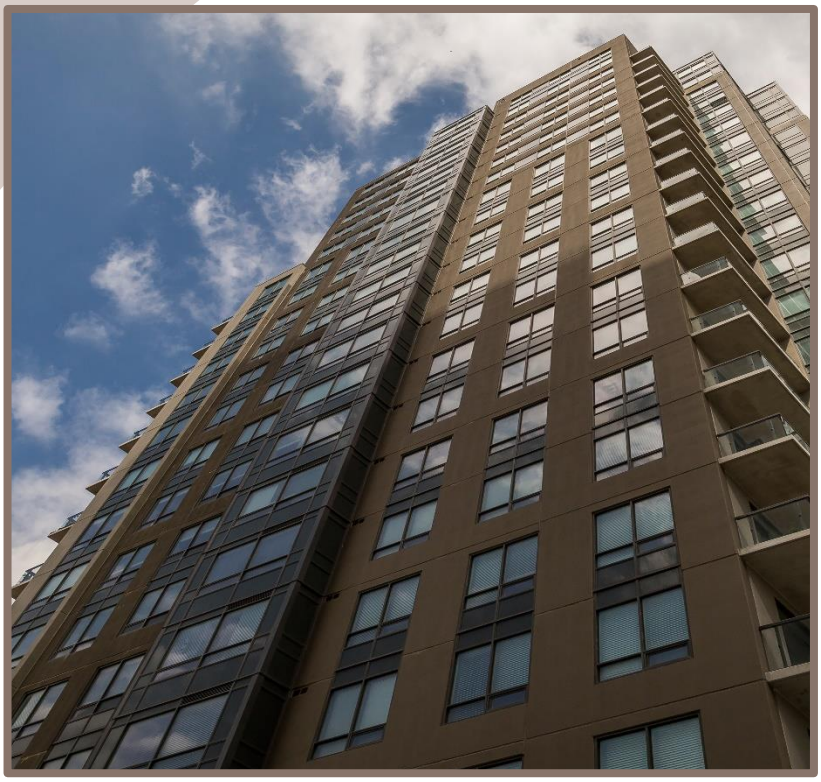
MID TO HIGH RISE RESIDENTIAL

THE ONYX AT THE BARREL YARDS



PROJECT CREDITS

OWNER
Auburn Development Inc.

ARCHITECT OF RECORD
Turner Fleischer Architects Inc.

ENGINEER OF RECORD
HGS Limited, Consulting Engineers

GENERAL CONTRACTOR
Stonerise Construction Inc.

FORMING CONTRACTOR
Redline Structures Inc.

MATERIAL SUPPLIERS
Stubbe's Precast
Hogg Fuel & Supply Ltd.

ADDITIONAL PARTICIPANTS
- Aluma Systems
- Sika Canada

PROJECT FACTS

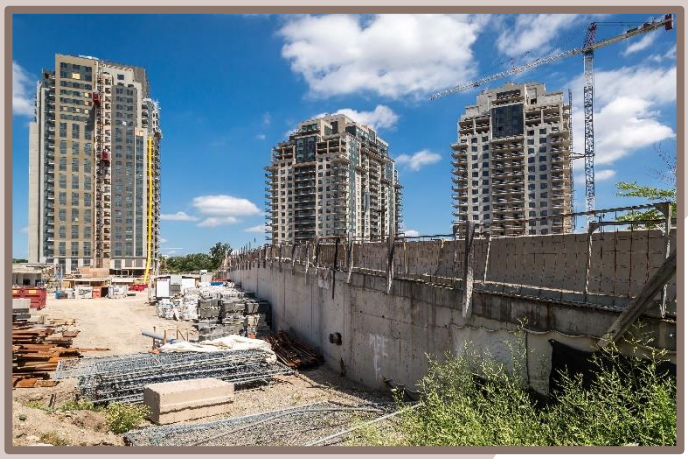
LOCATION Waterloo, Ontario

COMPLETION December 2015

GROSS FLOOR AREA over 450,000 sq. ft.

PROJECT SUMMARY
The Onyx at the Barrel Yards in Waterloo consists of two 25-storey point towers of 357 residential units complete with a 2-storey podium and one level of underground parking.

2016 Ontario Concrete Awards



The Onyx at The Barrel Yards is a multi-phase, multi-tower, high-rise residential project consisting of two 25-storey point towers with a 2-storey podium and one level of underground parking. Each standing at 85 m, the gross floor area is over 450,000 sq. ft., with a total unit count of 357. The historic Barrel Yards site in Watelroo, Ontario, was purchased by Auburn Devleopment. Teaming up with Turner Fleischer Architects, HGS Ltd. Consulting Engineers, Stonerise Construction, Stubbe's Precast, and Redline Structures, this The Onyx was realized on this unique site.

Initially, the two point towers were designed entirely as a cast-in-place system. Cost initiative and construction sequencing review, a hybrid cast-in-place and precast structure was devised, creating all typical tower levels out of precast. This conversion of concrete methods was determined after the initial visualization and preparation of the residential tower designs, which presented a challenge to maintain all architectural elements and details. The 2-storey podium and underground parking were cast-in-place for the first tower (D), followed by 22 storeys of precast typical levels forming the tower. Stubbe's Precast supplied and installed a complete precast system for the tower, the largest piece spanning 24'-2".

By tactfully determining the financial and scheduling efficiencies of precast through strong effective project management and collaboration, each floor was completed in 4-5 days, finishing an unprecedented four months ahead of schedule.

The skillful implementation of precast concrete at The Onyx is directly responsible for the success of this new, exciting development a The Barrel Yards in Waterloo. Using multiple forms of precast concrete and cast-in-place, the two 25-storey point towers represent adaptability, innovation, and savvy in concrete usage.

Initially, the entirety of these two towers was designed to be cast-in-place. It was late in the design development phase that the client requested a conversion to a full pre-cast structure. After evaluating costs, scheduling, and structural integrity, a hybrid model was devised, implementing cast-in-place concrete at the underground and podium levels, and precast on all 23 tower levels. Working closely with HGS Consulting Engineers and Stubbe's Precast, the first 25-storey tower was realized, without compromising the desired architectural design.

Collaboration with the supplier, Stubbe's Precast was integral to the success of these buildings. Stubbe's supplied and installed a total precast structure for the entirety of the towers above the podium level, producing an innovative and durable system. With this total precast system, new challenges were presented, with regards to connections and details. HGS Consulting Engineers were tasked with the challenge of analyzing and designing components and connections to withstand seismic and wind loads, in addition to the standard gravity loads. This meant developing unique connections, including the transfer of diaphragm forces from slabs to walls. Certain locations called for the design of transfer slabs and beam mechanisms which had to be designed and detailed using exclusively precast components. A 3D ETABS model was developed for each tower, generating a realistic prediction of anticipated deflections and drifts under full lateral loads by the precast system. Both ETABS and Revit expedited coordination, particularly of the concrete structure, between Turner Fleischer, Stubbe's and HGS, ensuring timely completion of this project.

Adaptability and motivation were the drivers of this successful development. Turner Fleischer's flexibility and willingness to accommodate all minor adjustments in the original design to allow for precast streamlined coordination efforts. The implementation of an innovative hybrid concrete system maximized efficiency and value. Multiple concrete methods a applications throughout the entire system allowed for the successful exploitation of concrete's manifold characteristics: structural integrity, durability, ease and speed of construction, and aesthetic value. This hybrid project promoted a greater understanding of each method's strengths and limitations, and the most efficient applications of each.

The Onyx at The Barrel Yards pushed the boundaries and expectations of concrete use in point tower construction, becoming a precedent for future concrete design.