
## Description

The D500™ composite floor joist system is an advanced up-to-date answer to elevated floor construction challenges. Combining Hambro® steel joists with poured concrete, the system consists of hybrid concrete/steel T-beams running in one direction and an integrated continuous slab in the other (see drawing below). The bottom chord ( $F_y = 50,000$  psi (350 MPa) min.) acts as a tension member in the concreting stage and during the service life of the floor. The web system tying top and bottom chords together consists of bent rods ( $F_y = 50,000$  psi

(350 MPa) min.) and resists vertical shear in a conventional truss manner. The patented 13 gauge top chord ( $F_y = 50,000$  psi (350 MPa) min.) acts as a compression member during the non-composite stage. In the composite stage, the top chord is embedded in the concrete and functions as a continuous shear connector. The concrete slab is reinforced with welded wire mesh. The top chord functions as a high chair, developing negative moment capacity in the concrete slab which behaves as a continuous one-way reinforced slab.



## Terminology



## The Secret Behind a Fast and Economical Installation

### 1. Spreading Joists



Joists are placed on the wall or beam and spread to approximately 4' (1 250 mm) o.c. Check your load conditions and fire ratings for permissible options.

### 2. Placing ROLLBAR®



ROLLBAR is designed to support the plywood forms, the slab dead weight and a 40 psf (1.92 kPa) construction load. When rotated and locked into notches in the top chord, ROLLBAR guarantees joist spacing while providing lateral and torsional stability.

### 3. Installing Plywood Forms



Together, the plywood and ROLLBAR form a rigid diaphragm during construction, providing a platform for your workforce. The Hambro® system accommodates standard 4' x 8' (1 220 mm x 2 440 mm) plywood sheets. (3/8", 1/2" or 5/8" (10, 13 or 16 mm) may be used.)

### 4. Mesh in Place



Standard 8' x 20' (2.4 m x 6.1 m) sheets of mesh are easily placed over the top chord "S" of the Hambro joists. With the top chord "S" acting as a high chair, the mesh forms a natural catenary to reinforce and support the concrete slab.

### 5. Using Spanners



Temporary spanners are installed to support 1/2" (13 mm) or 5/8" (16 mm) plywood sheets. Spanners are not required when using overlapped 3/8" (10 mm) plywood sheets.

### 6. View from Below



No permanent bottom chord bridging is required. Bottom chords are fabricated with clips generally at third points to accommodate ROLLBAR for temporary bracing during the concreting stage. No shoring is required unless noted.

### 7. Pouring Concrete



Minimum design is a 2 1/2" - 3,000 psi (65 mm - 20 MPa) slab. The monolithic pour develops diaphragm action and forms an acoustical seal where the slab passes over walls. The patented top chord "S" embeds in the pour of the slab for composite action.

### 8. Stripping Formwork



ROLLBAR and plywood forms may be stripped when the concrete reaches 500 psi (3.5 MPa), which is usually the day after the pour. The deck is ready for other trades when the concrete reaches a strength of 1,000 psi (7 MPa), usually within 48 hours after the pour. The formwork is easily removed for future re-use.

### 9. UL/ULC/cUL Fire Rated



Furring channels are tied to the bottom chord of the Hambro joists. Fire-rated gypsum board completes the assembly, providing an attractive continuous ceiling. See page 4 for UL/ULC/cUL ratings.

# TECHNICAL SECTION

## Fire Protection

Floor/ceiling assemblies using Hambro® have been tested by independent laboratories. Fire resistance ratings have been issued by Underwriters Laboratories Inc. and by Underwriters Laboratories of Canada (ULC) which cover gypsum board, acoustical tile and spray on protection systems. Reference to these published listings should be made in detailing ceiling construction. Check your UL/ULC directory for the latest updating of these listings.

UL/ULC/cUL Design No.	Rating (hr)	Slab Thickness		Ceiling	Beam Rating (hr)
		(in.)	(mm)		
I506	2	2 1/2	65	Gypboard 1/2" (12.7 mm)	-
	2	3 1/2	90	Gypboard 1/2" (12.7 mm)	-
I518	1 1/2	2 1/2	65	Gypboard 1/2" (12.7 mm)	2
	2	2 1/4 - 3	70 - 75	Gypboard 1/2" (12.7 mm)	2
I800	1 - 1 1/2 - 2	2 1/2 - 2 3/4	65 - 70 76 - 89	Spray on	1
G003	2	2 1/2	65	Suspended or panel	-
G213	2	3	75	Suspended or panel	2
	3	4	100	Suspended or panel	3
G227	2	2 1/2	65	Suspended or panel	3
G228	2	3 1/4	83	Suspended or panel	2
G229	2	3	75	Suspended or panel	2
	3	4	100	Suspended or panel	3
G401	4	2 1/2	65	Plaster	-
G524	1 - 2	2 1/2*	65*	Gypboard 1/2" (12.7 mm)	2
	3	3 1/2*	90*	Gypboard 1/2" (12.7 mm)	3
G525	3	3 1/4	83	Gypboard 5/8" (15.9 mm)	3
G702	1 - 2 - 3	Varies*	Varies*	Spray on	-
G802	1 - 2 - 3	Varies*	Varies*	Spray on	-

\*Note: Normal and lightweight concrete

## Acoustical Properties

**STC:** The Hambro assembly has a "SOUND TRANSMISSION CLASS" of 57. STC is a rating that assigns a numerical value to the sound insulation provided by a partition separating rooms or areas. The rating is designed to match subjective impressions of the sound insulation provided against the sounds of speech, music, television, office machines and similar sources of airborne noise that are characteristic of offices and dwellings.

**IIC:** The Hambro assembly has an "IMPACT INSULATION CLASS" of 30. IIC is a rating designed to measure the impact sound insulation provided by floor/ceiling construction. The IIC of any assembly is strongly affected by and dependent upon the type of floor finish for its resistance to impact noise transmission.

Materials	STC	IIC
Hambro D500™ Floor Joist System	57**	30**

\*With a drywall ceiling.

\*\*All results are based on laboratory testing.

**Note:** Laboratory tests were performed on a Hambro assembly consisting of a concrete slab, the Hambro joists, metal furring channels and a drywall ceiling. Your professional construction design team should be consulted to determine the overall requirements of your project and the methods by which they will be achieved.

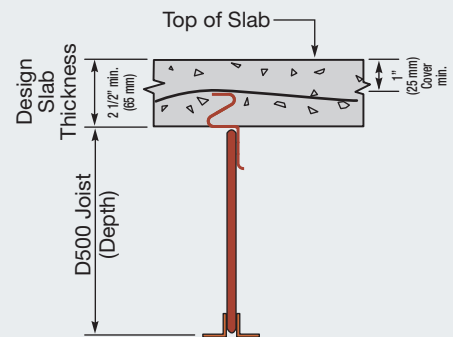
## D500™ Clear Span Table

Slab Thickness	Residential			Commercial	
	3" (75 mm)	3 1/2" (90 mm)	4" (100 mm)	3" (75 mm)	4" (100 mm)
Joist Depth*	LL = 40 psf (1.9 kPa) DL = 65 psf (3.1 kPa)	LL = 40 psf (1.9 kPa) DL = 71 psf (3.4 kPa)	LL = 40 psf (1.9 kPa) DL = 77 psf (3.7 kPa)	LL = 50 psf (2.4 kPa) DL = 65 psf (3.1 kPa)	LL = 50 psf (2.4 kPa) DL = 77 psf (3.7 kPa)
8" (200 mm)	20' - 0" (6 100 mm)	20' - 0" (6 100 mm)	20' - 0" (6 100 mm)	20' - 0" (6 100 mm)	20' - 0" (6 100 mm)
10" (250 mm)	25' - 0" (7 600 mm)	24' - 6" (7 500 mm)	23' - 6" (7 200 mm)	25' - 0" (7 600 mm)	23' - 6" (7 200 mm)
12" (300 mm)	30' - 0" (9 100 mm)	27' - 0" (8 200 mm)	26' - 0" (7 900 mm)	30' - 0" (9 100 mm)	26' - 0" (7 900 mm)
14" (350 mm)	31' - 0" (9 400 mm)	29' - 6" (9 000 mm)	28' - 0" (8 500 mm)	31' - 0" (9 400 mm)	28' - 0" (8 500 mm)
16" (400 mm)	33' - 6" (10 200 mm)	32' - 0" (9 800 mm)	30' - 6" (9 300 mm)	33' - 6" (10 200 mm)	30' - 6" (9 300 mm)
18" (450 mm)	36' - 0" (11 000 mm)	34' - 0" (10 400 mm)	32' - 6" (9 900 mm)	36' - 0" (11 000 mm)	32' - 6" (9 900 mm)
20" (500 mm)	38' - 6" (11 700 mm)	36' - 0" (11 000 mm)	34' - 6" (10 500 mm)	38' - 6" (11 700 mm)	34' - 6" (10 500 mm)
22" (550 mm)	40' - 6" (12 300 mm)	38' - 6" (11 700 mm)	36' - 6" (11 100 mm)	40' - 6" (12 300 mm)	36' - 6" (11 100 mm)
24" (600 mm)	43' - 0" (13 100 mm)	40' - 6" (12 300 mm)	38' - 0" (11 600 mm)	43' - 0" (13 100 mm)	38' - 0" (11 600 mm)

\* Total floor depth = D500™ Joist depth plus slab thickness

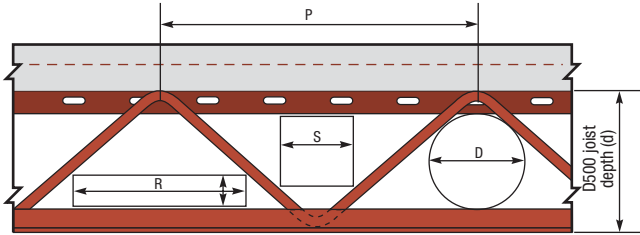
## NOTES:

- Minimum design thickness = 2 1/2" (65 mm)
- Minimum top chord cover = 1" (25 mm)
- $f'_c = 3000$  psi (20 MPa),  $F_y = 50$  ksi (345 MPa)
- Table reflects uniform loads only.
- Standard spacing is 4' - 1 1/4" (1 250 mm)
- Span limits reflect double 1/2" (12.7 mm) rod reinforcement limits
- Live load deflection limit L/360 (Standard)
- Design > 43' - 0" (13 105 mm) require additional structural design review.



**NOTE:** The information provided herewith is for general information about Hambro products and is subject to change without notice for updates and improvements. Hambro does not accept responsibility for improper use of this information.

## Maximum Duct Openings



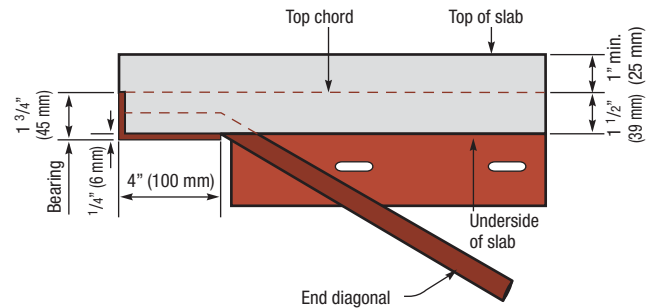
### Duct Openings (in.)

d	P	D	S	R
8	20	4	4	6 x 3
10	20	6	5	7 x 4
12	24	8	6	9 x 5
14	24	9	7	11 x 5
16	24	10	8	13 x 5
18	24	11	8 1/2	12 1/2 x 6
20	24	11 1/2	9	13 x 6
22	24	12	9 1/2	14 x 6
24	24	12 1/2	10	14 x 7

### Duct Openings (mm)

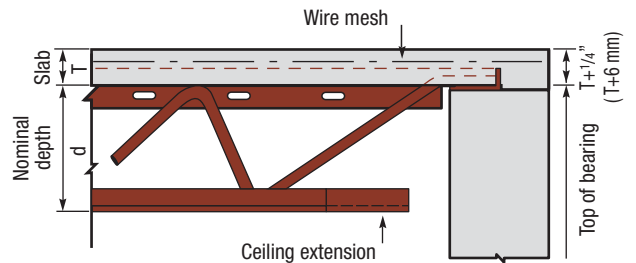
d	P	D	S	R
200	508	100	100	150 x 75
250	508	150	125	175 x 100
300	610	200	150	225 x 125
350	610	225	175	240 x 150
400	610	250	200	265 x 165
450	610	280	216	280 x 175
500	610	292	225	310 x 175
550	610	300	240	310 x 200
600	610	315	250	330 x 200

## Standard Shoe\*



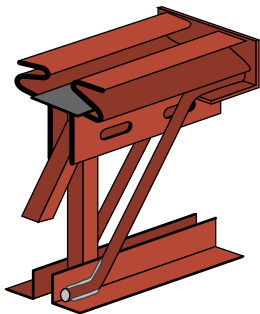
\*All dimensions are approximate

## Typical Bearing Detail



\*On concrete wall

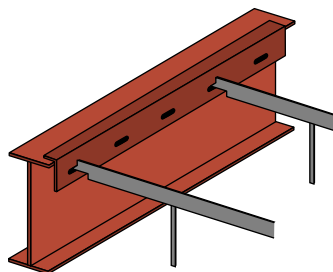
## Additional Systems and Accessories



### LH Series

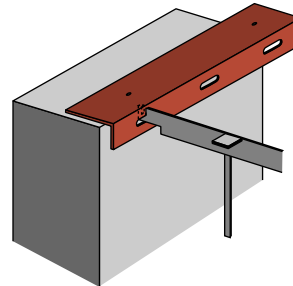
This series features a top chord "S" made of two Hambro sections.

Hambro composite long span floors provide greater economy for heavy service loads and longer spans. Joist depths range from 20" to 36" (508 mm to 915 mm) with spans up to 53' (16 155 mm). Details are available from your Hambro representative.



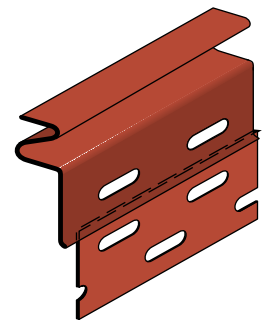
### ROLLBAR® Angle (RA) on Steel Beam

This Hambro accessory is designed to be field attached to the top flange of a steel beam running parallel to a Hambro joist. Rollbar Angle (RA) is slotted similar to the Hambro top chord "S" to accommodate ROLLBAR.



### RA on Walls

This Hambro accessory is fastened at the top of walls and is slotted similar to the Hambro top chord "S" to accommodate ROLLBAR.



### Hanger Plate / Hanger Strip

Shop attached slotted plate for thicker slab areas.

# PROJECTS



The design flexibility of the Hambro system satisfies the needs of any type of construction. It has been used for masonry or steel-frame buildings; poured or pre-cast concrete walls, as well as wood or metal frame construction. Hambro® has been used successfully in single-family detached houses, multi-storied residential complexes and commercial buildings.



*St. Leo University Domitory  
Tampa, FL*



*Lac-Brome Residence  
Brome, Quebec*



*Holiday Inn Express  
Albany, NY*



*Regions Bank Building  
Fort Lauderdale, FL*



*Stonington Commons  
Stonington, CT*



*Reimer Office Building  
Burlington, Ontario*

# PROJECTS



*Cherry Lane Towers  
Penticton, BC*



*Extended Stay  
Deerfield Beach, FL*



*Evergreen Place  
Guelph, Ontario*



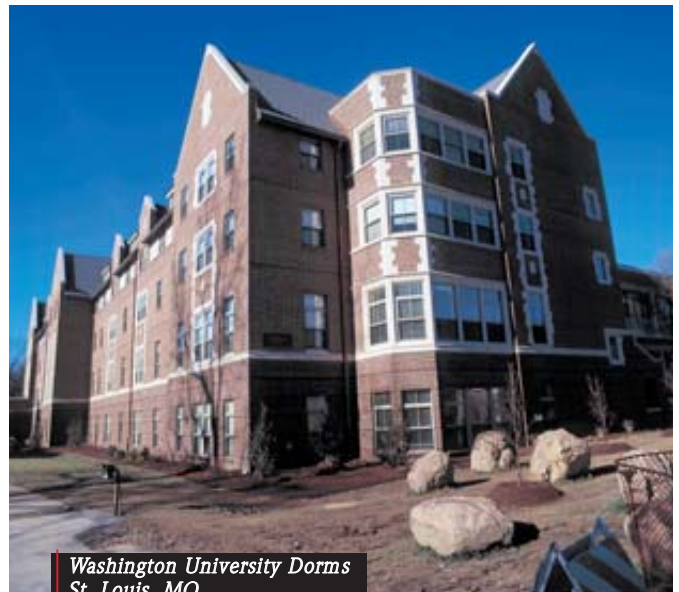
*Minto Builders Condominiums  
Boyton Beach, FL*



*Mordhorst Residence  
Millarville, Alberta*



*Courtyard Airport Corporate Center West  
Mississauga, Ontario*



*Washington University Dorms  
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