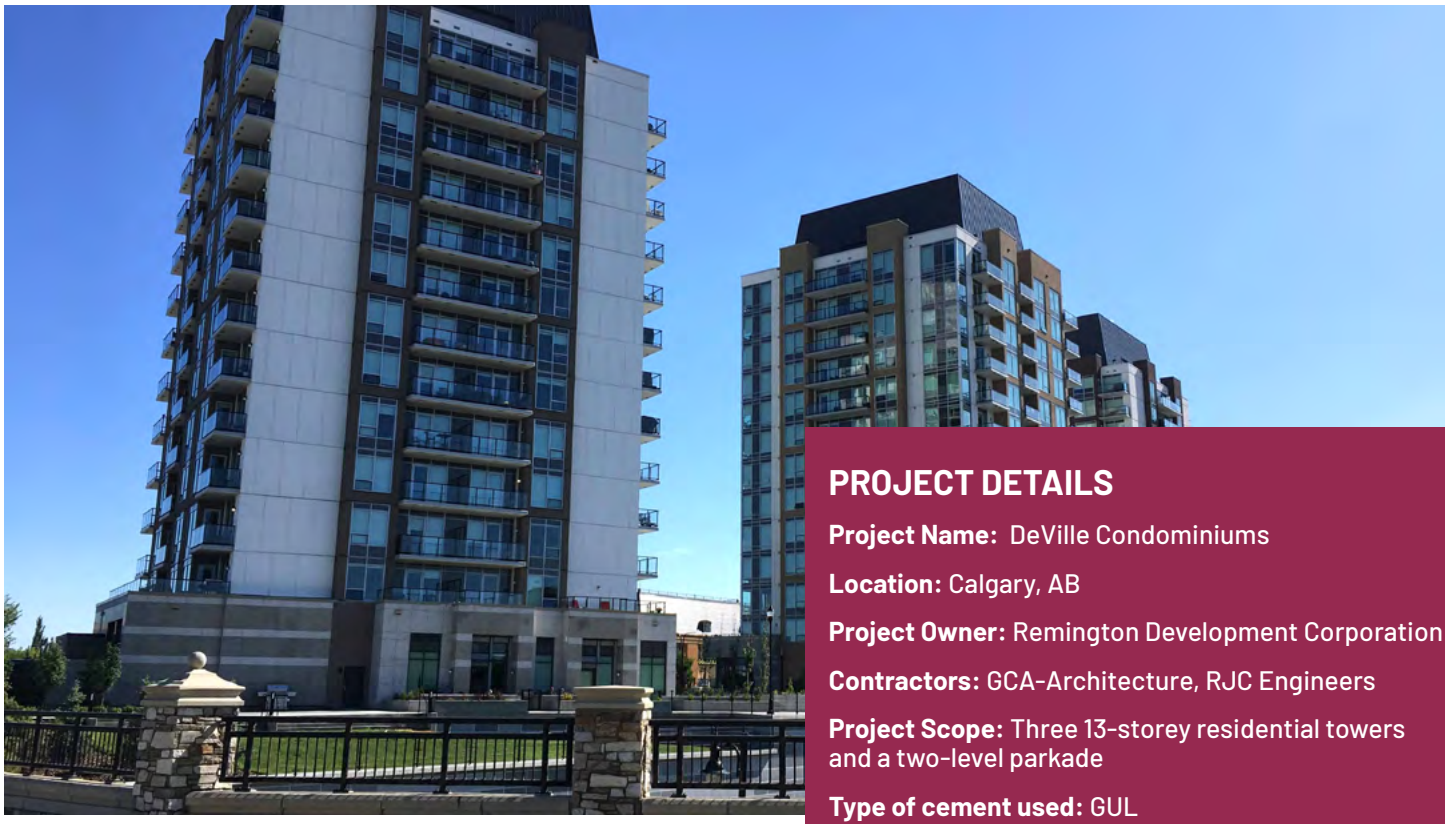
Cement Association of Canada

LOWER CARBON CONCRETE CASE STUDY: DEVILLE CONDOMINIUMS



PROJECT DETAILS

Project Name: DeVille Condominiums

Location: Calgary, AB

Project Owner: Remington Development Corporation

Contractors: GCA-Architecture, RJC Engineers

Project Scope: Three 13-storey residential towers and a two-level parkade

Type of cement used: GUL

SCMs: Type F fly ash at minimum cement replacement rates of 25%

Exposure Class: F-2, N

Concrete Design Strength: 25-45 MPa

Amount Used: 8,614 m^3

DeVille at Quarry Park entailed the construction of three, 13-storey residential towers, each housing one hundred or more rental units, with a shared two-level parkade. This multi-residential addition to the Quarry Park community was a result of a team effort by three key project team members, namely GGA-Architecture, Remington Development Corporation, and RJC Engineers. Construction of the $100 Million plus, 275,000 sq. ft. (25,550 sq. m.) complex was completed in three phases: tower one and parkade (completed August 2021), tower two (completed April 2022), and tower three (completed August 2022).

This project is a good example of the carbon reducing benefits of engaging and collaborating with ready-mixed concrete suppliers early in the project. As part of the mix design submittal and review process, eleven mix designs, including two high early strength mixes, were submitted by the ready-mix producer to the contractor.

Preliminary discussions at the planning table with the ready-mixed concrete provider present reviewed scheduling and mix performance. This discussion raised the possibility that the special application high-early strength mixes might be able to be eliminated. Not only would this allow the project to reduce the number of different mix designs, but this would also avoid the use of higher-carbon specialty high-early strength mixes.

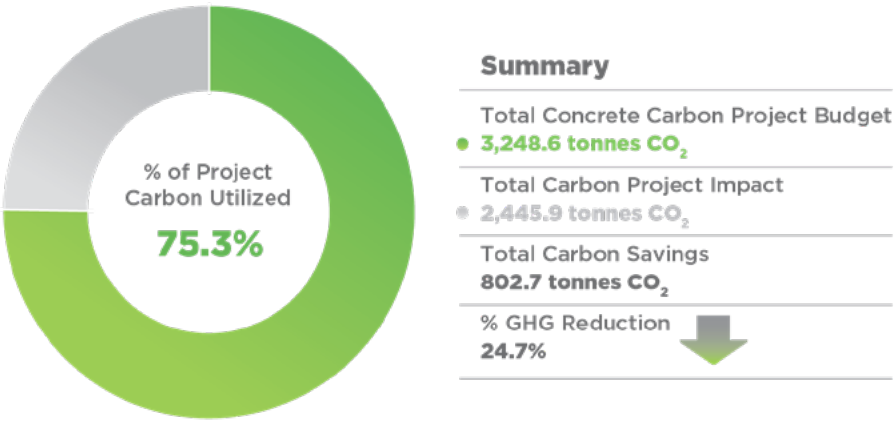
Photos: Masson 2023

Once the project got underway, early field test results, along with schedule coordination, supported the ability to eliminate the use of the high-early specialty mixes. Collaboration between ready-mixed concrete producer and project team in this regard facilitated implementation of this carbon-lowering value-engineering opportunity.

Other project details:

- Concrete carbon footprints (GWP values) were brought below baseline Industry Averaged EPD levels by using Type GUL portland-limestone cement and Type F fly ash at minimum cement replacement rates of 25%.
- Construction schedules were maintained through the occasional use of chemical accelerators and by effective use of super plasticizers to increase the workability and to improve cementing materials efficiencies.
- The project used 56-day design targets for most of the C-1 concrete. This extended time to specified design strength allowed for a reduction of cement in the mix design and therefore lowered CO2 in the project.
- The ready-mixed concrete producer had Type III plant-specific EPDs available for the mixes on the project.

Concrete Carbon Project Summary



Source: Concrete Carbon: A Guideline for Specifying Low Carbon Ready Mixed Concrete in Canada, p.71