

AEC  
Excellence Awards 2019

# 2019 AEC EXCELLENCE

## They're building it better

The opportunity for better buildings, infrastructure and construction is at our fingertips. No matter the project or its size, we can “build it better” with technology and sustainable practices to use materials and energy more efficiently, build healthy and resilient communities, and focus on the future of work and prosperity.

Innovative use of technology—whether it’s for an arena, a bridge, a metro line, or a mixed-use development—will drive this new reality. That’s why Autodesk’s AEC Excellence Awards honor the small, medium, and large-sized projects for infrastructure design, building design, and construction that are making an impact with advanced approaches and pioneering achievements. They’re reflective of how far we’ve come and inspire us all to do even more.



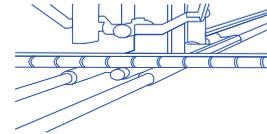
**Nicolas Mangon**, Vice President,  
AEC Strategy and Marketing, Autodesk

A stylized, handwritten signature in white ink, appearing to read 'Nicolas Mangon'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

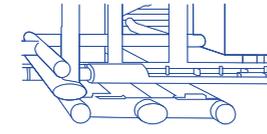
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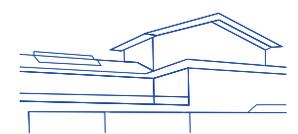
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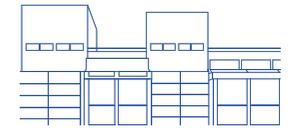
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# Meet the judges



**Aileen Cho**  
Senior Transportation Editor,  
Engineering News-Record



**Alexandra Wynne**  
Deputy Editor, New Civil  
Engineer



**André Borrmann**  
Full Professor for Computational  
Modeling and Simulation,  
Technical University of Munich



**Dr. Noha Saleeb**  
Associate Professor,  
Construction & Creative  
Technologies, Middlesex  
University UK



**Richard Massey**  
Director, Zweig Group



**Ryota Ieiri**  
Journalist, Nikkei



**Anil Sawhney**  
Director, Infrastructure  
Sector, Royal Institution  
of Chartered Surveyors



**Anthony  
Frausto-Robledo**  
Architect & Founder and  
Editor of Architosh



**Dr. Donna  
Laquidara-Carr**  
Industry Insights  
Research Director, Dodge  
Data & Analytics



**Sheng Liming**  
President, China Railway  
BIM Alliance



**Sigrid Brell-Cokcan**  
Founder and Director,  
Chair for Individualized  
Production in Architecture,  
RWTH Aachen University



**Steven K. Ayer**  
Assistant Professor, Arizona  
State University



**Jack Cheng**  
Associate Director, GREAT  
Smart Cities Institute



**Jay Snyder**  
Technology Practice  
Leader, FMI



**Keiichiro Taniguchi**  
Architect & Assistant  
Professor, University  
of Tokyo



**Todd Danielson**  
Editorial Director, Informed  
Infrastructure and V1 Media



**Wang Ziniu**  
Vice President and  
Executive Secretary General,  
China Engineering and  
Consulting Association



**Zulfikar Adamu**  
Associate Professor, Strategic  
IT in Construction, London  
South Bank University



**Luke Faulkner**  
Director of Technology  
Integration, American Institute  
of Steel Construction



**Max Labecki**  
Engineering Officer  
CAD, Ausgrid



**Monica Schnitger**  
President and Principal  
Analyst, Schnitger Corp.

# Ümraniye-Ataşehir-Göztepe Metro Line

**Company:** Gülermak Nurol Makyol Joint Venture and Yüksel Proje Inc.

**Country:** Turkey

**Project category:** Infrastructure Design | Large size project

**URL:** uagmetro.com

**Powered by:** AEC Collection, 3ds Max, AutoCAD, BIM 360, Civil 3D, Dynamo Studio, InfraWorks, Navisworks, ReCap, Revit, Robot Structural Analysis Professional



Image courtesy of Yüksel Proje Inc.

## Metro Line in Istanbul, Turkey

Using BIM technology resulted in approximately 16% cost saving across the project.

Opening in 2022, Ümraniye-Ataşehir-Göztepe Metro Line will be 13km in length with 11 underground stations. As the stations are located within heavily populated areas of the city, planning work has been complicated.

Every aspect of the project has been meticulously planned using technology. Data gathered from drones and survey equipment enabled accurate visualization of the project area to detect potential discrepancies before the construction phase.

By using 3D coordination, clash detection, project evaluation and 4D phase planning, the contractor and designer were able to visualize the structure of the underground stations. By creating a BIM model of the entire project, collaboration between previously disparate teams like design, planning and cost control became much easier. Through Revit Live, VR was used to explore design details in meetings; visualization made it easier to identify problems and optimize designs.

This collaborative working environment resulted in tunnelling works for the alignment being carried out far more efficiently, and approximately 35% of cable loss and 15% of traction power transformer loss was avoided.



Image courtesy of Yüksel Proje Inc.

“ The Ümraniye-Ataşehir-Göztepe Metro Line has been meticulously planned and designed using the BIM platform. We hope it’ll serve as an example for similar projects.”

Gamze Çiçekoğlu, Team Leader, Gülermak Nurol Makyol Joint Venture

# Istanbul System Design Services – Phase 1

**Company:** Yuksel Proje Inc.

**Country:** Turkey

**Project category:** Infrastructure Design | Medium size project

**URL:** [yukselproje.com.tr](http://yukselproje.com.tr)

**Powered by:** 3ds Max, Advance Steel, AEC Collection, AutoCAD, BIM 360, Civil 3D, CFD, Dynamo Studio, InfraWorks, Insight, Navisworks, ReCap, Revit, Revit Live, Robot Structural Analysis Professional

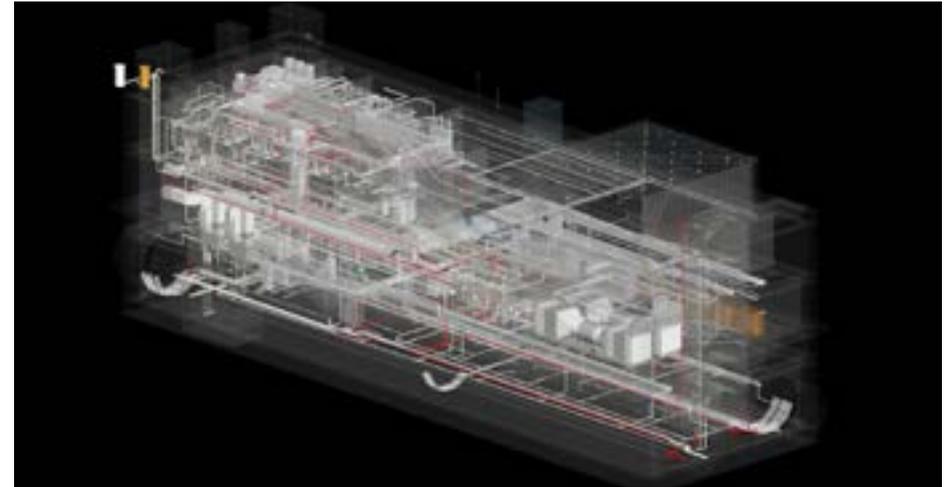


Image courtesy of Yuksel Proje Inc.



Image courtesy of Yuksel Proje Inc.

## Metro line in Istanbul

Phase 1 of Istanbul Metropolitan Municipality's project involves the design of a 16km metro line, which will be composed of 11 stations connecting to five existing metro lines when completed in 2023. It aims to provide a sustainable solution, allowing a pleasant commuting experience.

The project will play a vital role in the Istanbul public transport system, presenting a unique logistical challenge for the design team involving many different AEC disciplines.

To tackle this problem, Autodesk AEC collection and BIM 360 were used to define the design process and create a single, integrated BIM platform. 20 different models from various disciplines designed in Autodesk software like Revit, Civil 3D, and InfraWorks were combined into a single coordination model facilitating easier collaboration and reducing duration and cost.

As this is phase one of a project that will eventually cover 60km in total, the design team is using it as an example of how BIM software and modern construction technology can seamlessly integrate and coordinate diverse disciplines, including HVAC, plumbing, and electrical.

“This project is an extremely complex infrastructure undertaking – ensuring it goes to plan involves coordinating a multitude of different disciplines to work together.”

Cihan Kayhan, R&D Director, Yuksel Proje

## Engineering of Luchuan Service Area of Yulin-Zhanjiang Expressway (Guangxi Section)

**Company:** Tianjin Port Engineering Design & Consulting Company Ltd. of CCCC First Harbor Engineering Company Ltd.

**Country:** China

**Project category:** Infrastructure Design | Small size project

**URL:** gwsjy.com

**Powered by:** Revit, Navisworks Manage, Civil 3D, AutoCAD, 3ds Max, Dynamo Studio



Image courtesy of Tianjin Port Engineering Design & Consulting Company Ltd. of CCCC First Harbor Engineering Company Ltd.

### Application of BIM in expressway development

Using clash detection processes, the team managed to identify and resolve more than 100 potential issues at the design stage, avoiding expensive rework during construction.

The Yulin-Zhanjiang Expressway (Guangxi Section) project is 74.5km in length – it comprises a two-way, four-lane expressway, with seven toll stations, two service areas, and one parking area.

By simulating traffic routes, the project team was able to determine optimal road and parking layouts, while energy consumption analysis was employed to optimize air conditioning and thermal insulation.

The broad, multidisciplinary nature of the project means 3D visualization has been crucial in analyzing the spatial relationships of all the different parts as they are designed and built. Collaborating in one model via the cloud means that communication between teams across different regions and disciplines is convenient and fast.

Scheduled to open in early 2020, the project has served as a successful pilot program for implementing BIM technology – a real success story of multidisciplinary collaboration and design optimization.



Image courtesy of Tianjin Port Engineering Design & Consulting Company Ltd. of CCCC First Harbor Engineering Company Ltd.

“The application of BIM technology in PPP project is not only to realize the digitalization and informatization of the whole life cycle of traffic engineering, but also to build a data sharing platform and carrier for all participants in the project.”

**Yan Wang**, Chief Engineer, Director of BIM Technology Center Tianjin Port Engineering Design & Consulting Company Ltd. of CCCC First Harbor Engineering Company Ltd.

# European Spallation Source

**Company:** ÅF Infrastructure, Sweco Architects and Skanska Sverige AB

**Country:** Sweden

**Project category:** Building Design | Large size project

**URL:** europeanspallationsource.se

**Powered by:** AEC Collection, 3ds Max, AutoCAD, BIM 360, Civil 3D, Dynamo Studio, Navisworks, ReCap Pro, Revit



Image courtesy of European Spallation Source

## Sustainable research facility

With a budget of more than \$1.8 billion, this project is one of the largest building projects in Europe.

The European Spallation Source, located in Sweden, will be the world's most advanced neutron source and the leading sustainable research centre.

Collaboration is key for this project – with stakeholders from ESS's 13 member countries, it is a constant challenge to keep this complex and technically demanding project moving. Using Autodesk technology, the team is able to collaborate better and achieve their key goal of having as much information as possible in each model.

The majority of designers work in Revit and use a master file that contains everything that the designers need to deliver, making changes easy and fast to manage. As a result, the team has enhanced and streamlined processes, which enabled them to optimize time in several areas of the project.

The construction of the buildings is set to be completed in 2022, and the team is continuing to reach construction and operation milestones on-time and on-budget.



Image courtesy of European Spallation Source / Team HLA

**“A picture is worth a thousand words, a [BIM] model is worth a thousand pictures.”**

**Marcus Helmbäck** (BIM coordinator/BIM strategist, ÅF Infrastructure),  
**Arvid Gudmundsson** (BIM Coordinator, ÅF), **Martin Hörestrand** (Digital Leader, Skanska Sverige AB), **Ronald Cruz** (VDC/BIM coordinator, Sweco Architects),  
**Lukas Nowikowski** (VDC/BIM Manager, Sweco Architects)

# Buildings on East Artificial Islands of Hong Kong-Zhuhai-Macao Bridge

**Company:** CCCC-FHDI Engineering Co., Ltd.

**Country:** China

**Project category:** Building Design | Medium size project

**URL:** fhdigz.com

**Powered by:** 3ds Max, AutoCAD, BIM 360, Civil 3D, Dynamo Studio, Fabrication CADmep, InfraWorks, Insight, Navisworks Manage, Revit



Image courtesy of CCCC-FHDI Engineering Co., Ltd.

## Building connecting bridge and tunnel

BIM technology enabled this project team to not only save more than \$1.1 million, but also cut the construction process by nearly three months.

The East Artificial Islands, which are the connection of a tunnel and a bridge, play a key role in the Hong Kong-Zhuhai-Macao Bridge Authority operation. The project has multiple functions, including bridge management, road maintenance, emergency rescue, a tunnel equipment house and even tourism.

The marine climate conditions surrounding the building added to the project complexity, including a Chinese white dolphin national natural reserve. This meant the team had to take additional steps to ensure environmental requirements were met.

To aid collaboration and streamline the design process, the project team used coordinated BIM models. BIM increased accuracy of the design process by 40%, while model clash detection closed 805 of the total clashes in the project, shortening the design review time by 35%.



Image courtesy of CCCC-FHDI Engineering Co., Ltd.

“BIM’s high efficacy and environmental friendliness allowed us to perform simulations on the project that ensured the overall long-term sustainability of the design.”

Li Jiahua, BIM Center Deputy Director, CCCC-FHDI Engineering Co., Ltd

# REVITalisation for Design, Construction and Operations of Pre-World War Buildings

**Company:** Urban Renewal Authority & AECOM

**Country:** Hong Kong SAR, China

**Project category:** Building Design | Small size project

**URL:** [ura.org.hk](http://ura.org.hk) | [aecom.com](http://aecom.com)

**Powered by:** AEC Collection, AutoCAD, Navisworks Manage, ReCap Pro, Revit, Forge



Image courtesy of Urban Renewal Authority & AECOM

## Revitalisation of Pre-World War buildings

Going paperless by developing a centralized BIM platform with Autodesk Forge saved an incredible \$250,000 in printing costs.

With a mix of residential and commercial veranda-style houses, striking a balance between redeveloping and preserving original architectural features was one of the greatest challenges of this project.

The project, located in Mongkok in Hong Kong, involved a range of contractors. This meant the process of reviewing drawings, visualizing outcomes and reaching a consensus would have been very lengthy and complex without BIM technology.

The team leveraged BIM technologies like Revit and Navisworks across the project lifecycle, from design and construction to operation and maintenance. The team also developed a centralized platform on Autodesk Forge for consolidating BIM, BMS, field management, and real time monitoring via IoT into one solution for management, engineers, field teams and contractors.

The platform offered centralized, accurate, dependable information and improved collaboration among stakeholders. As a result, the traditional way of handling facility management, including arrangement of orders, daily operation monitoring, arrangement of maintenance schedule, and analysis maintenance data could be achieved in a more efficient way.



Image courtesy of Urban Renewal Authority & AECOM

“Autodesk Forge with its cloud architecture makes transfer, replication and integration with other BIM Field Management projects in the future much easier.”

Eric Poon Shun-wing, Director, Works and Contracts, Urban Renewal Authority

# Chase Center & Warriors Mixed-Use Office and Retail Development

**Company:** Mortenson | Clark, a Joint Venture  
**Country:** United States  
**Project category:** Construction | Large size project  
**URL:** [mortenson.com/sports](http://mortenson.com/sports) | [clarkconstruction.com](http://clarkconstruction.com)  
**Powered by:** AEC Collection, AutoCAD, BIM 360, Civil 3D, Dynamo Studio, Navisworks Manage, Revit, BuildingConnected

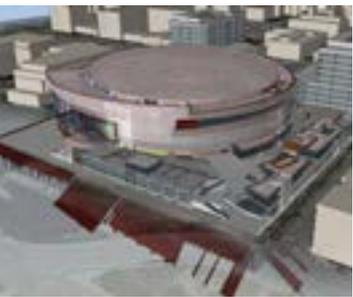


Image courtesy of Mortenson | Clark, a Joint Venture

## Sports and entertainment venue

This \$1.4 billion sports and entertainment complex includes an 18,000-seat arena, two 11-story office buildings, a gatehouse, more than 20 unique retail locations, 3.2 acres of publicly accessible plazas and open space, as well as a 925-space parking structure.

Chase Center's signature façade is inspired by the rich nautical history of the San Francisco Bay Area and the dynamic and flowing forms of the surrounding water.

From the outset, integrating innovative technology was essential to Mortenson | Clark's workflow. The team worked concurrently in a master model, and established a 3D and 4D approach during the preconstruction phase.

The team challenged its trade partners to resolve their own system routing issues and met every few days to resolve sequencing and design issues.

Using BIM allowed the project team to meet three key objectives: drive stakeholder meetings and timely decision making; improve communication to meet project milestones; and enhance communication with the surrounding community through visualization of the project.



Image courtesy of Jason O'Rear / Chase Center

“Our buildings are becoming increasingly complex. For us to integrate cutting-edge technologies on site we need to inculcate them into our projects now as prototypes to determine if they will succeed and know how to move forward. We need to act on small innovations to make giant waves.”

Santino Medina, Senior Integrated Construction Coordinator, Mortenson | Clark

# E03 Canada Court and E05 Quebec, Wembley Park

**Company:** John Sisk & Son

**Country:** United Kingdom

**Project category:** Construction | Medium size project

**URL:** [johnsiskandson.com/UK](http://johnsiskandson.com/UK)

**Powered by:** Revit, Navisworks Manage, BIM 360



Image courtesy of John Sisk

## Complex residential development

Sisk managed to avoid £90,000 worth of concrete reworks through enhanced clash detection processes, and made a time saving of 35% on their QA process by introducing an innovative site management solution.

With E03 and E05, a pair of significant build-to-rent developments, Sisk have pushed the boundaries of digital technology, design coordination, and site activities from the design and planning phase through to delivery on site.

They developed 'Digital Smart Containers' as an innovative mapping solution that links project data to smart containers in BIM 360 using QR codes. This creates a single source of information where the 3D model is at the core of all site activities, and improves collaboration by removing traditional silos.

Through the use of drone inspections, Sisk was able to eliminate the need for scaffolding, reducing deliveries and time on site. By creating a 4D simulation, monitoring health and safety issues was more efficient, with no major injuries recorded throughout the project.

Delivering such innovations enabled Sisk to erect the concrete structure for both buildings eight weeks prior to the deadline and complete the first block 25 days early.



Image courtesy of John Sisk

**“Sisk Digital Project Delivery is an excellent approach for delivery processes and we look to work with our Construction partners to enhance the use of these. To reduce risk, improve delivery and learn how to build better.”**

**James Burt**, Quintain (Client)

# CANVAS

**Company:** Windover Construction, Inc.

**Country:** United States

**Project category:** Construction | Small size project

**URL:** windover.com

**Powered by:** 3ds Max, AutoCAD, Civil 3D, Navisworks Manage, ReCap Pro, Revit

## Mixed-use apartment complex

CANVAS is an upscale, mixed-use apartment community covering 153,000 square feet in Beverly, Massachusetts. To address the site constraints associated with building in a busy city and to expedite the process, modular construction techniques were employed.

The apartments are composed of two buildings, both of which have two-structure systems. The first two floors are structural steel while the upper floors are prefabricated wood-framed modular units.

This method of modular construction requires the project to run like clockwork – to ensure it did, Windover took an advanced, tech-first approach that used drone mapping, laser scanning (with an accuracy of  $\pm 3\text{mm}$ ), 4D sequence planning, and mixed reality. This allowed conflict detection to take place based on reality capture data to ensure the prefabricated units and structural steel would fit together perfectly during construction.

Windover was able to coordinate the different parts of the project using Revit, in combination with Navisworks, Civil 3D, and Recap Pro.

The project is on budget and scheduled to be completed three months earlier than would be expected using conventional construction methods.



Image courtesy of Windover Construction, Inc.



Image courtesy of Windover Construction, Inc.

“CANVAS is a prime example of what can be achieved using the technology of today with the vision of tomorrow. Combining BIM technology and modular construction is transforming the construction workflow and mitigating risk on job sites.”

**Amr Raafat**, Director of Virtual Design and Construction at Windover Construction, Inc.

# Meet the finalists

## Infrastructure Design

**LaGuardia Airport Terminal B Replacement**, Skanska Walsh Joint Venture, United States

**Ümraniye-Ataşehir-Göztepe Metro Line**, Gulermak-Nurol-Makyol Joint Venture, Yuksel Proje Inc., Turkey

**Afsluitdijk - Largest Dike of the Netherlands**, Levvel - BAM, Van Oord, Rebel, Netherlands

**Istanbul Rail System Design Services – Phase 1**, Yuksel Proje Inc., Turkey

**Reconstruction of Wutaishan Interchange to Shuangshan Tunnel Section**, Chongqing Architectural Design Institute of China, China

**Shanghai Taihe Wastewater Treatment Plant**, Shanghai Municipal Engineering Design Institute Co. Ltd. & Shanghai Chengtuo Water Group Co. Ltd., China

**Westend-bridge Berlin**, Schüßler-Plan with SSF Engineers, Germany

**Environmental adequacy of drainage and sewer networks in Rio de Janeiro's Military District**, Brazilian Army, Brazil

**Engineering of Luchuan Service Area of Yulin-Zhanjiang Expressway (Guangxi Section)**, Tianjin Port Engineering Design & Consulting Company Ltd. of CCCC First Harbor Engineering Company Ltd., China

## Building Design

**European Spallation Source**, ÅF Infrastructure, Sweco Architects and Skanska Sverige AB, Sweden

**Hengqin Hospital**, Hunan Architectural Design Institute Limited Company, China

**Sanya Moutai Resort Project**, Capital Engineering & Research Incorporation, China

**National Maritime Museum**, Tianjin Architecture Design Institute (TADI), China

**Buildings on East Artificial Islands of Hong Kong-Zhuhai-Macao Bridge**, CCCC-FHDI Engineering Co., Ltd., China

**EcoTubes**, Geotectura, Israel

**REVITalisation for Design, Construction and Operations of Pre-World War Buildings**, Urban Renewal Authority & AECOM Asia Company Limited, Hong Kong SAR, China

**Automated Retrofit Designs for Informal Housing in Colombia**, Build Change, Colombia

## Construction

**Chase Center & Warriors Mixed-Use Office and Retail Development**, Mortenson | Clark, a Joint Venture, United States

**Terminal Area Construction Project of Chengdu Tianfu International Airport (Section 1)**, China Construction Eighth Engineering Division Corp. Ltd., China

**South Plot Project, 616, 735, Xiaodongmen Street, Shanghai**, Construction Eighth Engineering Division, China

**E03 Canada Court and E05 Quebec, Wembley Park**, John Sisk & Son, United Kingdom

**ATRIO**, Arpro EllisDon JV (AED), Colombia

**University of Arizona Health Sciences Innovation Building (HSIB)**, Kitchell, United States

**Digitalized Construction Practice of the Wutai Shan Buddhist Garden in Canada with the style of Tang Dynasty**, ZYF Construction Group Co., Ltd., Canada

**CANVAS**, Windover Construction, Inc., United States

**Historical Museum of Imperial Kiln, Jingdezhen**, China Construction First Group Limited, China



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[excellenceawards.autodesk.com](https://excellenceawards.autodesk.com)