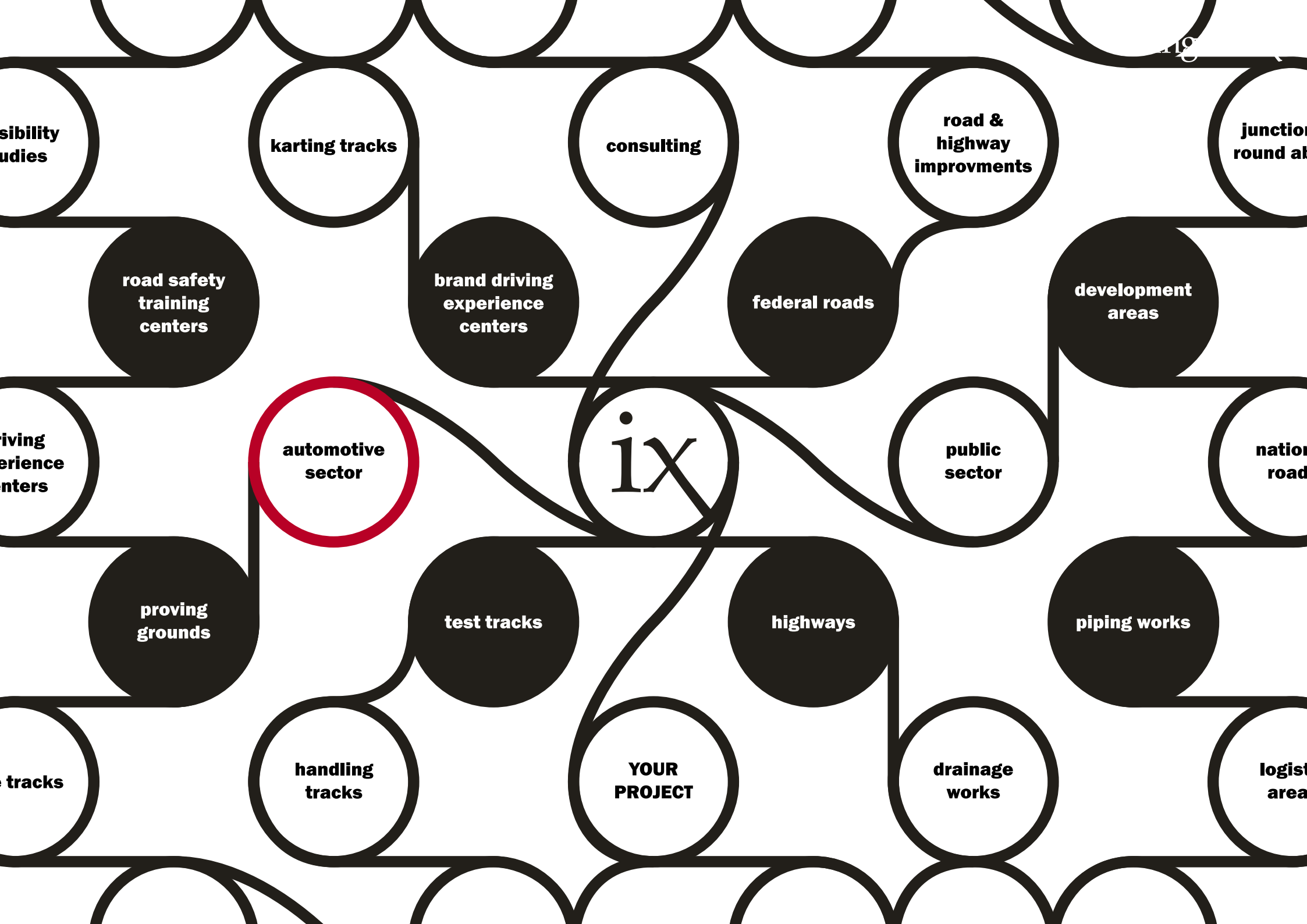


ingenaix

automotive sector

# **01 Company profile**



# EMOTIONAL ROAD ENGINEERING



## **Ingenaix Civil Engineers from Aachen**

Ingenaix is acting as an independent, national and international active engineering office with focus on designing, engineering and realizing complex civil construction projects. We support both automotive investors and public clients.

Being independent from any product and supplier interests we seek for the appreciation of our profession and Ingenaix engineers leading to longlasting successful development of our company.

We act focused on behalf of our clients and optimize our processes of quality management to deliver the requested services.

Throughout all engineering services Ingenaix feels responsible for our clients needs in regards to quality, time schedule and budget!





## Emotional road engineering

As a competent planning partner Ingenaix will bring your automotive project from the first sketches to inauguration.

### WE FOCUS OUR ENGINEERING KEY COMPETENCES ON THE FOLLOWING PROJECT TYPES:

- ✓ RSTC road safety training centers
- ✓ DEC brand Driving Experience Centers
- ✓ industrial used test tracks and proving grounds
- ✓ race circuits and handling tracks
- ✓ incl. related technical equipment
- ✓ incl. related project management

We offer interdisciplinary consulting and engineering know how throughout all civil works and technical equipment providing you with the services of the following engineering phases:

## A Project development

- ✓ feasibility study
- ✓ concept studies for entire project or parts thereof
- ✓ economic feasibility study
- ✓ development of construction phases

## B Design and engineering

- ✓ project basics
- ✓ schematic design
- ✓ detailed and construction design
- ✓ construction application
- ✓ preparation of tender documents and bidding
- ✓ planning in existing infrastructure
- ✓ site supervision and site superintendence

## C Value Engineering

- ✓ Partnering with Ingenaix will generate various beneficial effects for your project – it would be a pleasure for us to convince you personally!



## Technical consulting

We accept the client's responsibilities in the areas of:

- ✓ organization, communication and documentation
- ✓ qualities and quantities
- ✓ costs and financing schedule
- ✓ time schedules, processing and coordination
- ✓ risk management

We consider the project management to be an essential part of the project administration to reach the desired goals to the satisfaction of all involved parties.

At Ingenaix steering a project means considering all facts – plan, current status and goals – in the decision making process.

Technical Consulting by Ingenaix!

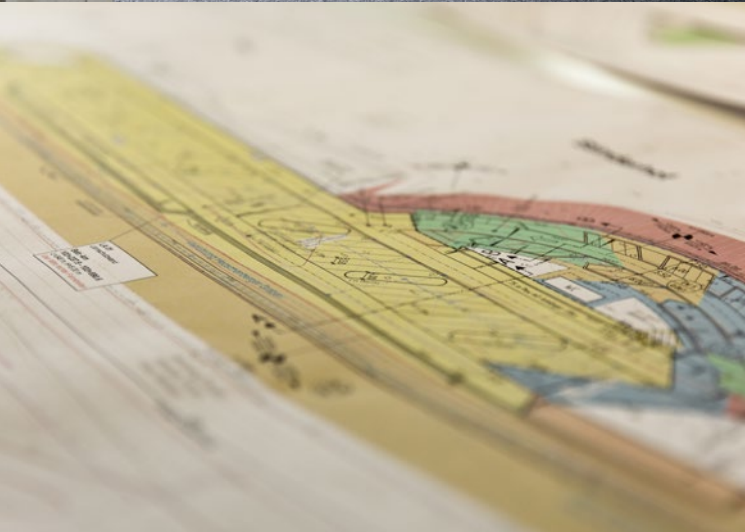
- ✓ earth works
- ✓ road construction
- ✓ civil works
- ✓ related technical equipment

Ingenaix performs an individual analysis of your specific inquiry. We provide a detailed decision basis and generate a sustainable decision making process - to avoid cost and time intensive mistakes.

Ingenaix provides second opinion analysis of third party planning and engineering services with focus to meet the user needs as well as the time and budget requirements. Further we take over the civil engineering quality management.

Independent consultancy by Ingenaix means more confidence and reliable decisions.

**With joined forces we lead  
your project to success!**



## 03 Projects

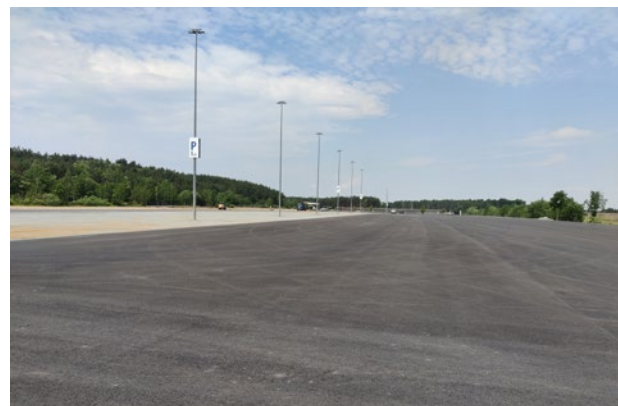
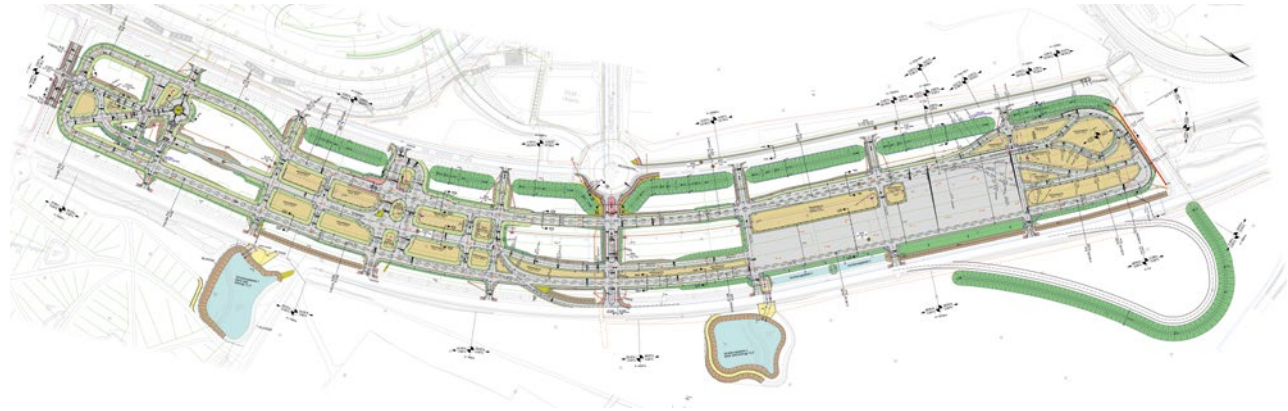


**DEKRA Mobility Center 4.0**  
**»City-Courses« at Lausitzring, Klettwitz, Brandenburg**

# City Courses at DEKRA Lausitzring, Klettwitz, Brandenburg

## PLANNING AND REALIZATION OF A MULTIFUNCTIONAL MOBILITY CENTER AND ITS DRAINAGE SYSTEM PROJECTSTAGES 1-7 (GERMAN HOAI)

- ✓ Transformation of existing parking area at the Lausitzring into a scalable, complex environment for scenario-based testing
- ✓ Setup of different test environments:
  - multifunctional area
  - urban module
  - outlying junctions
  - road module according to EuroNCAP requirements
- ✓ Construction of crossing railway
- ✓ realistic simulation of a parking garage ramp
- ✓ drainage system and seepage reservoirs



## City Courses at DEKRA Lausitzring, Klettwitz, Brandenburg

### KEY FACTS

- 250.000 m<sup>2</sup> total area
- 80.000 m<sup>2</sup> asphalt surface
- 30.000 m<sup>2</sup> multifunctional area
- 6.000 m road drainage
- 6.000 m pipes with cable chambers
- 300 m railway
- 150 m noise protection wall

### GOAL

- ✓ Implementation of a realistic test environment for research, development and validation of driver assistance systems and autonomous driving functions

### CLIENT

DEKRA SE



Photos:

© DEKRA / Bahler + Franzeck

© Ingenaix





**G-Class Experience Center, Graz, Austria**



## G-Class Experience Center, Graz, Austria

Concept and layout, engineering and realization of the premium and challenging Mercedes-Benz G-Class Experience Center

### ENGINEERING SERVICES

- ✓ General planning and engineering services for all dynamic project elements (engineering, application and permissions, tendering, supervision)

### KEY FACTS

- ➔ **Offroad modules:** tree trunk bridge, wooden seesaw, mud dive, artificial lake “submerge”, cross slope, twist axle track, inclination hill, ast gravel track, inclination hill and gravel tracks, 2 steal bridge ramps, inclination from 45-100% , height up to 10 m, stairway to heaven 60-100%, inclination hill, height up to 13 m with app. 30.000 m<sup>3</sup>, including 12 different ramps, 30-80% with challenging track surfaces

### GOAL

- ✓ „stronger than time“

### CLIENT

Mercedes-Benz G GmbH



**“CERMcity” urban test enviroment at  
ATC Aldenhoven, Aachen**





## “CERMcity” urban test environment at ATC Aldenhoven, Aachen

“CERMcity” urban test environment at ATC Aldenhoven, Germany. Turn key planning for road construction. Engineering services and technical equipment (all engineering stages incl. site supervision).

### SERVICES

- ✓ development and engineering of a flexible urban testing environment considering design criteria acc.
- ✓ EURO NCAP as well as user requirements of highly diverse user types (OEMs and suppliers)

### KEY FACTS

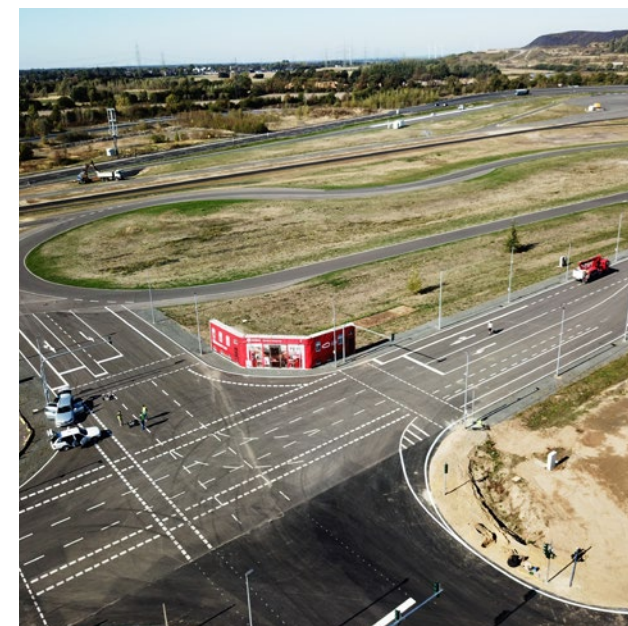
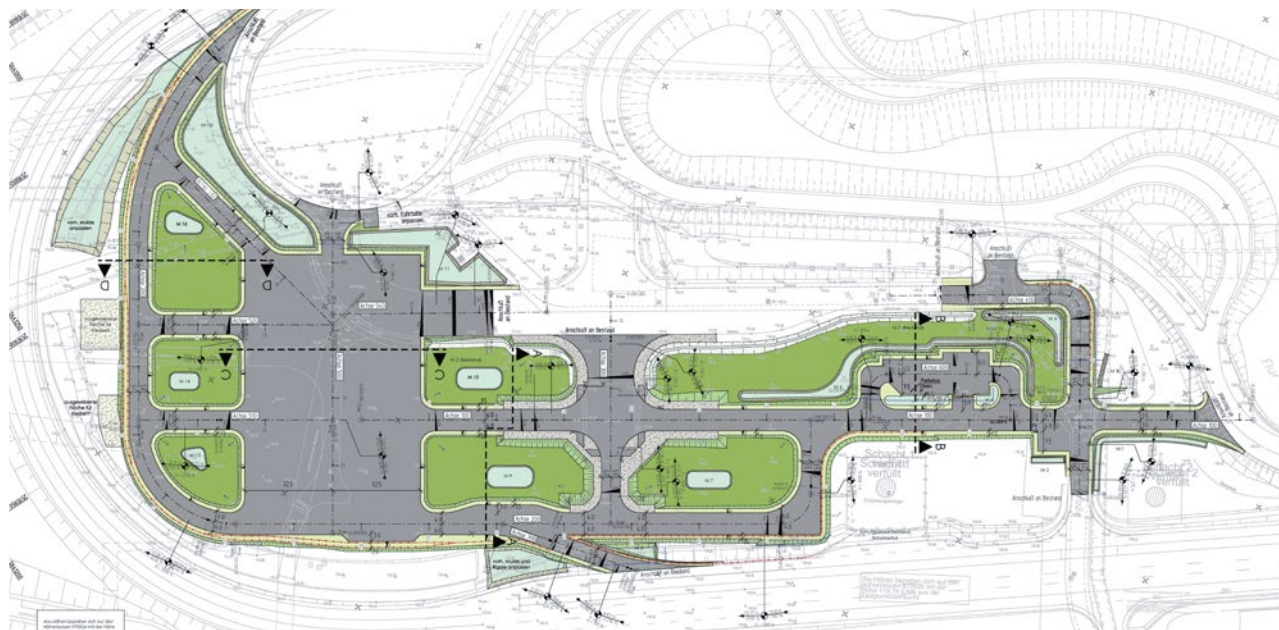
- project area app. 5ha
- asphalt area app. 18.000m<sup>2</sup>
- flexible walls for urban sceneries
- supply and distribution network for electricity and IT
- 5G mobile data environment

### GOAL

- ✓ be prepared for future testing requirements

### CLIENT

RWTH Aachen



# Kyalami Grand Prix Circuit South Africa





# Kyalami Grand Prix Circuit, South Africa

## CIVIL ENGINEERING AND CONSULTING SERVICES, ACCORDING TO FIA REGULATIONS

- ✓ modification of the track layout
- ✓ extension of the start-finish straight
- ✓ run off area engineering and layout
- ✓ Kyalami circuit safety measures according to FIA regulations
- ✓ new underpass for infield accessibility
- ✓ civil consulting services during construction period

## KEY FACTS

- ➔ 4 new turn geometries „Crowthorne“, „Jukskei“, „Barbeque Corner“ and „Crocodiles“
- ➔ adoption of app. 40% of the existing Kyalami circuit
- ➔ new set up of all safety measures
- ➔ complete new pavement of Kyalami circuit

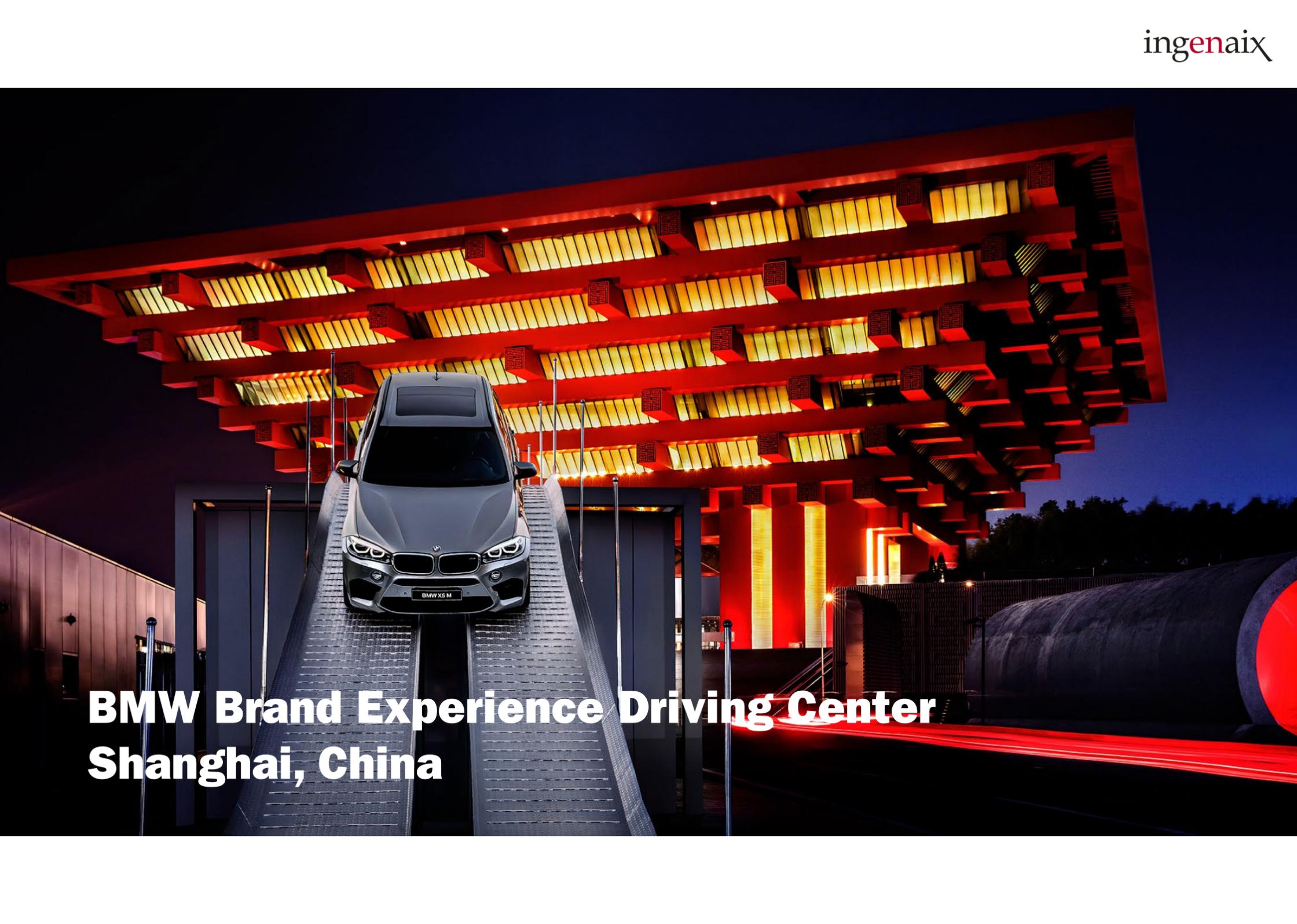
## GOAL

Polish the uncut diamond

## CLIENT

Porsche South Africa





**BMW Brand Experience Driving Center  
Shanghai, China**





# BMW Brand Experience Driving Center Shanghai, China

Turn key planning of the Brand Experience  
Driving Center (BEDC)

## KEY FACTS

- 20.000 m<sup>2</sup> asphalt area as a multifunctional dynamic area
- sectional irrigated with 84 sprinkler
- 6 off-road modules
- pumping station

## GOAL

- ✓ short construction time
- ✓ design and construction in existing contexts

## CLIENT

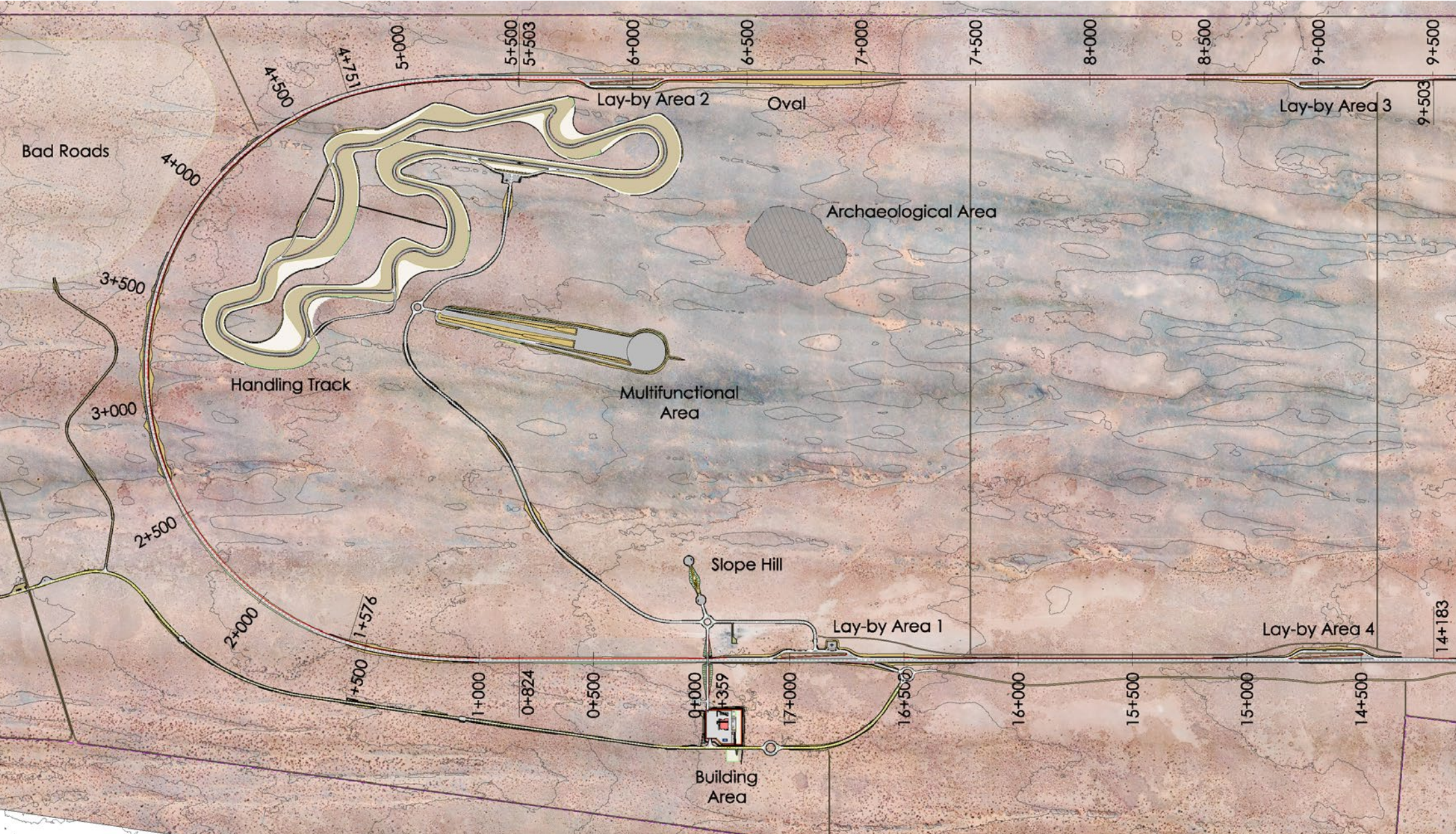
BMW Brilliance Automotive Ltd., Shenyang



Photo: IngenAix, BMW Brilliance Automotive



**DAIMLER Proving Ground  
Upington, Northern Cape, South Africa**





# DAIMLER Proving Ground Upington, Northern Cape, South Africa

Full scale General Planning Services

## INGENAIX ENGINEERING SERVICES

- ✓ site evaluation and due diligence
- ✓ value engineering and estimates
- ✓ concept design, detailed design, working and construction drawings of all civil constructions (roads, bridges, earthworks, drainage), buildings, MEP services and infrastructure works
- ✓ specialist studies, EIA environmental impact study and assessment, noise and air pollution studies, etc.
- ✓ approved applications for all required permits
- ✓ tendering and procurement of general contractor's services

## KEY FACTS, EXTRACT

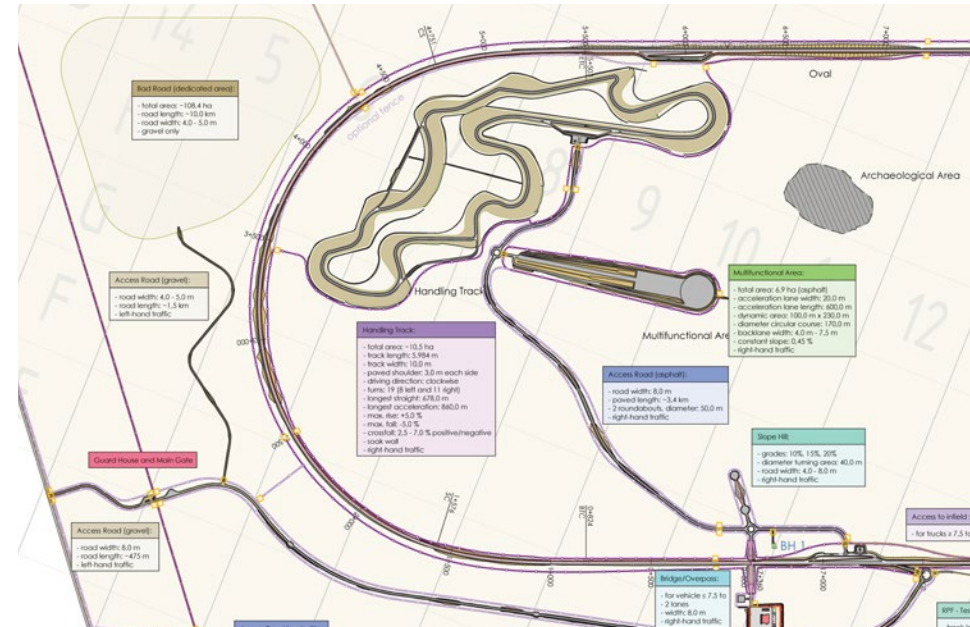
- ➔ property size appr. 3.600 ha
- ➔ superelevated high speed oval length approx. 17,4 km
- ➔ handling track appr. 5,5 km
- ➔ VDA dynamic area appr. 70. 000 m<sup>2</sup>
- ➔ various slope hill/grades
- ➔ building area incl. all buildings and MEP services
- ➔ access roads approx. 5 km

## GOAL

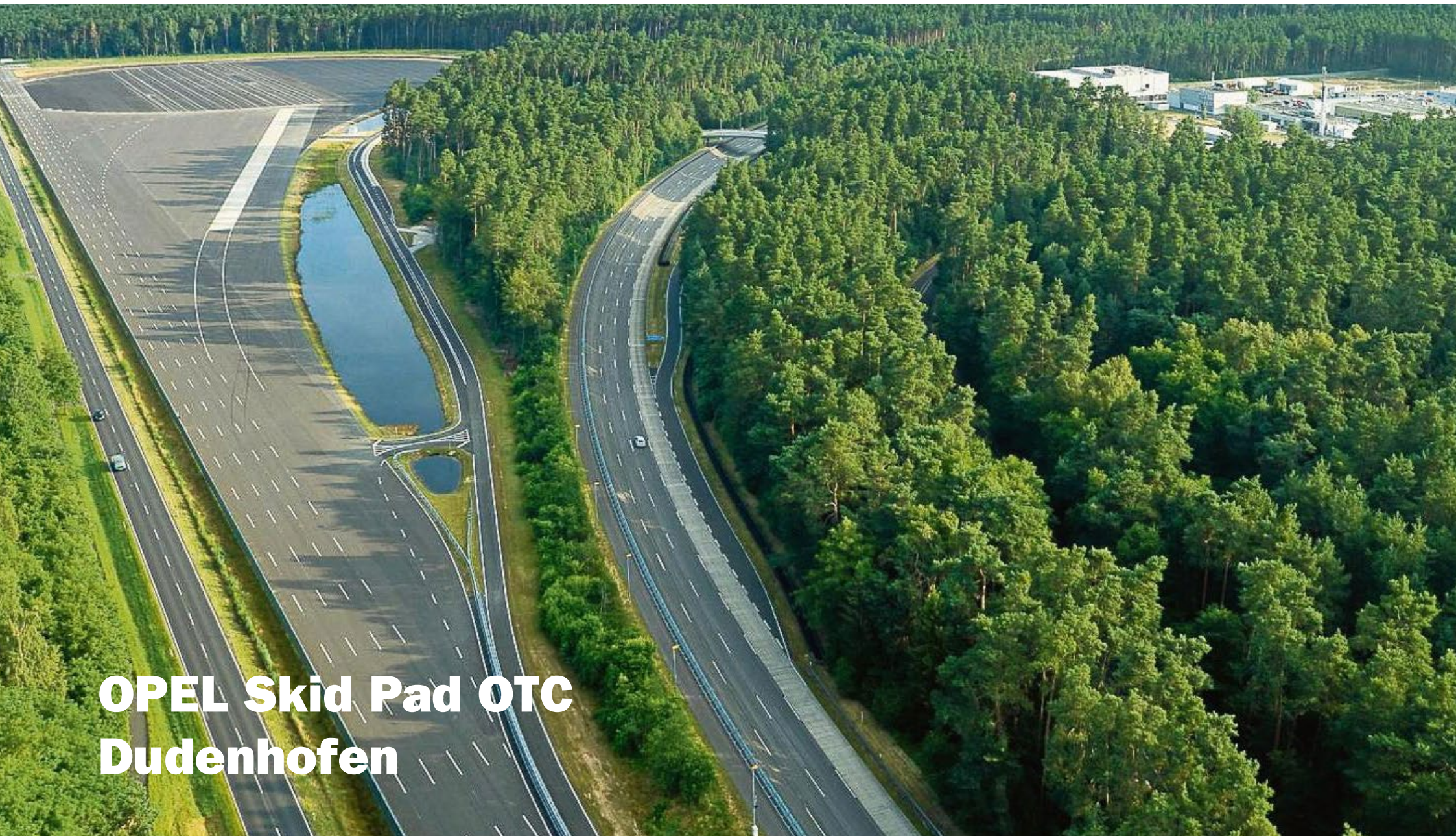
- ✓ arid - huge - remote - fast

## CLIENT

Mercedes Benz South Africa Ltd., South Africa



# OPEL Skid Pad OTC Dudenhofen



## OPEL Skid Pad OTC, Dudenhofen

### TURN KEY PLANNING OF THE 300 M SKID PAD

- ✓ concept and construction design
- ✓ tender documents and contracting
- ✓ site supervision
- ✓ health and safety coordination (SiGeKo)

### KEY FACTS

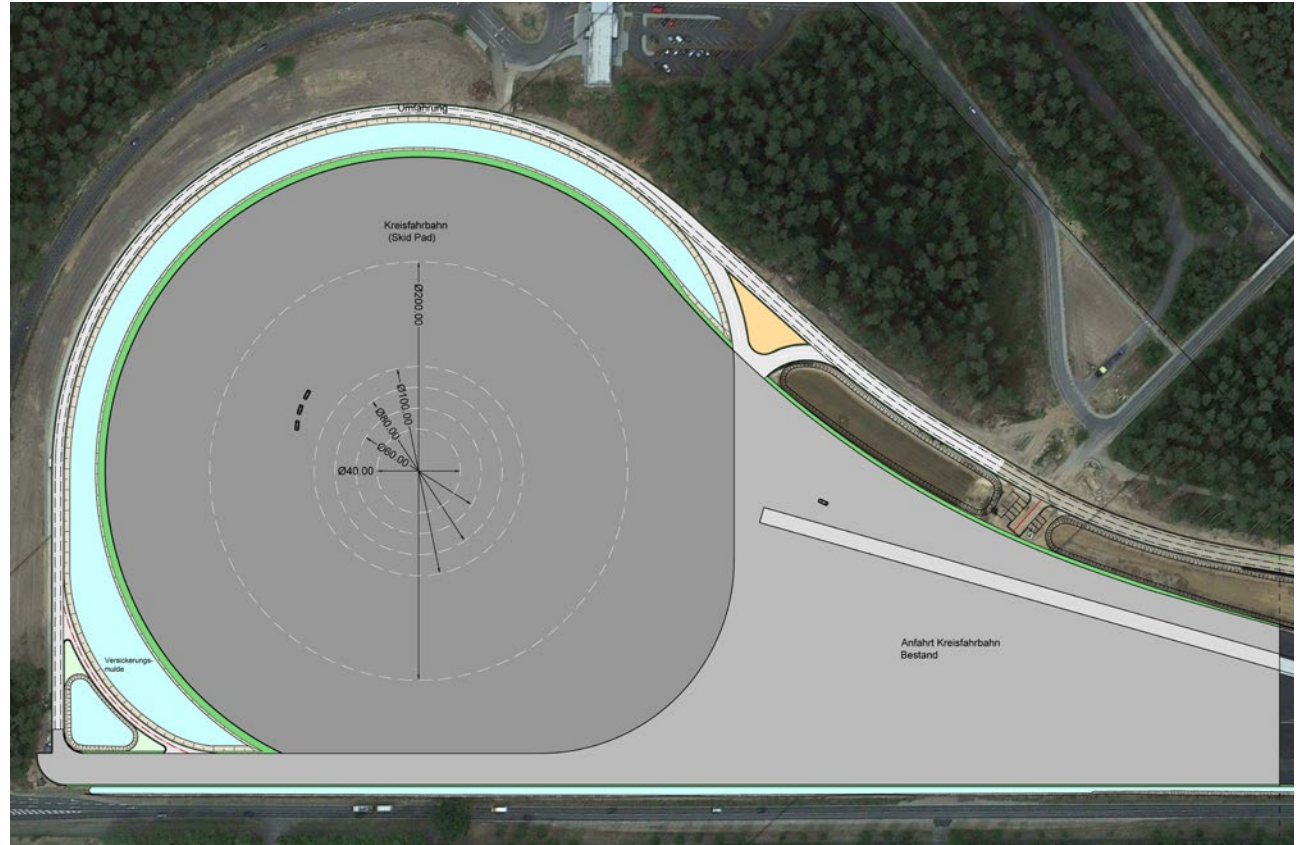
- 70.000 m<sup>2</sup> asphalt area
- Ø 300 m Skid Pad
- 0,6% slope
- surface drainage

### GOAL

- ✓ high surface evenness
- ✓ short construction time

### CLIENT

Adam Opel AG Rüsselsheim, Germany





**New Belgian Block Track and Privacy Fencing**



# New Belgian Block Track and Privacy Fencing

## ENGINEERING SERVICES

- ✓ design and execution planning of road construction, drainage and structures
- ✓ 3D-analysis of an existing Belgian Block Track and deduction of pavement plans for cobble stones for the new track
- ✓ tendering and procurement of GC-works
- ✓ commissioning
- ✓ site supervision
- ✓ quality control
- ✓ documentation

## KEY FACTS

- 0,5 mile Belgian Block Track as approximated copy of an existing Belgian Block Track
- 0,1 mile access road with parking area
- 6000 ft of privacy fence up to 9ft height
- 350 ft of privacy

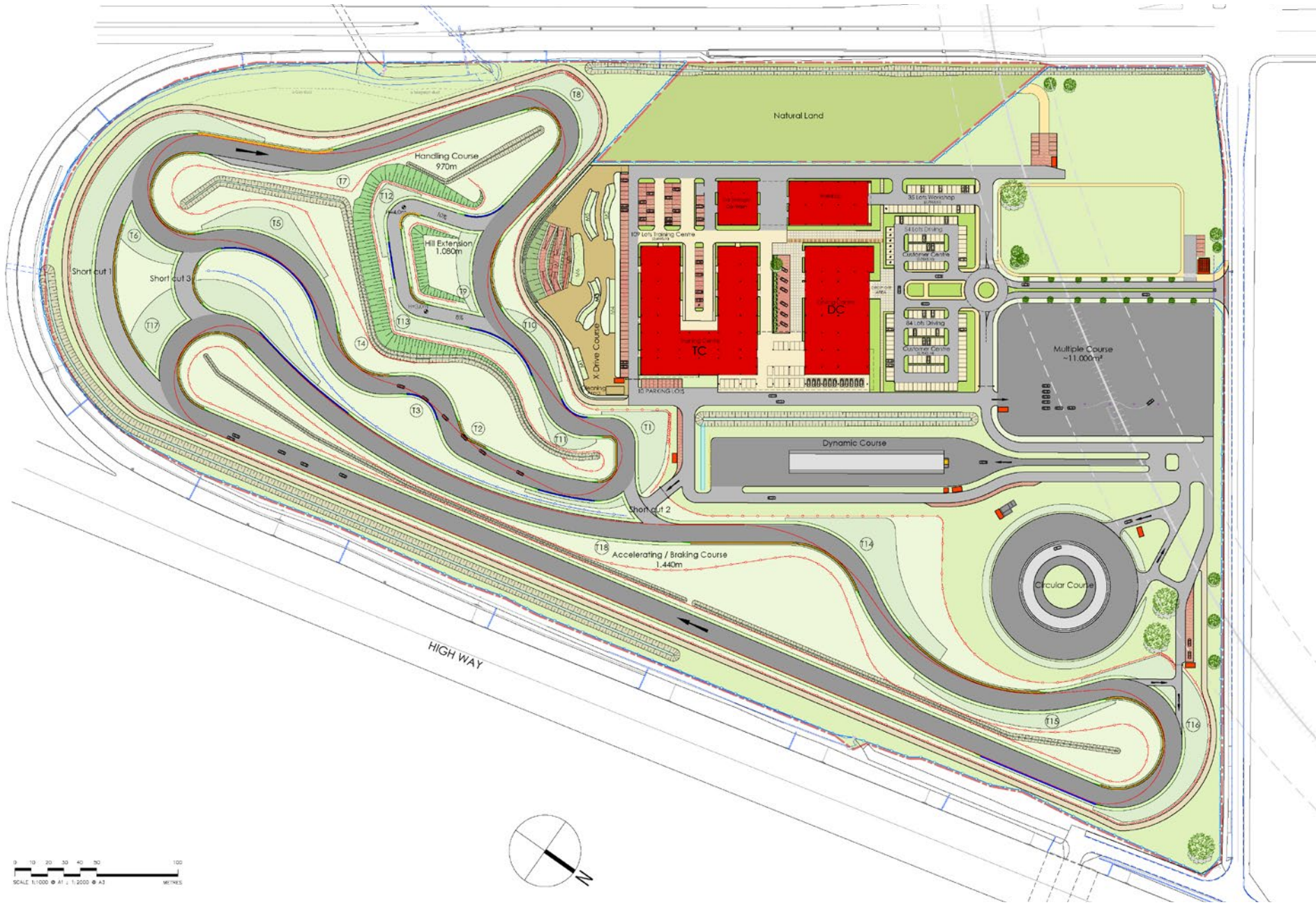
## CLIENT

Private Investor

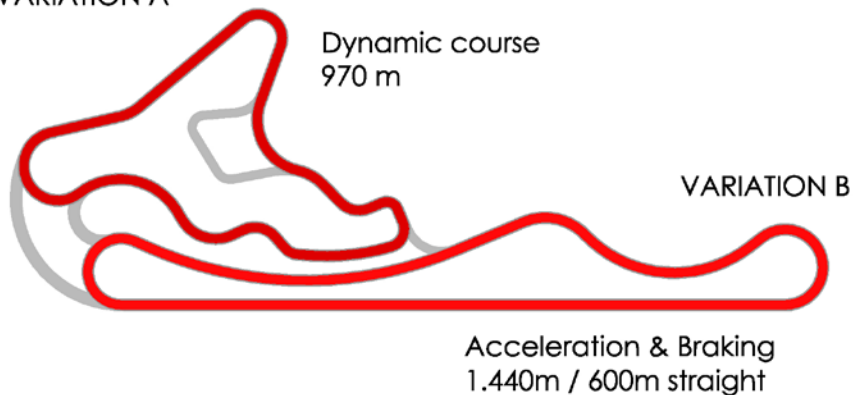




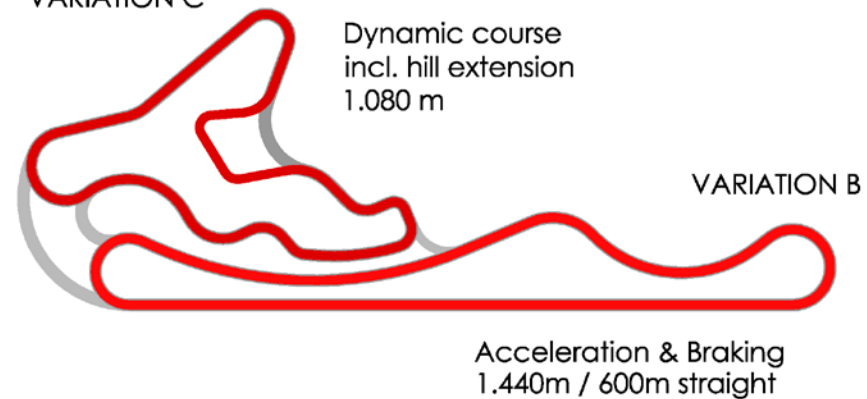
# **BMW Driving Experience Center Incheon, South Korea**



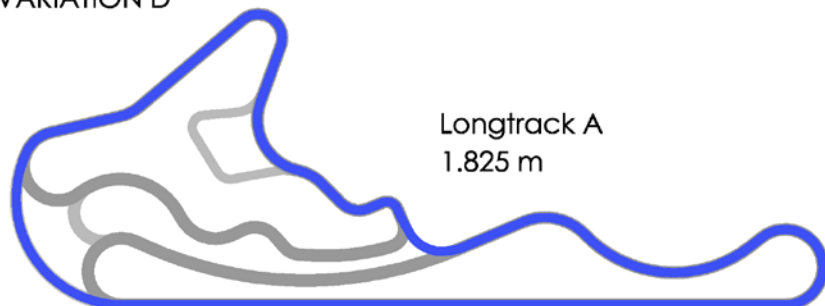
VARIATION A



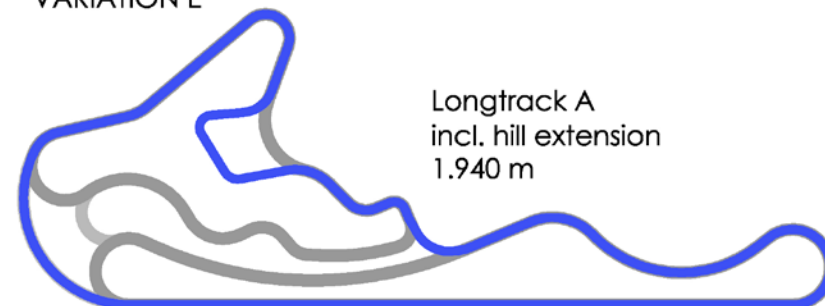
VARIATION C



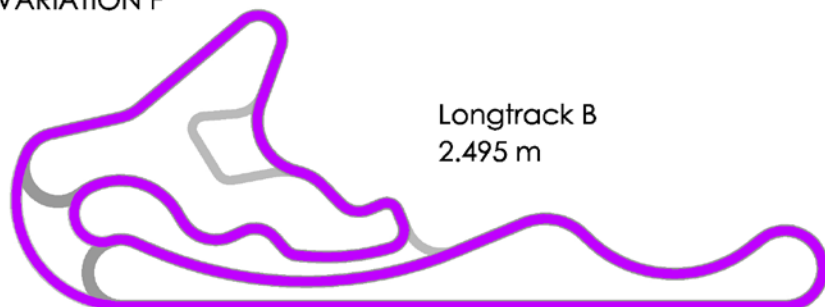
VARIATION D



VARIATION E



VARIATION F



VARIATION G





# BMW Driving Experience Center, South Korea

## TURN KEY PLANNING OF THE DYNAMIC MARKETING PLATFORM

- ✓ 2.400 m handling track
- ✓ 2-separation of the handling course up to 7 track variations
- ✓ hill extension
- ✓ multiple course
- ✓ circular course,  $\varnothing$  90 m, incl. irrigation and water obstacles
- ✓ dynamic course incl. Kick plate, irrigation and water obstacles
- ✓ X-drive course, 8 modules
- ✓ 6 separate presentation modules

## KEY FACTS

- 2.400 m track length with
- 7 track variations
- 235.000 m<sup>2</sup> total area
- 53.000 m<sup>2</sup> asphalt area
- 5.800 m<sup>2</sup> irrigated area

## GOAL

- ✓ Pleasure of driving

## CLIENT

BMW Group Korea Seoul, South Korea

Photos: Ingenaix, BMW Group Korea



## BMW Driving Experience Center, South Korea

### X-DRIVE AREA

- ✓ sandpit
- ✓ twist track
- ✓ banks & slopes
- ✓ climbing hill
- ✓ erratic boulders
- ✓ tree trunk
- ✓ track rail
- ✓ water passage

### KEY FACTS

- 6.000 m<sup>2</sup> off-road area
- 8 modules

### GOAL

- ✓ Pleasure of driving

### CLIENT

BMW Group Korea Seoul, Sotu Korea



Photos: Ingenaix, BMW Group Korea



# AUDI Driving Experience Center Neuburg, Donau

# AUDI Driving Experience Center Neuburg, Donau

## TURN KEY PLANNING OF THE DRIVING DYNAMIC FACILITIES

- ✓ 2.200 m handling track
- ✓ optional 2 segments, length 1.100 m and 1.130 m
- ✓ FASYS straights, length 1.250 m
- ✓ full size handling track with 3.160 m
- ✓ irrigated dynamic area, 30.000 m<sup>2</sup>
- ✓ 9 off road modules
- ✓ noise and sight protection
- ✓ 5 separate presentation modules

## KEY FACTS

- total track length 4.200 m with 6 different combinations
- 470.000 m<sup>2</sup> total area
- app. 98.000 m<sup>2</sup> asphalt area

## GOAL

- ✓ Safe and perfect driving experience while optimal usage of resources

## CLIENT

AUDI AG, Ingolstadt, Germany  
in cooperation with Weinzierl, Ingolstadt



# AUDI Driving Experience Center Neuburg, Donau

## OFF ROAD AREA

- ✓ tree trunk seesaw
- ✓ banks and slope concave
- ✓ banks and slopes convex
- ✓ climbing hill
- ✓ dry river bed
- ✓ twist track
- ✓ erratic boulders
- ✓ halfpipe
- ✓ water passage

## KEY FACTS

- ➔ 18.000 m<sup>2</sup> total area
- ➔ 9 off road modules

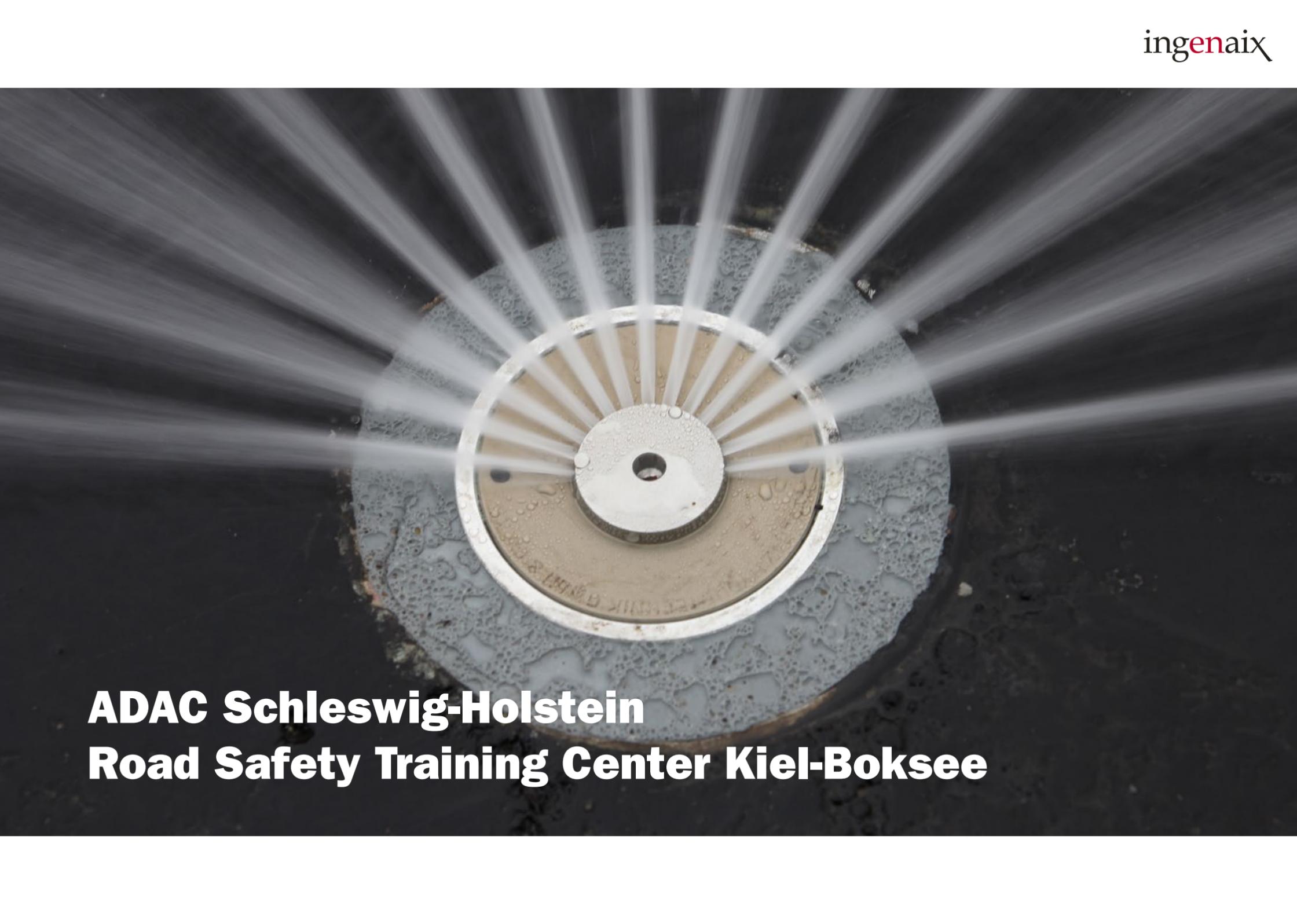
## ZIELVORGABE

- ✓ Safe and perfect driving experience while optimal usage of resources

## AUFTRAGGEBER

AUDI AG Ingolstadt, Germany





**ADAC Schleswig-Holstein  
Road Safety Training Center Kiel-Boksee**



# ADAC Road Safety Training Center Kiel-Boksee

## PLANNING OF THE STRUCTURES AND TECHNICAL EQUIPMENT OF DYNAMIC MODULES

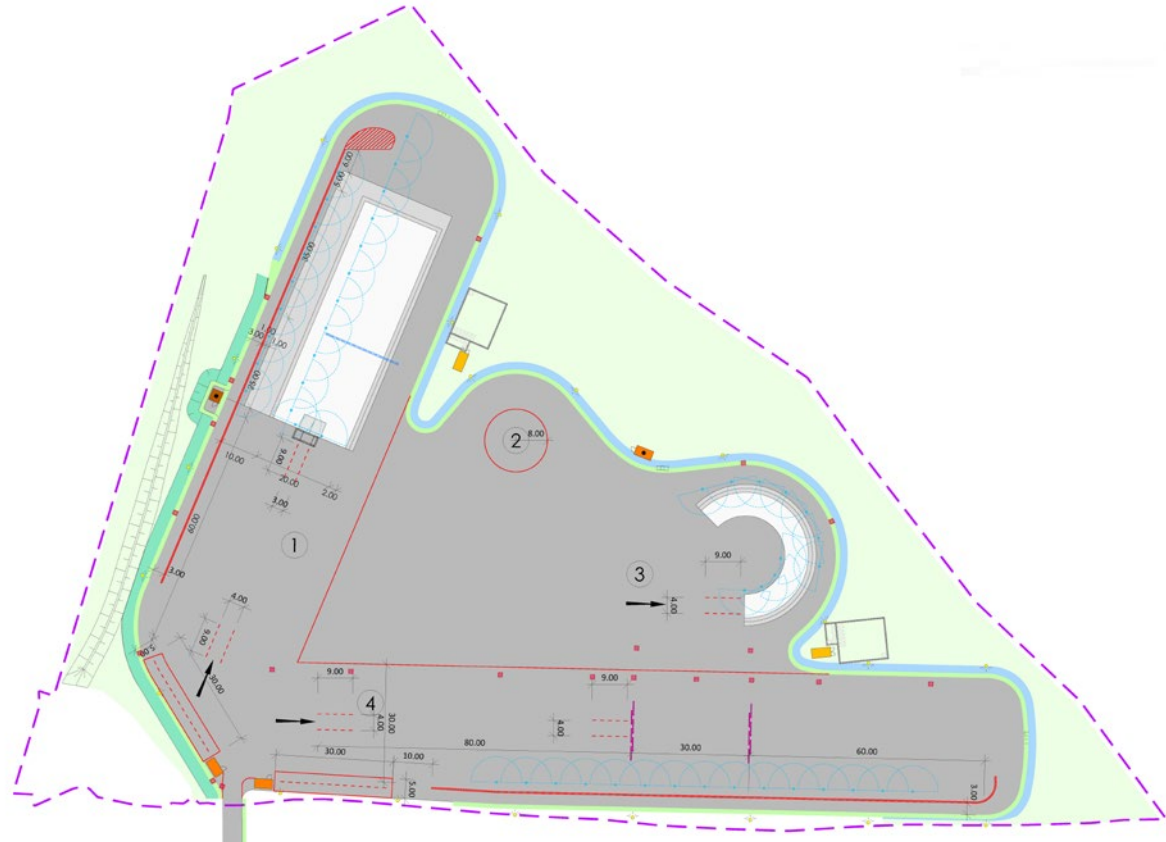
- ✓ irrigated car dynamic area with kick plate and mechanical obstacles
- ✓ circle module, dia 40 m
- ✓ curve modul with irrigation
- ✓ multifunctional dynamic area with irrigation and water obstacles
- ✓ off road parc with 8 modules

## KEY FACTS

- ➔ 33.000 m<sup>2</sup> total area
- ➔ 21.000 m<sup>2</sup> asphalt area
- ➔ 4 separate modules

## CLIENT

ADAC Schleswig-Holstein e.V., Kiel



# DAIMLER Test Track Beijing, China

## SCHEMATIC DESIGN OF TEST TRACK FACILITY ADJACENT TO THE PRODUCTION PLANT OF BBAC

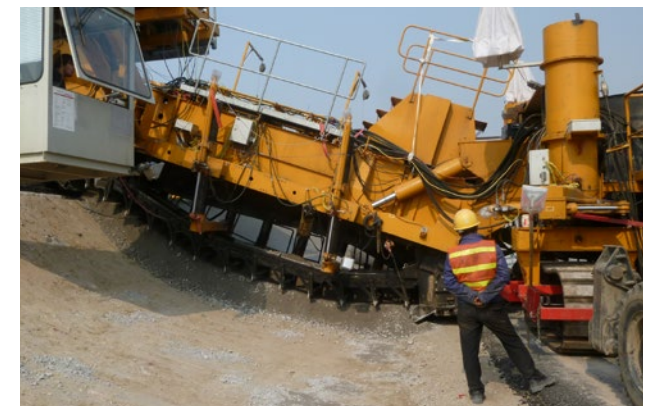
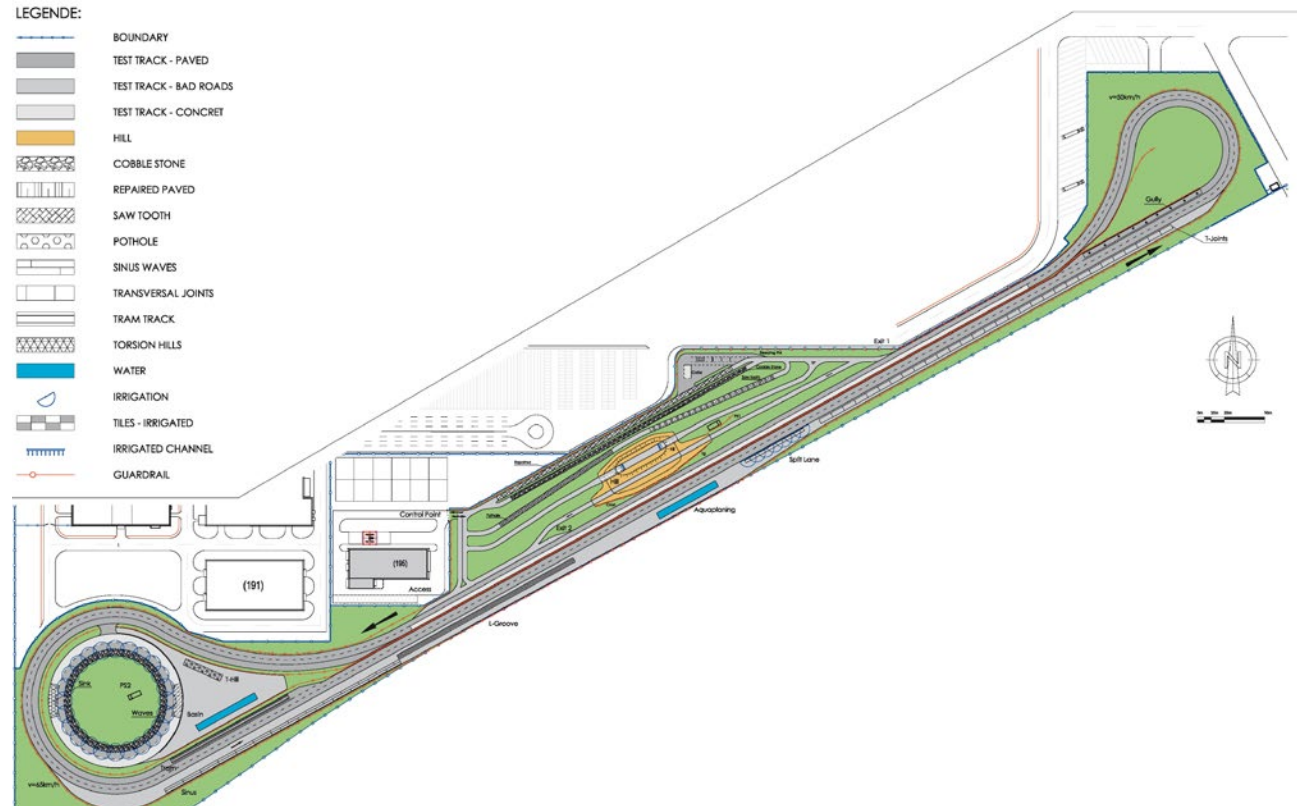
- ✓ NVH elements
- ✓ bad roads
- ✓ circle module
- ✓ hill module
- ✓ high speed track
- ✓ multifunctional area
- ✓ hydroplaning
- ✓ groove lanes
- ✓ technical equipment of track
- ✓ power and media supply
- ✓ pump stations
- ✓ irrigation system

### KEY FACTS

- ➔ total area app. 110.000 m<sup>2</sup>
- ➔ asphalt area app. 49.000 m<sup>2</sup>

### CLIENT

Daimler AG





# ADAC Road Safety Training Center, Schlusselfeld



ingenaix



# ADAC Road Safety Training Center, Schluesselfeld

## TURN KEY PLANNING OF THE MULTIFUNCTIONAL DYNAMIC FACILITY

- ✓ truck dynamic area
- ✓ car dynamic area
- ✓ circle module, dia 80 m
- ✓ down hill track
- ✓ motorcycle track
- ✓ multifunctional area
- ✓ handling track, length 830 m
- ✓ technical equipment of track modules
- ✓ power and media supply
- ✓ Illumination
- ✓ pump stations
- ✓ water obstacles
- ✓ mechanical obstacles
- ✓ irrigation system

## KEY FACTS

- total area app. 125.000 m<sup>2</sup>
- asphalt area app. 55.000 m<sup>2</sup>
- 7 dynamic areas

## GOAL

- ✓ CO<sub>2</sub> reduced operation of facility

## CLIENT

ADAC Nordbayern e.V. Nürnberg, Germany

Photos: Ingenaix, Lothar Wels





# Porsche Driving Experience Center, USA

# Porsche Driving Experience Center, USA

## CONCEPTUAL DESIGN OF 2 PORSCHE DRIVING EXPERIENCE CENTER IN USA DRIVING DYNAMIC MARKETING PLATFORMS

- ✓ driving dynamic facility
- ✓ dynamic area
- ✓ circular module, dia 80 m
- ✓ ice hill
- ✓ handling track
- ✓ technical equipment
- ✓ pump station
- ✓ water and mechanical obstacles
- ✓ irrigation system

### KEY FACTS

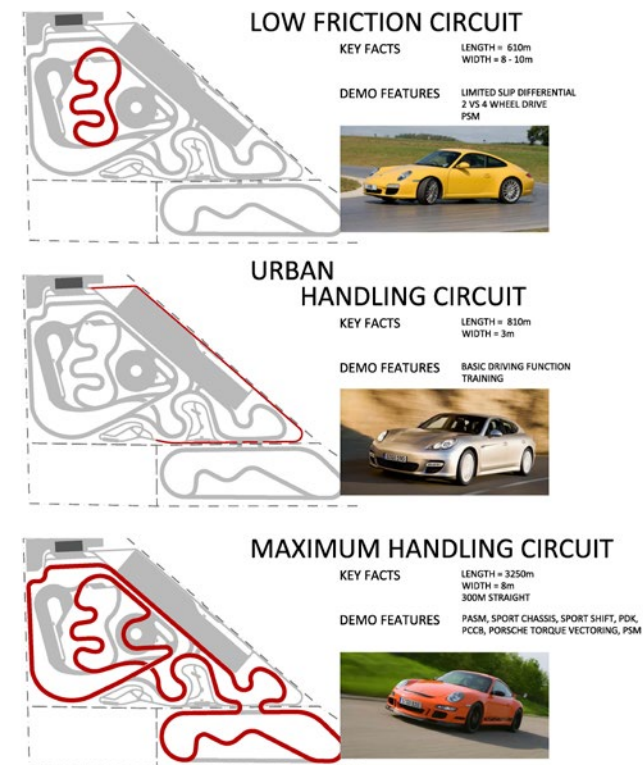
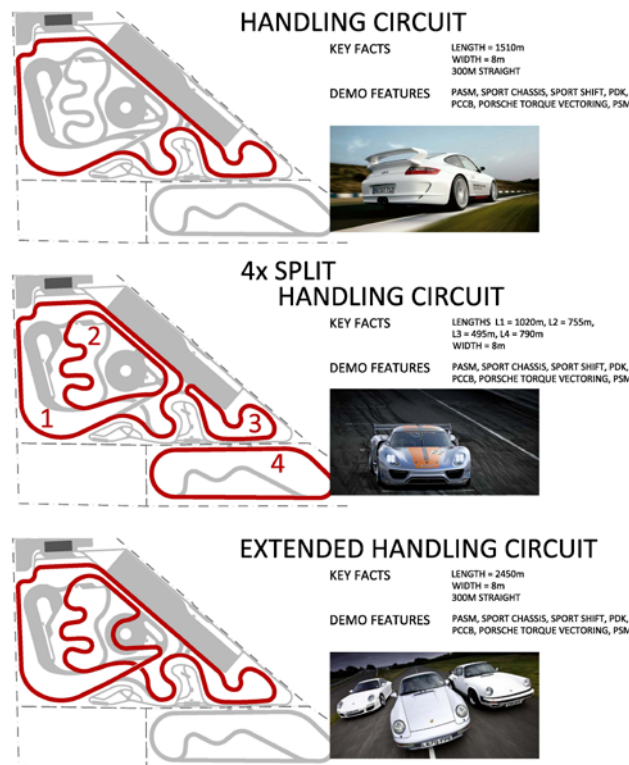
- ➔ total area app. 135.000 m<sup>2</sup>, 110.000 m<sup>2</sup>

### GOAL

- ✓ Perfection and driving fun

### CLIENT

Porsche Cars North America Atlanta, USA



# CIK - Indoor Kart Track Linz, Austria

## TURN KEY PLANNING FOR A NEW CIK-IN-DOOR KARTING FACILITY

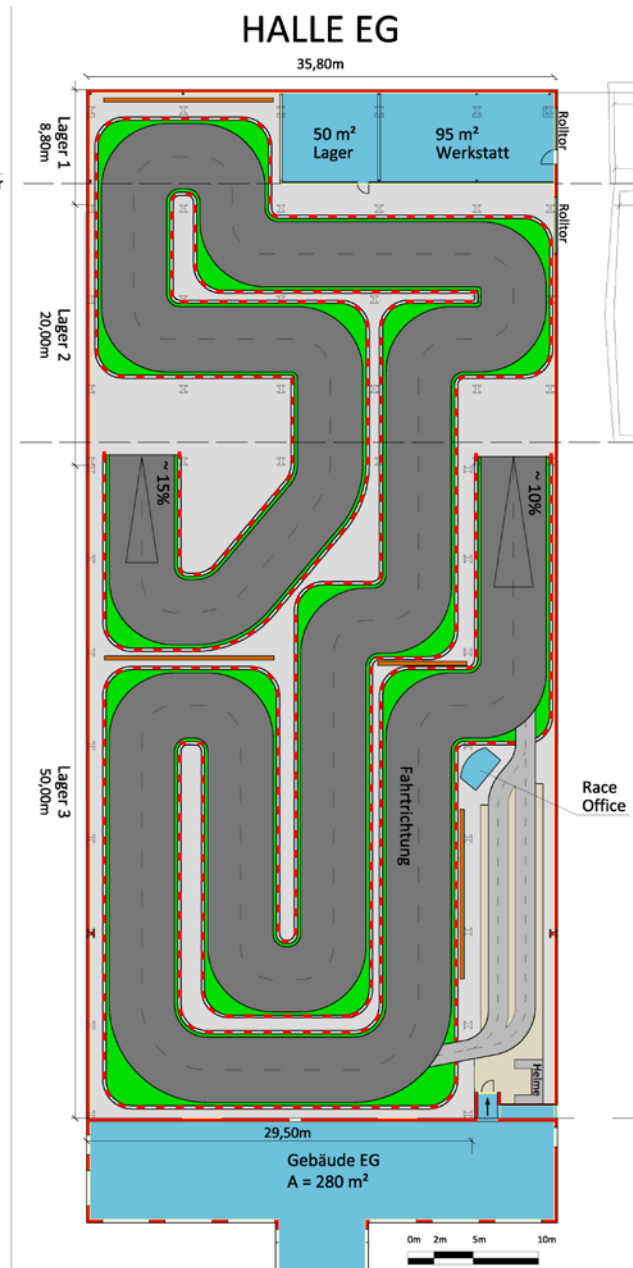
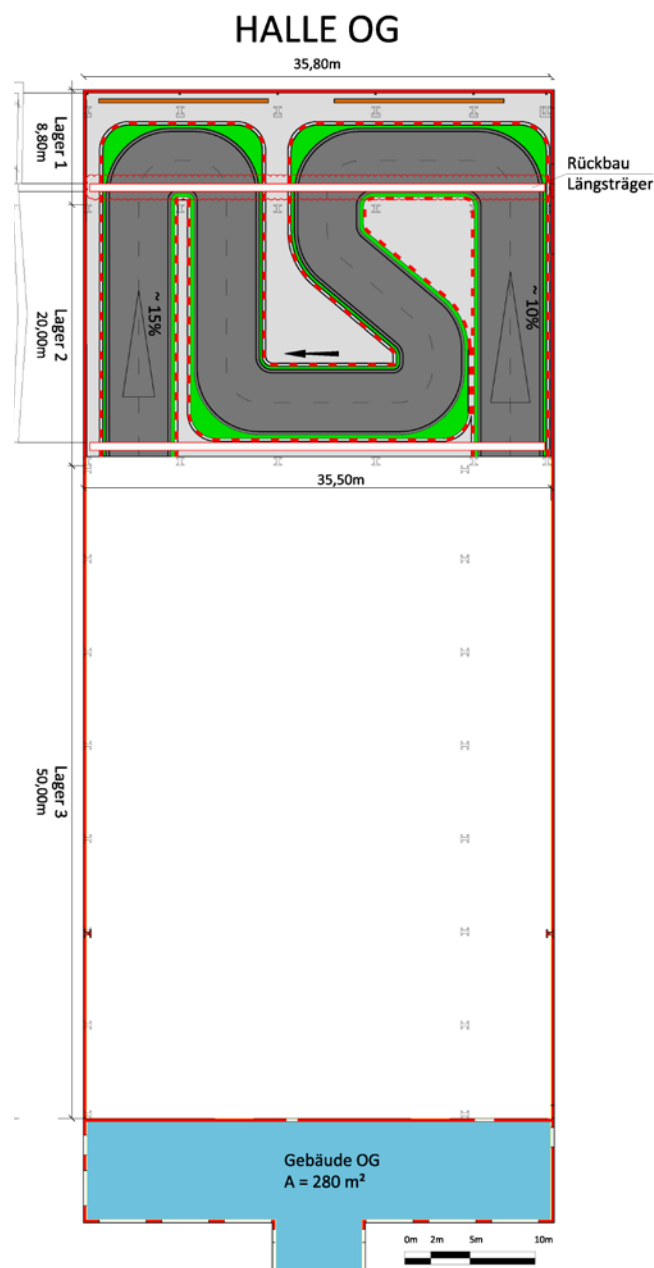
- ✓ multifunctional event center
- ✓ CIK homologation
- ✓ kart track on 2 levels
- ✓ welcome and administration building
- ✓ bar/restaurant and changing rooms
- ✓ workshops and storage
- ✓ stands
- ✓ club rooms
- ✓ auxiliary rooms

## KEY FACTS

- floor area app. 4.800 m<sup>2</sup>
- kart area app. 3.900 m<sup>2</sup>
- 410 m track length
- 5 m track width
- 32 m pit lane

## CLIENT

Plus City



# Automotive City, Russia

## TURN KEY PLANNING OF THE MULTI-FUNCTIONAL MARKETING PLATFORM

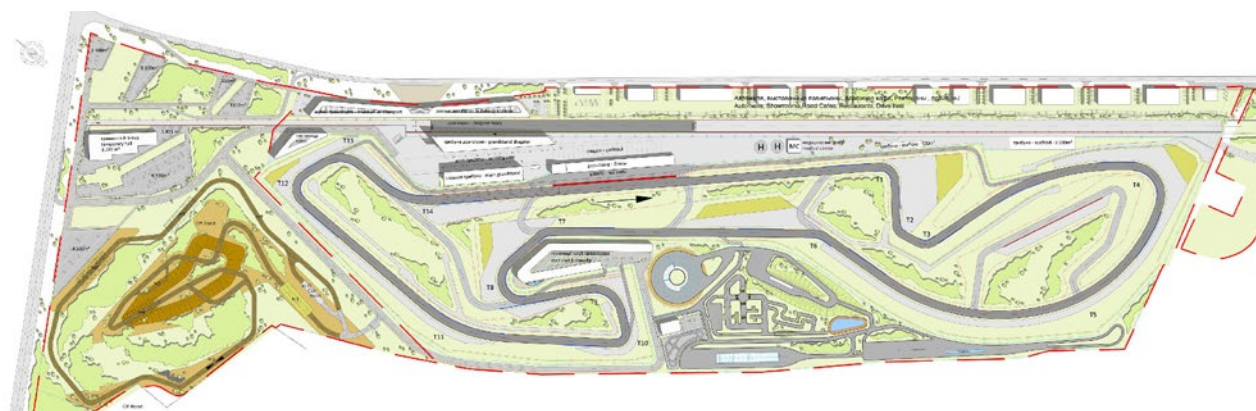
- ✓ race track
- ✓ FIA homologation grade 2
- ✓ pit building and tower
- ✓ Road Safety Training Center
- ✓ automated driving school
- ✓ traffic kindergarten
- ✓ drag strip - 3/4 mile
- ✓ main grand stand and natural stands
- ✓ museum „automobile und transport“
- ✓ showrooms and presentation and display areas
- ✓ club building
- ✓ indoor carting
- ✓ hotel facility
- ✓ leisure park
- ✓ off-road park
- ✓ further related facilities

## KEY FACTS

- ➔ total area app. 850.000 m<sup>2</sup>

## CLIENT

Private Investor





## **AUDI Pre-Series-Center Brussels, Belgium**

## AUDI Pre-Series-Center, Brussels, Belgium

### TURN KEY PLANNING

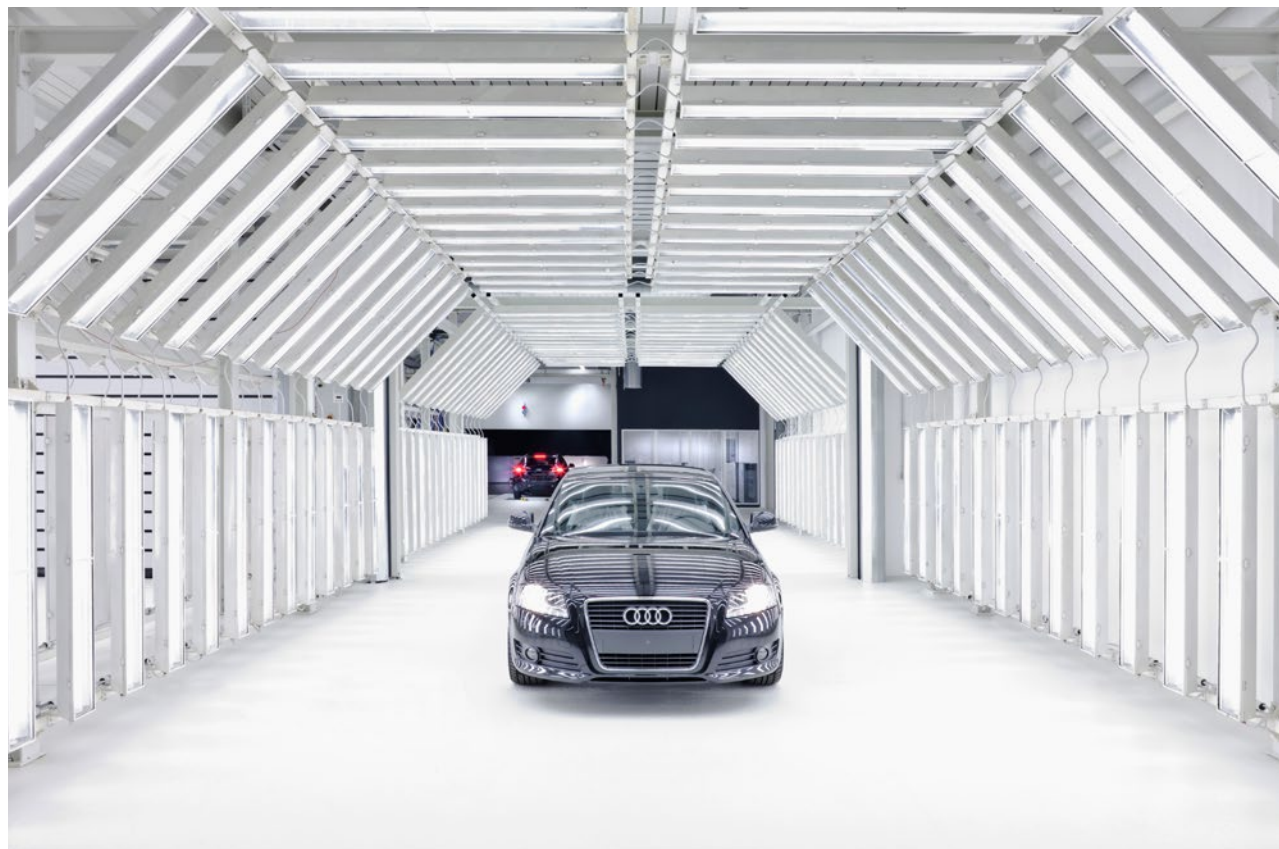
- ✓ multifunctional pre-series center
- ✓ working plots for simulation of the serial production plus quality control
- ✓ car wash plant
- ✓ permeability test stand and chassis dynamometer
- ✓ optical test bed with sided light
- ✓ head lamp test stand for adaptive light
- ✓ presentation rooms
- ✓ media floor with technical equipment
- ✓ office and meeting rooms
- ✓ staff rooms
- ✓ logistic center

### KEY FACTS

- ➔ total footprint area app. 10.000 m<sup>2</sup>

### CLIENT

AUDI Brussels S.A. /N.V. Brussels, Belgium  
in cooperation with SzturHärterArchitekten



Photos: Ingenaix, Lothar Wels

# Regional Sport Park Simbirskiy

## TURN KEY PLANNING OF THE SPORT PARK

- ✓ multifunctional sport facility
- ✓ road safety training center and traffic kindergarten
- ✓ race track FIA Grade 2 with pit building and pit tower
- ✓ main grand stand and natural/ temporary stands
- ✓ showrooms and presentation-/ display areas
- ✓ hotel
- ✓ leisure park with spa and pools
- ✓ automotive museum
- ✓ indoor kart track
- ✓ sport center with indoor soccer and skating incl. further related infrastructure

## KEY FACTS

- ➔ total area app. 900.000 m<sup>2</sup>

## CLIENT

«Avtodrom» public corporation Ulyanovsk,  
Russian Federation  
in cooperation mit SzturHärterArchitekten



## BRIDGESTONE “European Proving Ground” EuPG, Aprilia, Italy

- ✓ full service design and engineering
- ✓ site superintendence
- ✓ road works design, planning of all structure
- ✓ design and engineering of the irrigation and drainage system
- ✓ technical equipment of the skid pad, da=240 m
- ✓ requirement: homogeneous irrigation result of heterogeneous road surfaces

### KEY FACTS

- asphalt area app. 45.000 m<sup>2</sup>
- irrigated area app. 22.000 m<sup>2</sup>

### CLIENT

Bridgestone S.p.A. Rome, Italy





**GOODYEAR Proving Ground  
Colmar-Berg, Luxemburg**

## GOODYEAR Proving Ground Colmar-Berg, Luxembourg

### DESIGN-ENGINEERING AND CONSTRUCTION OF NOISE AND COMFORT LANES AT GOODYEAR PROVING GROUND, COLMAR-BERG, LUXEMBURG

- ✓ design and engineering of specific proposals
- ✓ technical and operational optimization of the proposed construction project
- ✓ technical and strategic consultancy
- ✓ client's representative
- ✓ site superintendence

### KEY FACTS

- total area app. 90.000 m<sup>2</sup>
- asphalt area app. 27.500 m<sup>2</sup>

### CLIENT

Goodyear S.A. Technical Center  
7750 Colmar-Berg Luxembourg





**Ingenaix GmbH**  
**Schurzelter Strasse 27**  
**D-52074 Aachen**  
**Germany**

tel	+49-241-894 9184-0
mail	<a href="mailto:mailbox@ingenaix.de">mailbox@ingenaix.de</a>
web	<a href="http://www.ingenaix.de">www.ingenaix.de</a>