



SERVICES DESIGN TECHNOLOGY International



**Transportation, Infrastructure
and Environmental Services**



SDT professional services

SDT offers a wide-ranging variety of professional services to infrastructure operators and owners. We understand the requirements and offer projects of all sizes and kinds ranging from feasibility studies to detailed design to supervision.

Our work covers all phases of service and includes:

- Strategic consulting
- Planning and environment
- Engineering design
- Project management
- Construction management

We are the leaders in the industry with respect to alliance and other relationship-based contracting approaches due to our capability of collaborating effectively.

SDT's specialist services include planning, environment, engineering, project and construction management, transport planning, and strategic consulting.

We collaborate with clients to design future cities. The infrastructure investment plans of cities and the way these future cities will develop with time are affected through the economic situation, growing population, and the issue of a carbon pressured economy.

SDT combines its different services to develop quality spaces. This is because social and cultural vivacity is formed through sustainable, liveable, and dynamic cities.

Our services are modified according to the clients' project and budget requirements. We make use of our skills on projects that are beneficial for local cities, and consequently the country.

SDT Infrastructure and Environmental Consultancy will ensure a professional and timely submission of engineering providing planning, design and project management services covering:

- Transport and Road design
- Power and Communications Networks
- Water Networks
- Environmental Assessment and management

Transport and Road Design



The Transportation design works includes engagements with leisure passenger transportation, mass transit, roadways, railways and subways, water, air, pipeline etc...

SDT Transportation design section provides engineering consultancy services in the field of highway and bridge design, subdivision development, drainage, in addition to transportation and infrastructure related services on airport and marina development projects.

We aim to provide safe and economical solutions that meet the needs of each project. Our services are for the entire life cycle of transport structures starting from planning and advisory services to operations and asset management.

SDT's transport structures capabilities include:

- Transport strategic advice & master planning
- Feasibility studies & concept design
- Options analysis & business case assessment
- Tender design and detailed design
- Bridge structures designs
- Cut-and-cover and other subsurface structures
- Retaining walls
- Noise barriers
- Pedestrian and cycleway structures
- Transport building structures, including bus stations, toll facilities, ventilation stations and tunnel control buildings
- Railway and busway stations
- Tunnel structures
- Road furniture & lighting
- Traffic Studies
- Traffic management Systems



SDT enables provision of services within different developmental and contractual contexts for better planning of Road, Highways, Underpasses and Bridges.

Expertise in planning and inter-modal transport studies, traffic analysis, resettlement planning, social and environmental impact evaluations, as per the requirements of each project; are some more capabilities of SDT in this division.



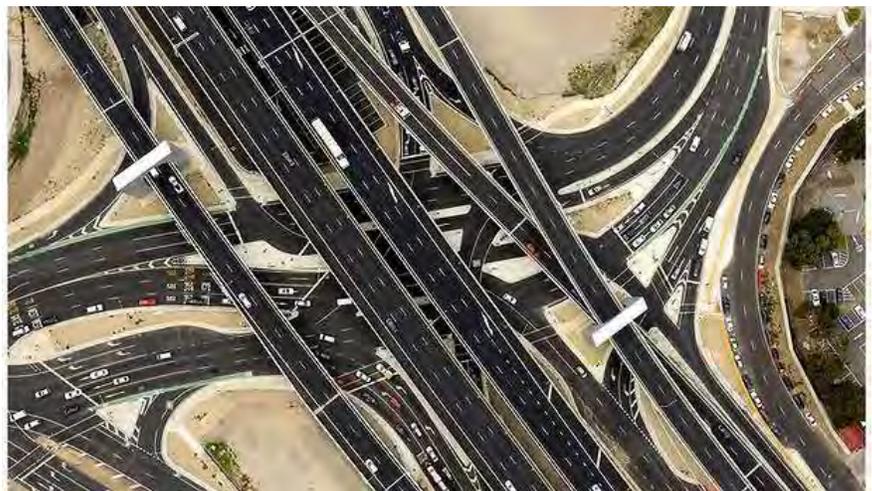
Bridges

Our bridge expert engineers and architects offer an aesthetic bridge design insuring safety and durability. We also offer effective planning, management, optimization and control. Our team at SDT join their skills to reach these goals for our clients.

SDT works as per the client's requirements for each bridge, which makes our designs unique.

SDT's bridge design capabilities include:

- Highway bridges
- Pedestrian bridges
- Bridges crossing waterways
- Complex viaducts
- Roadway bridges
- Pipeline structures
- Retaining walls





Tunnels

The SDT engineering teams have proven their experience in the design of tunnels for highways and all kinds of transportation systems for more than 22 years. By minimizing potential environment impact on air, noise or visual aggression, protecting high cultural and historical value areas and reducing traffic congestion and disturbance to surface areas, tunnels are not only a solution to cross a physical barrier, but certainly one of the most appropriate alternative to satisfy the sustainability requirements.

Our bridge design capabilities include:

- Project Management
- Value and risk management
- Geological studies
- Route selection
- Concept design
- Retaining walls design
- Design of tunnel liner and temporary support
- Expert inspections and assessments





At SDT we Provide
Road Designs for
Compounds





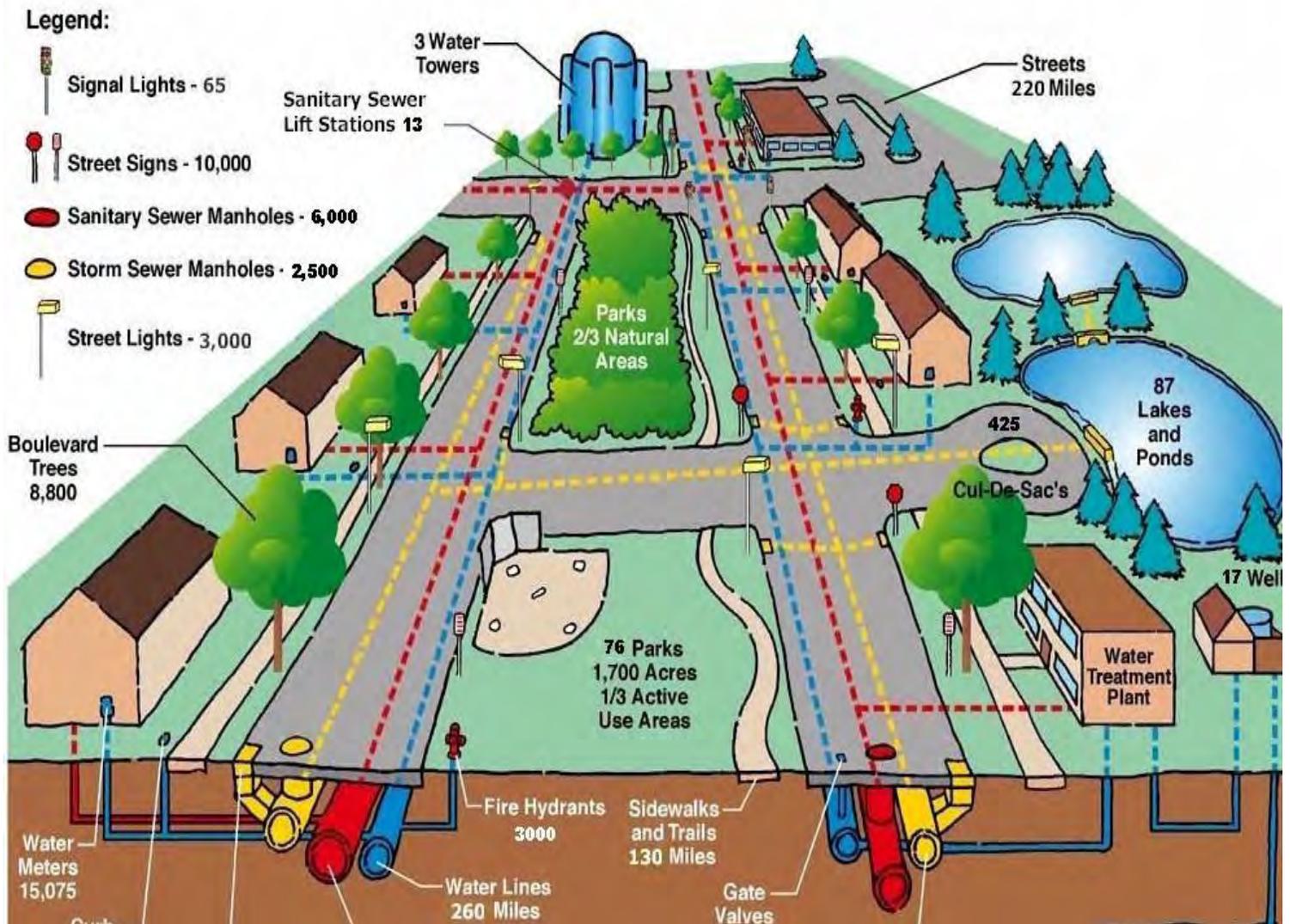
Road/Street Lighting

The Road/Street Lighting Design specialist team at SDT offers a full spectrum of lighting consulting services to transportation systems, roads and streets.

The Lighting Design Specialty team can provide:

- Roadway lighting design
- Tunnel lighting design
- Highway interchanges lighting design
- Daylight design and evaluation
- Computer analysis and modeling of natural and artificial lighting systems
- Lighting energy management
- Life cycle cost analysis
- LEED credit documentation

SDT brings design expertise to meet the client's objectives. The design must meet energy regulations and the client's budget. The design process features close collaboration among the architects, landscape architects, and other disciplines.



Utilities Diversions

At SDT we understand the risks and costs associated with delivering utility infrastructure and the impact they can have on the projects, if not delivered professionally. Our approach means we can help our clients understand the exposure, providing them with a realistic picture of what's involved and how to get the best value for money through qualified, intelligent, experienced based, value engineering.

Given that there is a multiplicity of utilities – water, gas, sewers, power cables, communications cables – under the city streets, this is a significant and complex undertaking. Our work involves significant traffic management and requires arrangements that maintain accesses to premises and businesses.

The desire and commitment of our team gives SDT its unique strength and ability to continually challenge operational standards - redefining current practices within the industry. Every individual within the team understands the critical nature of our service and make it their priority to successfully deliver every day.

Our efficient and very deliberate approach provides clarity; by developing and employing effective systems and processes, we are able to utilise the latest technology and software interfaces, giving utilities a level of transparency never achieved before.



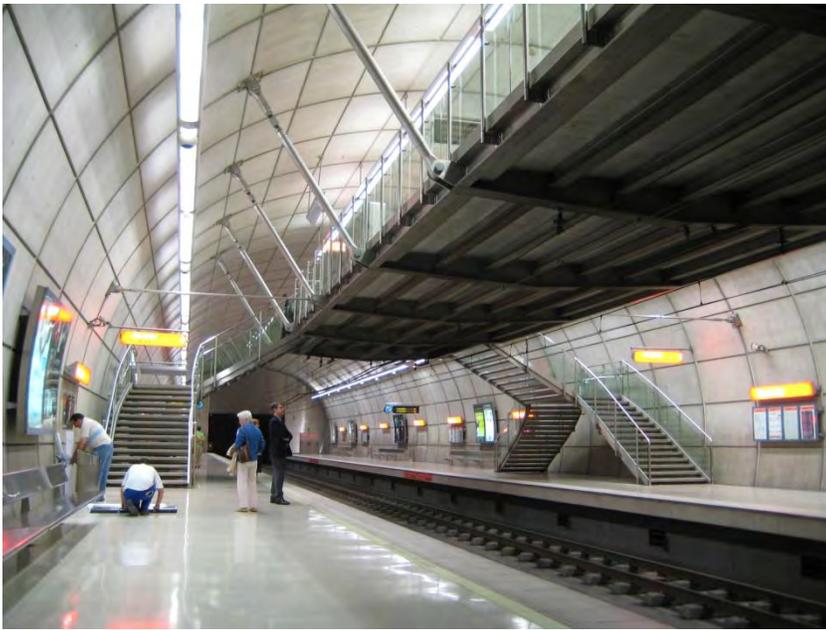
Traffic Impact Studies (TIS)

Our traffic engineering experts provide transportation and traffic engineering solutions for urban roadways and intersections, highways and local roads, airports, hospitals, educational institutes, commercial, hotel and residential developments and land development projects.

Our services include:

- Traffic engineering and design studies
- Traffic safety studies
- Interchange justification studies
- Traffic impact studies
- Site circulation studies
- Mass transit, including Maglev, studies
- Parking studies
- Feasibility studies
- Corridor and needs studies
- Point-of-access studies
- Transportation Improvement Plan (TIP) reviews
- Pedestrian and bicycle studies





Our Metro/Transit Stations Team

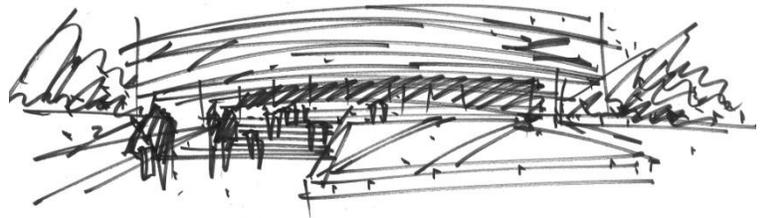
Transit is not simply a transportation mode; it is a community-building tool. Transport projects are one of the most mathematical typologies among other architectural projects. The majority of success lies in the efficient logistics of people in a precise and controlled fashion, creating unique, comfortable, safe and orderly environments for travelers.

Years of experience in the design of rail, road, air and sea transport facilities support SDT position at the forefront of this sector. In our continuation to expand on our portfolio, we strive to deliver innovative approaches in this sector.

Our team have global expertise in designing air, rail, road and sea transport stations projects, either as a standalone projects or within an alliance.

Effective transport design relies on proactive and critical analysis, sustainable solutions and the capacity to integrate mixed-use retail and commercial spaces within multimodal rail, road and air interchanges.

SDT helps transportation projects in planning, designing and managing the construction of all forms of transit, rail stations, and bus interchanges. We combine our expertise in engineering design and construction-phase services with strategic consulting, land use planning, and program management to provide clients with comprehensive support from inception through operations.



Why SDT?

The main reasons why our clients choose us due to:

- our experience in delivering practical cost-effective solutions to the transit stations designs
- our independence and academic integrity;
- our long-term focus, reflecting the long-term nature of planning and investment in the transit stations and interchanges industry;
- our focus on maximising the benefit of projects to the transit stations and its customers.





Transport/Metro Stations Services

At SDT we are capable to perform architectural and structural design for all sorts of transit stations. Our team of experienced architects and structural engineers can work together to produce a piece of art as visualized by our clients.

Through the transport stations mechanical engineering services we design and oversee the heating ventilation and air conditioning (HVAC), plumbing designs, and rain gutter systems.

Our electrical engineering services include the building's power distribution, telecommunication, fire alarm, signalization, lightning protection and control systems, as well as lighting systems. These services are implemented by our specialized transport stations (Rail, Metro, Bus, etc..) team.

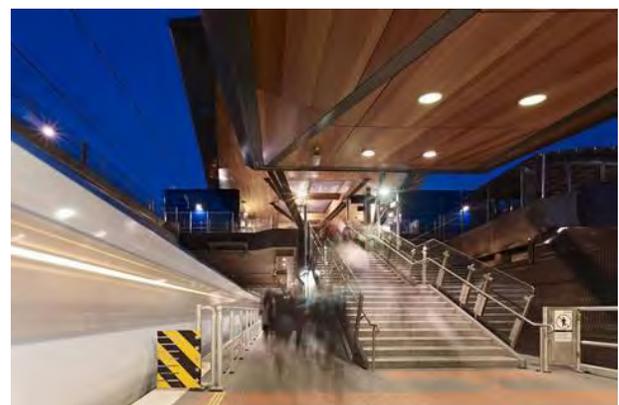
Our mechanical, electrical and plumbing engineers offer clients a full complement of services dedicated to efficient system operations and technological innovation in transport stations. Our careful, computer modeled studies ensure each system balances initial cost against operating expenses to achieve a life-cycle cost-benefit ratio that meets every requirement to the owner.

Our Services Include:

- Architectural Design
- Structural Design
- Mechanical Design
- Electrical Design

Our Transport stations include:

- Airports
- Railways Stations
- Metro Stations
- Bus Interchanges



Intelligent Transportation Systems (ITS)



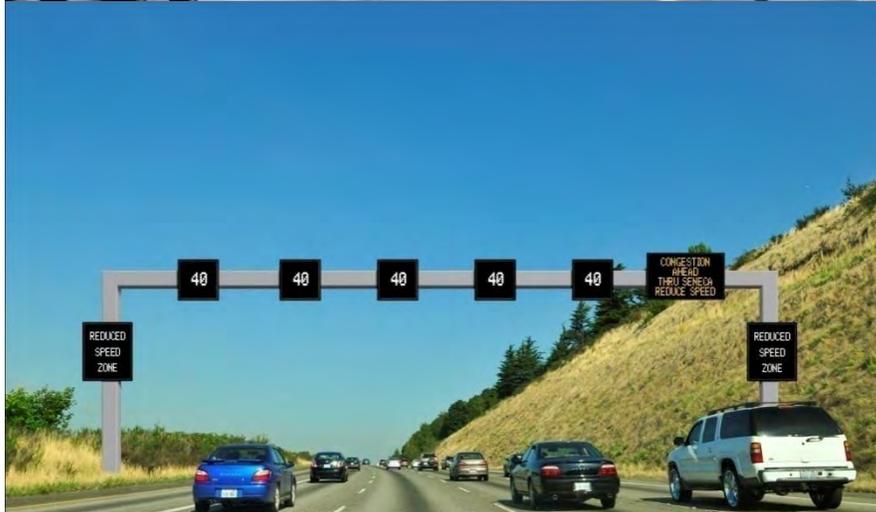
SDT is committed to assisting highway and road authorities with creative and innovative technology solutions to help meet their transportation requirements.

SDT is a leader in the planning, design, and implementation of Intelligent Transportation Systems (ITS), including field devices, managed lanes, communications, travel information, and transit technology.

Throughout SDT we are aware of the needs for Transportation System Operations. Our work culture helps us create and innovate new ideas for our clients.

Our ITS capabilities include:

- Wireless communication
- Sensing technologies
- Inductive loop detection
- Video vehicle detection
- Emergency notification systems
- Collision avoidance systems
- Variable speed limits



Power and Communications Networks



This division in SDT provides power and communications services for safe and efficient operation. We seek to deliver holistic design solutions to support our clients throughout the entire project, minimising whole-of life costs and integration issues while maximising safety and reliability.

To ensure we provide complete solutions, in all our planning and design we consider technical, economic, financial, environmental, safety and statutory requirements.

Our services cover the full life cycle of infrastructure projects from planning and advisory services through to monitoring and asset management.

At SDT we have a specialised electrical team of dynamic engineers and drafters. Our electrical department is capable of the following:

- **Power networks engineering**

Our networks capability provides engineering design expertise, from feasibility and conceptual studies, through all phases of detailed design, project delivery and operation. We provide our clients with expertise in the following areas:

- Overhead, underground line design and modeling
- Substation design
- Protection scheme designs and studies
- Control, automation and telecommunication systems design
- Civil, structural and geotechnical design management and integration
- Networks planning, steady state and dynamic power systems studies
- Insulation coordination, lightning protection and earthing design
- Power quality, harmonics, and electric and magnetic fields analysis.

- **Communications**

At SDT we have a specialised communications team of dynamic engineers and draftsmen. Our electrical department is capable of the following:

- Fibre Optic networks
- Telephone networks

- **Complementary capabilities Sustainability and climate change**

SDT believes sustainability is central to its power networks service offering. We support the development of major energy network projects, by providing infrastructure solutions that prepare clients for the carbon economy and ensure resilience against the impacts of climate change.





Water Networks

The engineering consultancy services offered by SDT- Water & Environment division include construction management, engineering design, operation and maintenance solutions, master planning, water, drainage, wastewater, solid waste and environmental influence evaluations.

Two important elements of community infrastructure are safe, reliable supply of water, and effective disposal of sewage. SDT is quite familiar with the technical challenges of the water industry in main urban cities of the region.

Our experience extends to:

- Water and wastewater management
- Water treatment plants
- Integrated water cycle management
- Environmental management.

At SDT we are capable of delivering the following:

- Water infrastructure management and planning
- Water recycling and desalination
- Water and wastewater conveyance





Environmental Assessment and Management

One of the most significant issues that industries, businesses and governments encounter is the protection of our natural environment.

We are able to contribute to various kinds of projects through our knowledge and commitment to deal with, and solve environmental problems in a business-oriented manner.

- **Environmental management**
 - Environmental management systems (development and auditing)
 - Environmental management and monitoring plans
 - Stakeholder and community engagement
 - Construction environmental management
- **Environmental assessment**
 - Environmental impact assessment and study
 - Ecology
 - Sustainability assessment
- **Environment planning, approvals and auditing**
 - Risk planning and analysis
 - Options identification and evaluation
 - Environment in design
 - Permits and statutory approvals
 - Permits and licensing
 - Feasibility and due diligence assessment
 - Environmental auditing



About SDT

SDT international was established in 1991 as an engineering consulting company that provides comprehensive range of services in the Structural, Mechanical, Electrical, Infrastructure, Environmental and Plumbing design.

For the past 22 years, we have been a pioneering force in the planning, design and implementation of development projects in the Middle East, UK and Australia.

With six offices in six countries, we employ high caliber specialized engineers capable to apply innovative approaches to design and deliver practical and cost effective solutions.

UK . Lebanon . KSA . Qatar . Dubai . Australia

www.sdtconsultant.com



Appendix A – Our Previous Projects



Location: Damman, KSA

Traffic Study

AL RASHID MALL & HOTEL

The Project

Al Rashid Shopping Mall and Hotel are located in the city of Damman, eastern province of the Kingdom of Saudi Arabia. The Mall consists of one basement, Ground floor and three other levels. The hotel consists and twenty floors. The project area comprises of 400,000 m2 of mall and 300 hotel keys.

Our Role

SDT was hired as a Design Consultant for the traffic studies.

Our experienced specialists went to the next level with their design due to the client's additional requirements for traffic and roads services.

The Results

The project is still under design phase. We have recently completed 60% of detailed design successfully, on time and within the allocated budget.



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Infrastructure, Roads and Underground Utilities Design

KARBALA COMPOUND IRAQ

The Project

Karbala Compound will offer a variety of residential apartments with reworked designs and dimensions to fulfil your living desires. Ranging from Apartment Studios to One, Two and Three bedroom Apartments, all with distinct designs and models are built with the highest construction methods and materials. Fully isolated walls and floors for heat and sound, double-glazed windows, connection to the LPG natural gas network, Internet, TV communications and a premium grade of two elevators is provided in each building.

Our Services

- Infrastructure Design
- Roads Design
- Construction Cost estimate
- Underground Utilities Design
- Sustainable Design Study

The Result

We were able to complete the project successfully and on time as assigned by the project managers. Every step of our design was thought of by our professional engineers for better sustainable solutions.



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Location: Bekaa, Lebanon

Infrastructure & Roads Design

BEKAA SHOPPING VILLAGE, BEIRUT

The Project

Sprawling over a 200,000 m² property in the heart of the Bekaa Valley, the Bekaa Mall is a one-stop leisure destination, combining retail shopping, entertainment, dining, event hosting, business servicing and outdoor touristic attractions amid beautiful landscapes.

A regional mall, Bekaa Mall is built on a 90,000 m² footprint consisting of a parking level and two retail floors. It boasts 100,000 m² of commercial space with 70,500-m² gross leasable area. Its covered and outdoor parking spaces can accommodate up to 4,500 cars.

Our Role

Our engineering/design departments at SDT worked together to perform a comprehensive design of the development. The engineering requirements were taken into consideration when designing this shopping centre and its services.

The Results

We have completed the project successfully, on time and within the allocated budget. Our solutions impressed our client.



SERVICES DESIGN TECHNOLOGY INTERNATIONAL



Location: Beirut, Lebanon

Infrastructure & Roads Design

GEANT MALL, BEIRUT

The Project

Geant Beirut Mall quickly became one of the most visited Malls in the Country, creating a one-stop shop with the most varied tenants.

Geant Beirut Mall modern architecture with its fully air-conditioned spacious area exceeding 150,000m² distributed over 4 storeys above ground and 4 storeys underground, creates an atmosphere that is welcoming and uplifting to its visitors.

For easy access and better experience Beirut Mall offers a 3 storeys underground car park for over 650 cars.

Our Role

We designed the infrastructure and roads around the shopping centre, including entries, exits and traffic circulations. Our engineers worked closely with the client to put all the required components together to produce a genuine solution as per the international standards.

The Results

We have completed the project successfully, on time and budget. Our engineering solutions impressed our client.



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Road Design

Nabateyeh Main Road

SOUTH LEBANON

The Project

The Nabateyeh Main Road project is located in the South of Lebanon. It was constructed after its destruction in 2006.

It runs for 21 km along the existing main road. The road includes all underground and overhead utilities including street lighting.



Our Role

SDT was hired as a Design Consultant for the road design, underground and overhead utilities of the road.

Our experience specialists went to the next level with their design due to the client's additional requirements for traffic and roads services, including the sewage, water and electricity services.

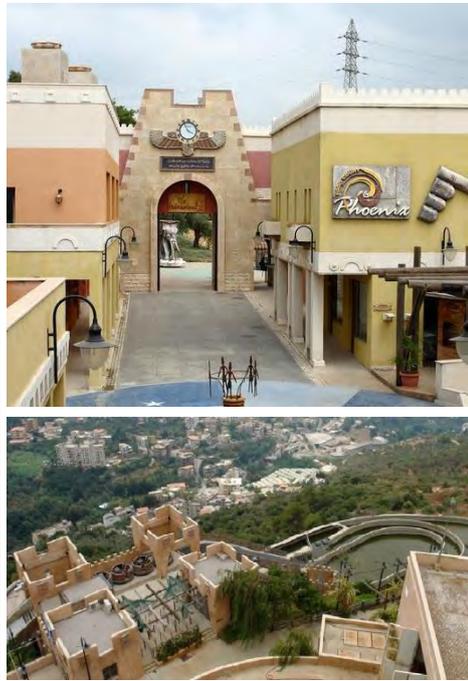
We were also involved with the street lighting of the road.

The Results

We were assigned the design phase of the project which we completed successfully, on time and within the allocated budget.



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Infrastructure Design

Habtoorland
BEIRUT, LEBANON

The Project

Habtoorland is one of the biggest theme parks in Lebanon. Situated on a 107,000 square meter plot of land in a Beirut suburb. Habtoorland is a \$40 million (USD) project by the Al Habtoor Group.

Our Role

We were awarded to work on the inner infrastructure of the project. Working closely with the developer, we developed a vision and group of compatible uses that fit both the developers' requirements and fulfilled the requirements of the client.

A separate package was prepared for each parcel including its proposed use, a building program for its development, design guidelines, infrastructure design, electrical underground and system design, mechanical design, civil and structural design, a construction cost estimate and a feasibility study for the whole project.

Our Services

- Infrastructure design work

- Electrical underground & system design
- Mechanical design
- Civil and structural design
- Construction Cost estimate
- Feasibility study
- Design guidelines

The Result

A cost-effective design was developed in a relative short period of time through intensive value engineering workshops with designers' team, and drafting team.

All concept and detailed designs were submitted and presented to the client, with construction now being completed.



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Infrastructure Design

Hydra Village

ABU DHABI

The Project

Hydra Village is Lease Hold Development developed by Hydra Properties and located on highway 11, the main highway connecting Abu Dhabi and Dubai and a short drive from Abu Dhabi International Airport.

Hydra is a self-sustained city perfectly located at the entrance of Abu Dhabi. It comprises of various 2 and 3 bedroom townhouses and villas. The environment is surrounded by green areas with parks and open spaces.

Our Role

SDT was hired as a Design Consultant for the road designs and underground infrastructure of the village.

Our experience specialists went to the next level with their design due to the client's additional requirements for traffic and roads services, including the sewage, water and electricity services.

The Results

We were assigned the design phase of the project which we completed successfully, on time and within the allocated budget.



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