

# CAPABILITY & EXPERIENCE STATEMENTS



Planning | Feasibility | Design | VE / R&D | Supervision | Management | Advisory

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CAPABILITY & EXPERIENCE

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CAPABILITY &  
EXPERIENCE  
STATEMENTS

Greetings from  
The Chairman



Many thanks for your keen interest to Pyunghwa Engineering Consultants Ltd.

This brochure is tailored to give you a snap shot of the company activities and performances in various engineering fields.

In the world's ever-changing business environment with far more complexity of the clients' needs, we, on top of our hands-on expertise from past track records, are constantly striving to replenish ourselves with the most up-to-date technologies so that we can readily provide our clients with innovative solutions and added values.

With our commitment for engineering excellence, we look forward to the opportunity of creating a better tomorrow and achieving the ultimate goal for mutual progress and long-term growth with our valued clients and partners in a wider communities of the world.

Sincerely yours,

**Kwon, Jae-Won**

Chairman of the Board

A handwritten signature in black ink, appearing to be 'Jae-Won Kwon'.

# 01

## INTRODUCTION

- Who Are We?
- Our Services
- Our Approach to Project Delivery
- Our Operations In a Nutshell
- Our World



The business of PEC is realizing the client's dream and vision of efficient and affordable infrastructure with added value.

Expertise and capacity of our professionals help create environment conducive to promoting growth momentum for sustainable and equitable development.

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## Who Are We? | Qui sommes-nous?

**Pyunghwa Engineering Consultants Ltd (PEC)** is a dynamic infrastructure engineering consultancy firm focusing on its business strategies oriented to global reach.

### Our People

We are a company of resourceful, technology oriented innovative people representing a wide spectrum of expertise and experience profiles.

The projects which are planned in today's rapidly advancing high technological world demand an unusual combination of technical, organizational and management capability, and it would not be enough just to have talented and experienced people. Our business operations are backed by in-depth resources, R&D infrastructure, competent management and global network to sustain the growth momentum, in addition to the solid foundation of achievement and experience.

The company's senior management and engineers have gained experiences in a variety of infrastructure projects at home during phenomenal economic development of Korea and in other parts of the world – particularly in the Middle East since the 1970s. We therefore are well prepared to deliver infrastructure solutions with balanced experiences in both public and private sector projects not only for domestic but also international assignments with a good deal of understanding on *cultural mores and practices* of the host country.

### Two Pillars of Business

Our early projects have been primarily in transportation infrastructure engineering, in which sector we are arguably one of the most trusted firm in Korea. We have now developed into a leading multi-disciplinary infrastructure consultancy, providing full range of services for a variety of engineering business demands of both public and private sector clients.

Whilst the infrastructure sector remains as the main pillar of our business, we have diversified into the plant engineering sector as the other pillar of our continued growth. Our specialty in the plant engineering comprises inter alia: power plant, new & renewable energy, environmental plant, and environmental resources management and utilization technologies.



# Our Services

PEC is committed to providing impartial, best value and quality services customized specifically to the requirements of the most demanding clients.

The driving force in delivery of cost effective solution for our clients is the company’s culture of innovation, safety and sustainability, and continued R&D with a deep understanding on the sectors we are involved - encapsulating all economic, social and environmental dimensions as well as design, construction and management operations.

## PRINCIPAL BUSINESS SECTORS

- Road and Highway Engineering
- Railway, MRT & LRT
- Transportation Planning, BRT & ITS
- Bridge & Structural Engineering
- Tunnel & Geotechnical Engineering
- Water Resources, Flood Control & Drainage
- Water Supply & Wastewater
- Environmental Plant, Renewable Energy and Power Plant
- Urban/Rural Development & Landscape Architecture
- Defense & Security Installations
- IT & Engineering Technologies Dissemination

## PRINCIPAL SCOPE OF SERVICES

- Feasibility Study & Climate Resilient Planning
- Preliminary & Detailed Design
- Economic & Financial Analysis
- Construction Supervision & Management
- Contract Documents & Procurement Support
- Value Engineering & Forensic Engineering
- Safety Audit, Operation & Maintenance
- Engineering & Construction Technology R&D
- CAD Design Software Development

# Our Services

Pursuant to the laws and regulations of Republic of Korea, PEC is duly registered with relevant authorities to conduct infrastructure engineering consultancy business, fully covering all related fields.

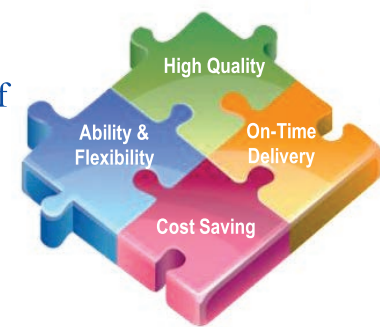
## BUSINESS REGISTRATIONS & LICENSES

- |   |   |
|---|---|
| ▪ Roads & Highways                          | ▪ Construction Supervision & Management           |
| ▪ Railways                                  | ▪ Industrial Safety                               |
| ▪ Traffic & Transportation                  | ▪ Supervision of Electrical Facilities            |
| ▪ Traffic Impact Assessment                 | ▪ Supervision of Fire-fighting Facilities         |
| ▪ Civil and Building Engineering Structures | ▪ Environmental Impact Assessment                 |
| ▪ Soil & Foundations                        | ▪ Disaster Impact Assessment                      |
| ▪ Geological & Geo-technical                | ▪ Population Impact Assessment                    |
| ▪ Harbor & Coastal                          | ▪ Public Assessment                               |
| ▪ Water Resources Development               | ▪ Air Pollution Control                           |
| ▪ Hydro Mechanics                           | ▪ Water Quality Control                           |
| ▪ Water Supply & Sewage Treatment           | ▪ Noise & Vibration Control & Management          |
| ▪ Waste Disposal                            | ▪ Electrical & Transmission                       |
| ▪ Landscape Architecture                    | ▪ General Industrial Facilities & Plants          |
| ▪ Urban & Regional Development Planning     | ▪ Soil Environmental Control & Remediation        |
| ▪ Agricultural & Fishery Civil Engineering  | ▪ Telecommunications                              |
| ▪ Topographic Survey and GIS                | ▪ Engineering Technology Research and Development |



# Our Approach to Project Delivery

We endeavor to meet the client's expectations within budget, time frame, quality and performance requirements through a wealth of planning and design expertise, practical experience and management skills.



## Collaborative Working

Our multidisciplinary engineers and experts enable the project team to cover all components of a project at all stages from inception to completion, providing a totally integrated and quality assured one-stop service. Close team work and partnership with client ensure that all activities under assignment are effectively coordinated and targeted towards attaining the project's objectives.

We strive to build close working relationships based on trust and teamwork with all our customers, nurturing interaction between private and public sector expertise and partnering arrangements for PPP (Public-Private Partnership) and PFI (Private Finance Initiative) projects, acting in a variety of roles including:

- Advisory to Funding Institutions and Project Developers;
- Advisory to Government and Client Departments; and
- Consortium Team Members.



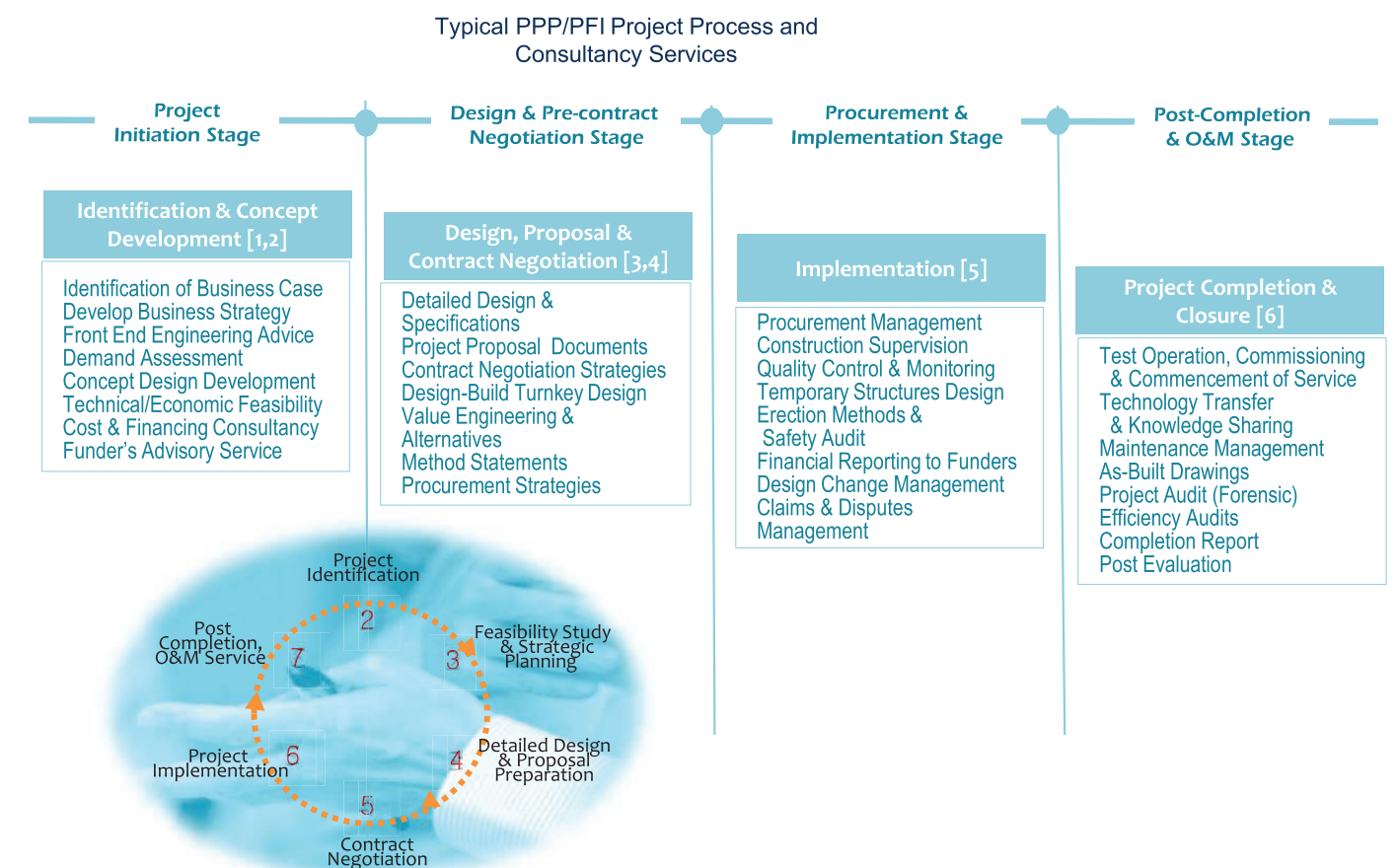
# Our Approach to Project Delivery

## Client Oriented Services

We are constantly striving to improve what we do and how we do it, by actively searching for the most appropriate *modus operandi* for collaborative working arrangement, constant communication and feedback to assure best practice interface with our client for timely delivery of high performance, best value and sustainable solutions.

We provide a comprehensive line of services customized to the needs of both public and private sector clients. Specific role and type of the services will vary depending on project delivery route adopted by the client, which may be: Traditional Mode of Contract, Design-Build, PPP & PFI, Early Contractor Involvement and Partnering, etc.

A generic example of our services in a typical PPP/PFI project is illustrated below.

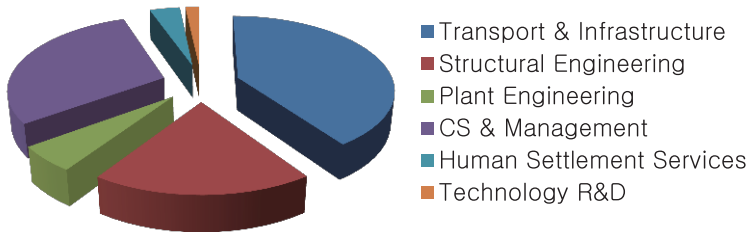


# Our Operations In a Nutshell

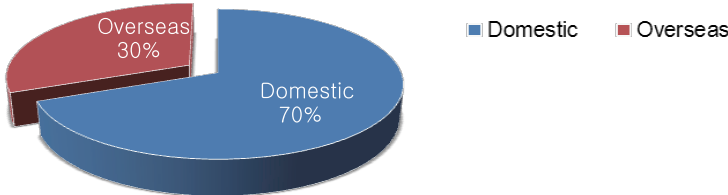
We continue efforts to broaden our business portfolio beyond the conventional infrastructure engineering consultants and to diversify the theater of operations in the global market.

The illustrations below are indicative sectoral and geographical spread of our activities for the last 3 years average.

Sectoral Spread by Category



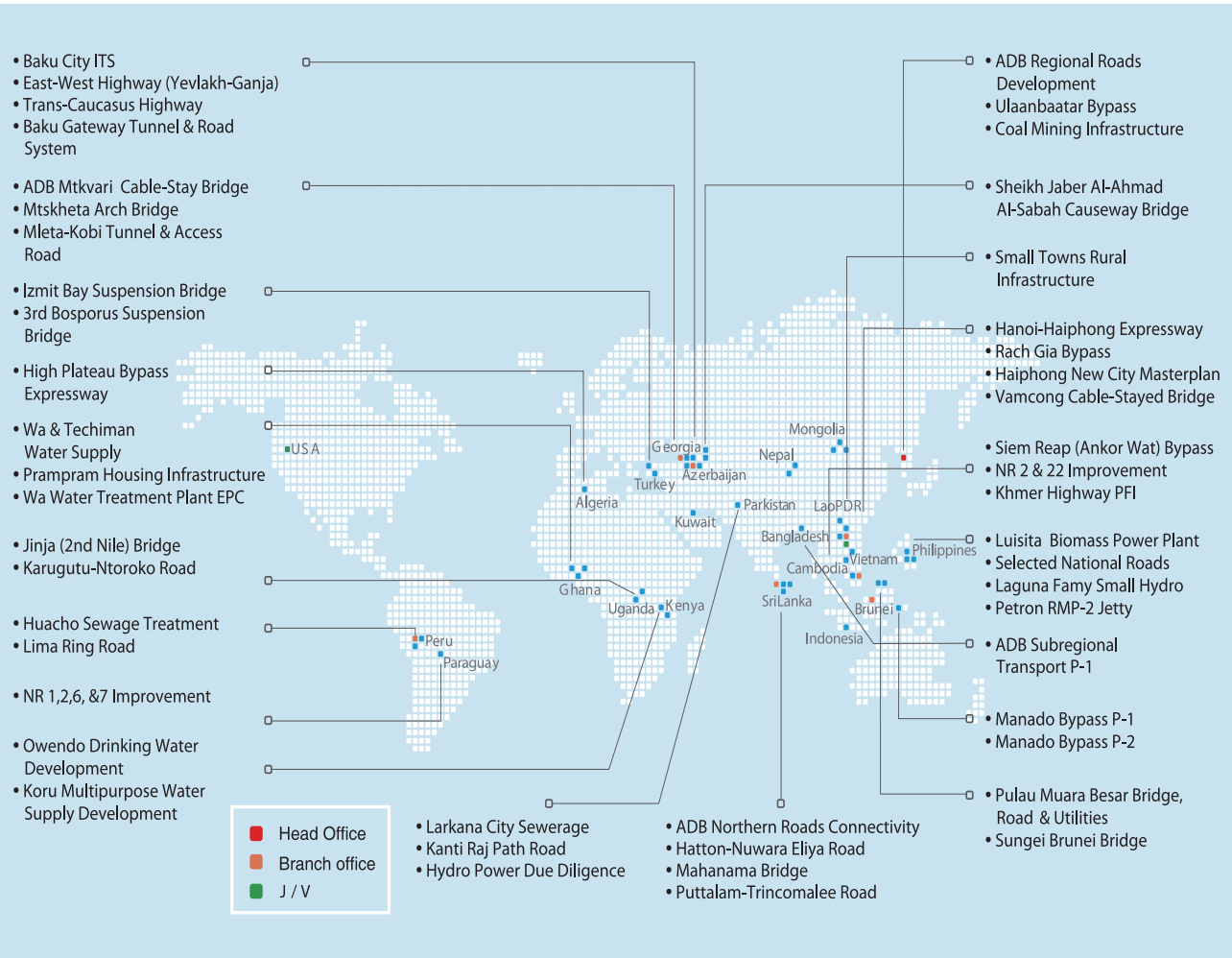
Share of Global Business



## Key Business Divisions

Transportation & Infrastructure Division	<ul style="list-style-type: none"><li>Transportation / EIA</li><li>Road / Railroads / Tunnel &amp; Geotechnical</li><li>Water Management, Water Supply &amp; Waste Water</li><li>PPP/PFI Special Service</li></ul>
Bridge & Structural Division	<ul style="list-style-type: none"><li>Super Long-Span Bridge / Overseas Bridge</li><li>Underground Structure</li><li>Hydraulic Structure / Maritime Engineering</li></ul>
Human Settlement Division	<ul style="list-style-type: none"><li>Urban &amp; Regional Planning</li><li>Tourism, Leisure &amp; Landscaping</li><li>Military Infrastructure</li></ul>
Plant Engineering Division	<ul style="list-style-type: none"><li>Power Plant, New &amp; Renewable Energy</li><li>Environmental Plant</li><li>Other plant and process engineering</li></ul>
Supervision & Management Division	<ul style="list-style-type: none"><li>Construction Supervision</li><li>PMC Contracts</li></ul>
R & D Institute	<ul style="list-style-type: none"><li>Technology Development</li><li>Value Engineering</li><li>Technology Transfer</li></ul>
Global Business Division	<ul style="list-style-type: none"><li>Global Marketing &amp; Business Development</li><li>Overseas Contracts</li></ul>

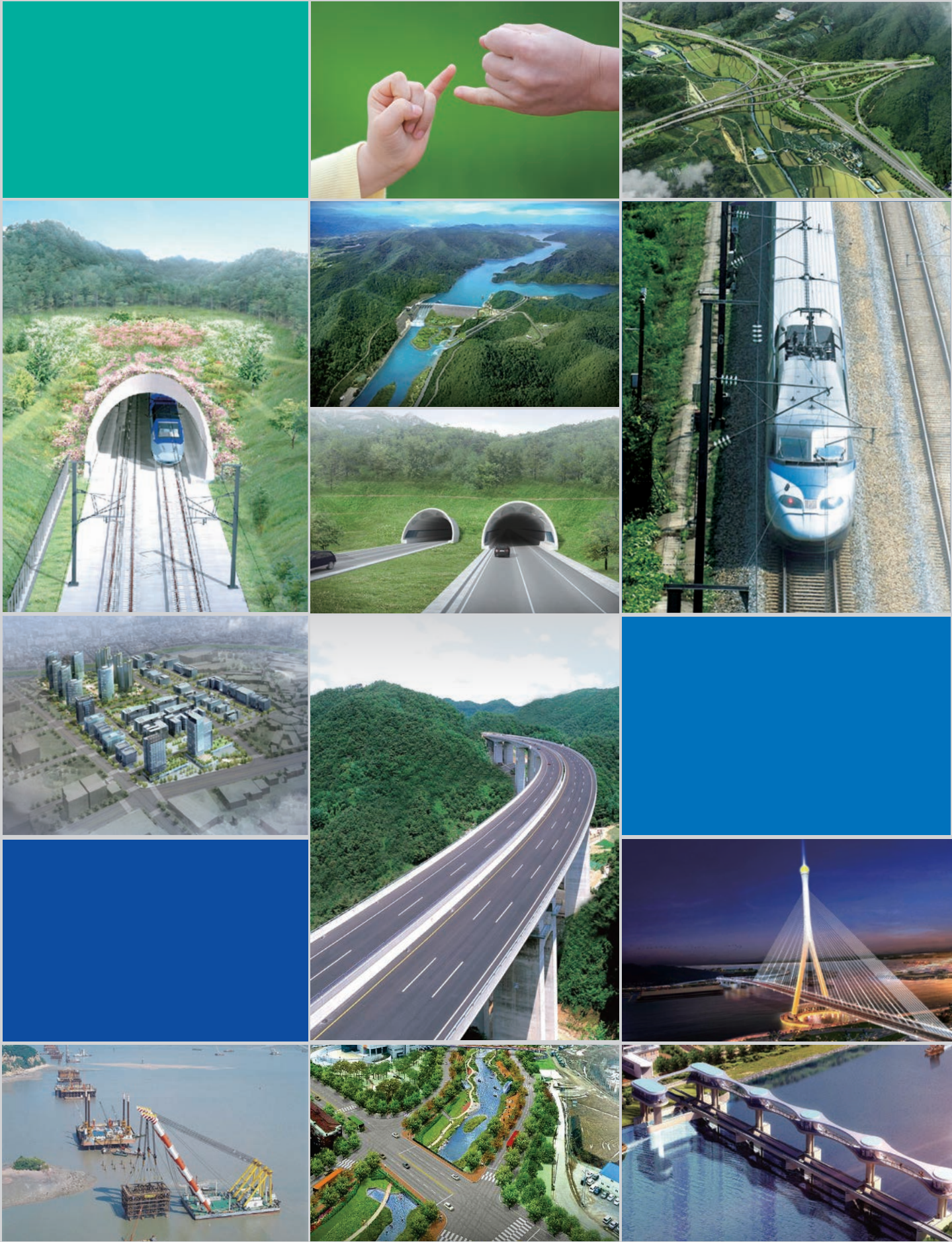
# Our World



## Overseas Offices

Sri Lanka	No 500/5, Thalapathpitiya Road, Madiwela, Kotte, Sri Lanka Tel : (+94-1) 1562 4503
Oman	Alwattayah, Mutrah, Muscat Governorate, P.O Box 1657, Postal Code 112
Viet Nam	Rm. 2709, 34T, Houg Dao Thuy St. Trung Hoa Nhan Chinh, Cau Giay, Hanoi, Viet Nam Tel: (+84 4) 2221 3084
Brunei	(P/P) No. 14 Spg 357-13-22, Jln Subok, BD2717, Brunei/Muara, BRUNEI, DARUSSALAM Tel : (+673) 233 8424 Tel : (+968) 24 835660, Fax : (+968) 24 835727
Azerbaijan	104, Nizami Str., Ap.5, Nasimi District, Baku AZ1010, Azerbaijan Tel : (+994) 50 4989611 (Baku)
Georgia	7th Floor, Business Centre, Sopmsheni #45, Vazjapshavela Avenue 0112, Tbilisi, Georgia Tel : (+995) 32 239 33 78
Peru	Av. Enrique Palacios N. 470, Dpto 705, Miraflores, Lima,. Postal Code: LIMA 18 Peru Tel. : (+51-1) 445 1952





# CAPABILITY & EXPERIENCE

- 2 Specialist Services
- 3 Infrastructure Engineering
- 4 Plant Engineering
- 5 Supervision & Management
- 6 Technology Development



# 02

## Specialist Services

- Turnkey & PMC Consultancy
- Due Diligence, Independent Checking  
& Implementation Support
- PPP/PFI Business Consultancy
- Specialist Service to Funders

## Specialist Services

Turnkey | PFI | Project Management Consultancy | Implementation Services

While placing greater emphasis on innovation and R&D in sustainable technologies in coping with global warming, we have diversified our service horizons beyond the traditional infrastructure consultancy services.

We cater to the increasing business demands of new breed of clients such as turn-key contractors, institutional investors and funders for projects implemented under innovative project deliveries including:

Type of  
Services

- Private Public Partnerships (PPP) and Private Finance Initiative (PFI) Projects;
- Engineering Due Diligence, Independent Checking and Advisory Services to Funders and Implementing Agency;
- Turn-key and Alternative Design Competition with added value;
- Early Contractor Involvement, Partnering Arrangements;
- Implementation Support including Construction Method Statements, Specialty Advices on unforeseen ground conditions and solutions for site-specific technical issues, etc.



Turnkey  
Design

Izmit Bay Bridge on Gebze-Orhangazi-Bursa-Izmir Motorway, Turkey:  
- 3-span continuous bridge (L=2,800m, main span 1,550m)  
- Tender Design for the EPC Contractors [Nömayg JV / Hyundai E&C]



# Specialist Services

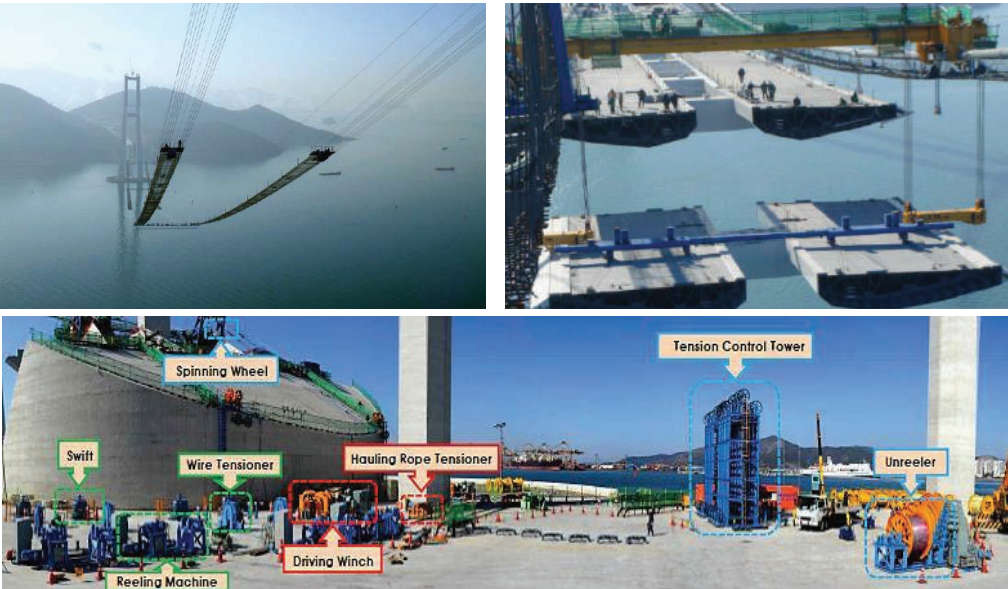
Turnkey | PFI | Project Management Consultancy | Implementation Services

Project  
Management  
Consultancy

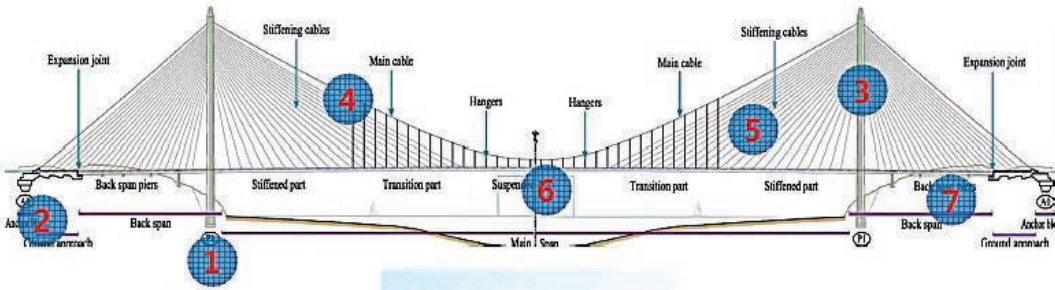


Project Management Consultancy Services for Pulau Muar Besar Bridge, Roads and Utilities Development Project, Brunei Economic Development Board, Brunei Darrusaleem

Due Diligence,  
Independent  
Checking &  
Implementation  
Support



Engineering Due Diligence, Erection Methods Advisory, Independent Checking & Monitoring



The Third Bosphorus Bridge, Istanbul, Turkey: Implementation Design for the Contractors

# Specialist Services

Turnkey | PFI | Project Management Consultancy | Implementation Services

PPP/PFI  
Business  
Specialist  
Services

We provide specialist services for the institutional investors and funders for projects involved in lending, investing or refinancing of PPP/PFI schemes – to assist them in facilitating project financing decisions through identification and analysis of uncertainties, costs and risks advisory in major infrastructure projects. The PPP/PFI specialist consultancy specialist services include, among others:

- Independent checking and design due diligence;
- Financial and cost modeling with respect to commercial sensitivities;
- Progress monitoring, assessment and certification of works done on behalf of the lenders and reporting thereof; and
- Project management and risk management, etc.

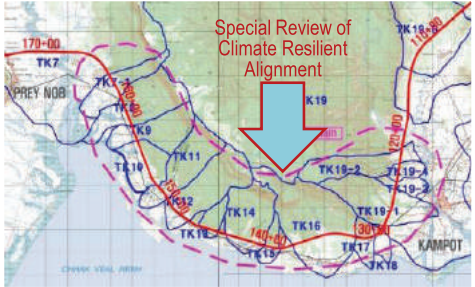
Seoul Beltway Privatized Toll Expressway, Korea: Specialist Service to Funders, the Bank of Tokyo-Mitsubishi UFJ



Daegu-Daedong Toll Expressway PFI, Korea: Specialist Services to the Funders, Daiichi-Kangyo Bank & Korea Development Bank



Trans-Khmer Highway PFI Project, Cambodia: Due Diligence and Updating for the SPC/Investor





# Specialist Services

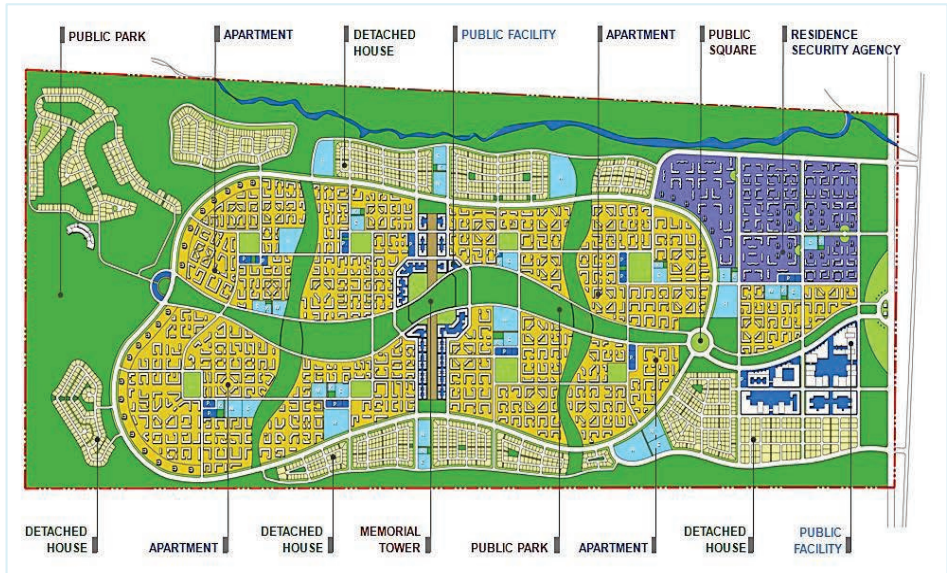
Turnkey | PFI | Project Management Consultancy | Implementation Services

Municipal  
Sewerage  
System BTL



Yangju Sewerage Facility Build-Transfer-Lease (BTL) & Cheongju Sewerage System Projects

Municipal  
Infrastructure  
Advisory



Infrastructure Development Study for Pram-pram Housing Project, Accra, Ghana:  
A study for the developer/contractor for loan financing of infrastructure development

Bio-Mass &  
Renewable  
Energy  
Advisory



Bio-mass Power Plant Feasibility Study in the Philippines: Power Generation: 9.9 MWe (net)



Small Hydro Power Plant in the Philippines: Feasibility Study in Lavac River Basin

## 03 Infrastructure Engineering

- Transportation Engineering
- Environmental Planning
- Roads & Highways
- Railroads
- Bridges & Structures
- Tunnel & Geotechnical
- Port, Coastal & Maritime
- Water Management
- Water Supply & Wastewater
- Human Settlement Development



# Transportation Engineering

Transportation Planning | ITS | TSM | BRT | Public Transport Facilities

Growth of economy means people are travelling more for work and leisure, translated into more cars taking to the roads, resulting in congestion and pollution of living and working environments; and hence provision of modern transportation infrastructure is the backbone of economic development which influences the sustainability of economy, national security and standard of living.

An efficiently planned public transport system that incorporates railway and metro, public bus and taxi services can help alleviate urban congestion by reducing private car traffic and enhance level of service and convenience to the public transport users.

Key Scope  
of  
Services

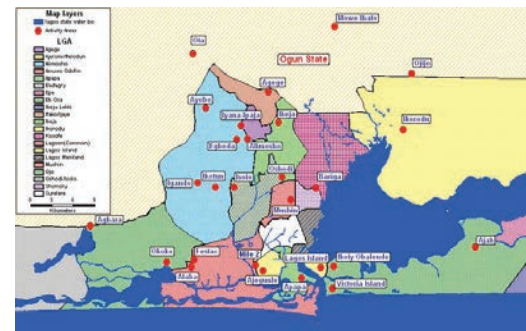
PEC has extensive experiences in planning, design and management of public transport systems. Our services cover among others ;

- Public transport planning and traffic system management,
- Patronage forecast for transport infrastructure privatization,
- Traffic impact assessment and management,
- Integrated transport system and modal transfer terminal development,
- Bus Rapid Transit (BRT), and
- Intelligent Transport System (ITS), etc.

Transportation  
Planning



Planning of National Roads ITS Infrastructure – Traffic Safety Control & Surveillance System, Korea: Detailed Design



Preparation of Strategic Transport Master Plan for Lagos Metropolitan Area, Nigeria

ITS  
Infrastructure  
Design



Baku City Intelligent Transportation System Project, Azerbaijan: Transportation Infrastructure Design

# Transportation Engineering

Transportation Planning | ITS | TSM | BRT | Public Transport Facilities

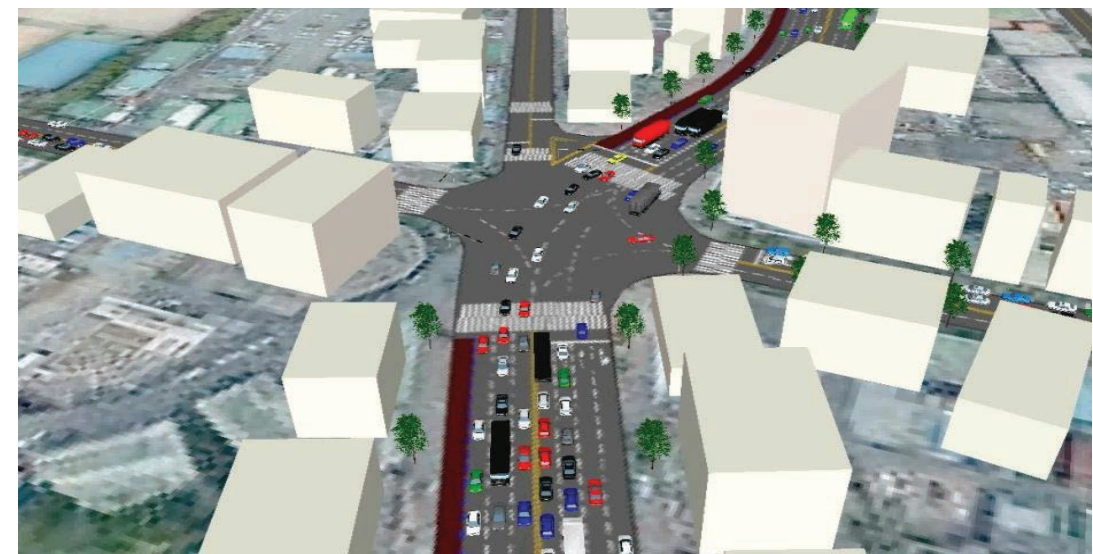


Formulation of Basic and Medium Term TSM Implementation for Ansan City, Korea



Metropolitan Region Transportation System Management Project, Ansan City, Korea

TSM  
Design



BRT System on NR-42: Gugal Station to Suwon Interchange, Korea: Basic & Detailed Design

Bus Rapid  
Transit



Development of Multi-functional Transfer Center for Iksan Station on Korea National Railroad



Honam High-speed Railway, Gwangju-Songjeong Station, Korea: Traffic Impact Analysis and Congestion Improvement Planning

Public  
Transport  
Transfer  
Facilities



# Environmental Planning

Ex Ante & Ex Post EIA | Environmental Management | Public Consultation

Development of infrastructures invariably give rise to significant impacts on natural and built environment and a well conceived environmental planning and management is crucial for achieving the balance between often the conflicting issues of the development pressures versus the sensitive environmental preservation mandates and the project cost control.

By focusing on objectives and needs of the project, our team of engineers and environmental experts work closely with the clients as well as the key interest groups and communities to identify any issues and problems of infrastructure development to deliver sustainable and balanced solutions that meet legal and functional requirements of the project with minimum adverse impact, supportable by all stakeholders.

The environmental planning topics of infrastructure projects include:

- Corridor Review and Effect of Road Surface Finish or Rail Track Details on the environment,
- **Ex Ante** assessment and **Ex Post** Evaluation of Environmental Impact, and Assessment on Effects and Processes,
- Environmental Monitoring, Integrated/Sectoral Assessments & Management,
- Sustainable Industrial and Human Living Environment Planning, Resettlement and Compensation,
- Conservation and restoration of ecosystem and biological species,
- Prediction and Mitigation of Air, Water, Ground-borne Noise and Vibration,
- Cultural/Archaeological Investigations and Assessment, and
- Public/Community Consultation and Grievance Redressing, etc.



Ex Ante Environmental Impact Assessment on Construction of the Second Circular Expressway of Seoul Metropolitan Area, Korea

Environmental  
Planning Topics

# Environmental Planning

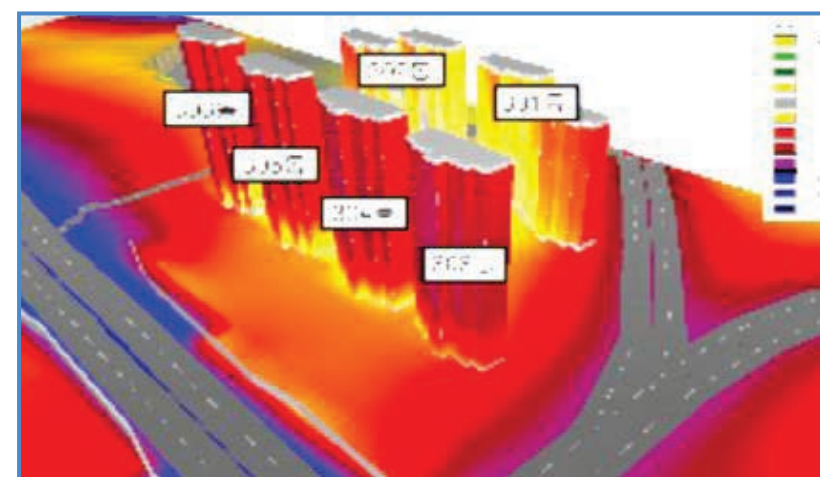
Ex Ante & Ex Post EIA | Environmental Management | Public Consultation



Ex Post Evaluation of Environmental Impact on Development of Balan Regional Industrial Complex, Hwaseong City, Korea



Environmental Impact Assessment on Development of Jeongok Multi-functional Port, Korea



Monitoring of Road Traffic Noise Level and Abatement Measures for Gongdo Residential District, Anseong City, Korea



Create Biological Habitat and Strengthen the Ecological Property adjacent area of Railway, Korea



# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

Highway  
Engineering  
Expertise

As an acknowledged leader in the transportation infrastructure engineering field in Korea, we provide a full spectrum of services from feasibility study, design, construction supervision, operation & maintenance to program management of road transport sector projects that range from a new expressway incorporating the latest technologies to upgrading of a simple farm-to-market road that encompass bridge and drainage structures, tunnels, etc. at home and abroad.

In addition to the traditional mode of project services, we also have extensive experiences in:

- Private finance initiative (PFI), design-build and turn-key projects;
- Multi-lateral, bi-lateral official development assistance projects, with diversified experiences in many countries - often under demanding physical, geotechnical and varying cultural and social conditions.

PEC's team of engineers and IT professionals have successfully developed two world-class planning and design tools for highway and railway engineering:

- **Ei-Road** for feasibility study alignment review and optimization; and
- **RD\_SmartPro** for basic and detailed design.

The extreme climatic and physical conditions of Korea have provided an excellent ground for our engineers to attain extensive and intensive empirical experiences in finding effective solutions for projects under demanding conditions. Hence we are poised to deliver more climate resilient, cost effective and sustainable solutions for all classes of roads to our clients in any parts of the world.



High Plateau Bypass Expressway (Rocade des Hauts Plateaux), Algeria: Basic & Detailed Design of 4 to 6 lane Expressway, 220.4km w/ 17 Interchanges, 105 Bridges & 9 Rest Areas

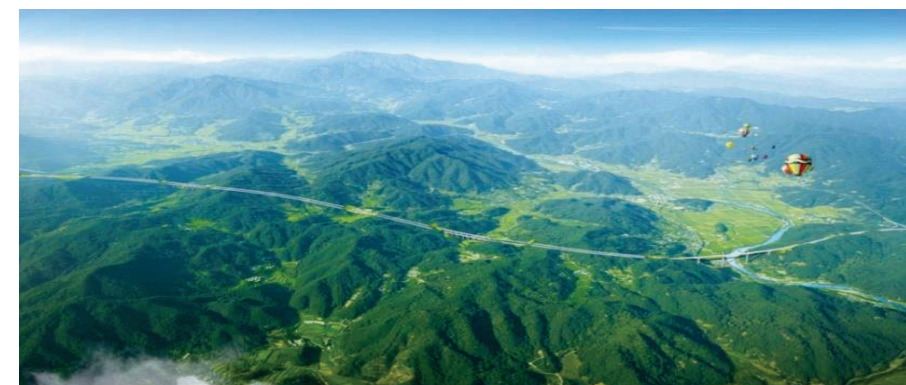
# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

Expressways



Ghihung – Yongin Private Toll Expressway PPP Project, Korea: 3 Interchanges, 2 Intersections 9 Bridges, 3 Tunnels, 1 Toll Plaza and 1 O&M Office



Left to Right: Mokcheon Bridge, Yaro- Tunnel, Yaro Bridge

Olympic Expressway Lot 12 (Damyang-Sungsan) Widening & Upgrading Project, Korea: Alternative Design; Construction Cost: US\$200mil; 3 Bridges & 5 Tunnels



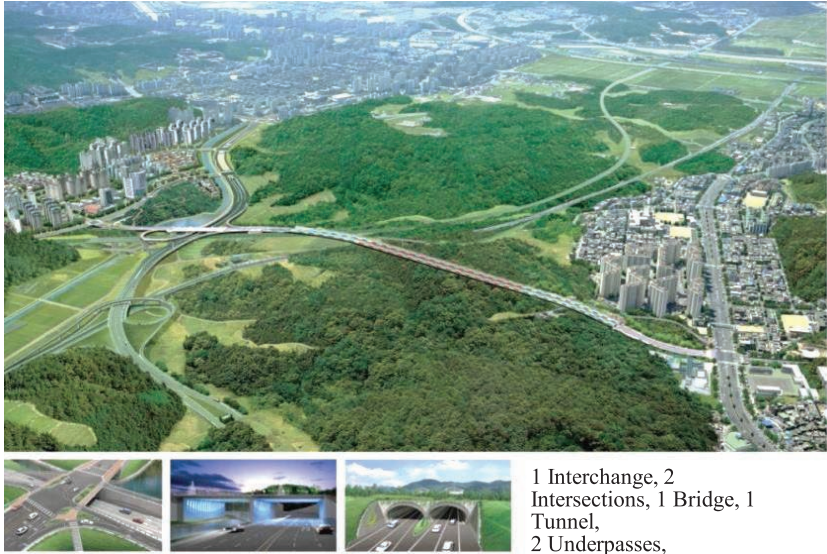
National Road Gwangyang Bypass, Korea: Alternative Design of a 3-pylon Cable-stayed Bridge & two Interchanges, five other Bridges, and a Rest Stop



# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

Turnkey Design



Turnkey Design for New Road between Dochon-Gongsanro, Seongnam City, Korea

Road for Industrial Infrastructure



Daegu Technopolis Industrial Complex Access Road, Daegu Metropolitan City, Korea

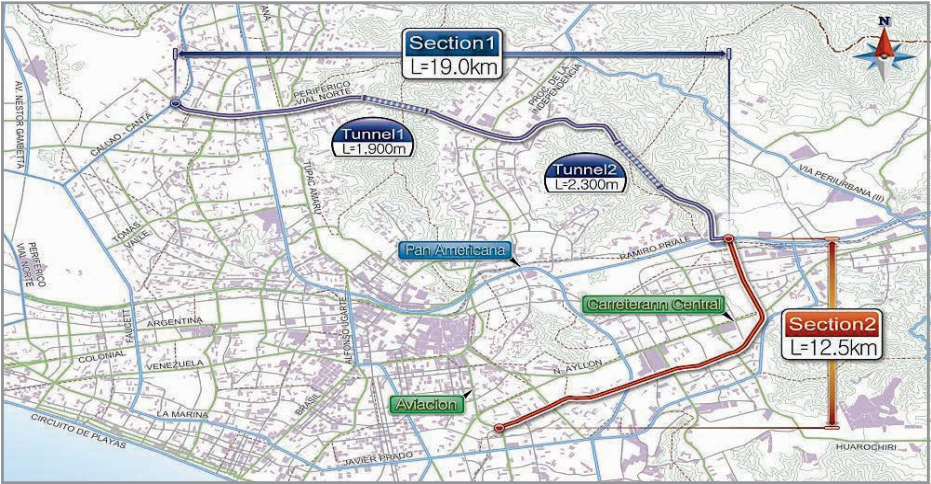


Detailed Design of the Port's Trunk Road System and Bridges for New Busan Port, Korea: 1 Grade Separated Interchange, 4 Level Crossings and 4 Bridges

# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

Global Diversification:- Sample Projects

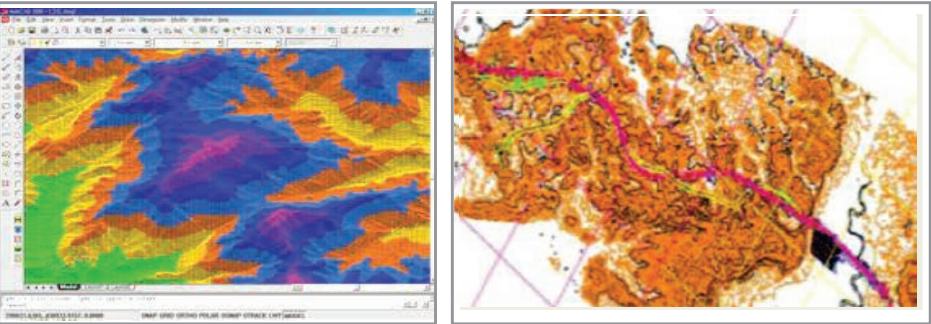


Feasibility Study for Section 1: North Ring Road (19.0km); and Section 2: New Airport Road (12.5km), Lima, Peru

Feasibility Study



Feasibility Study for Upgrading of National Roads Nos. 1, 2, 6 & 7, Paraguay



Digital Mapping and Alignment Planning of Khmer Highway Corridor in Cambodia

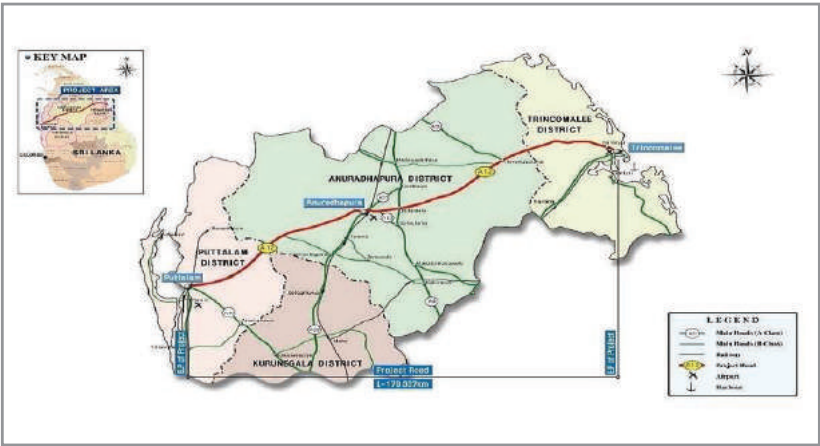
Toll Road PFI Service



# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

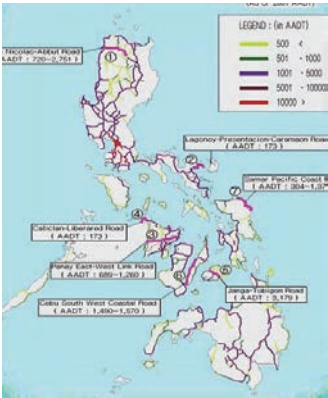
Feasibility Study & Design



Puttalam-Anuradhapura-Trincomalee Road Upgrading Feasibility Study, Sri Lanka



Feasibility Study, Detailed Design and Contract Documentation of Manado Bypass, North Sulawesi, Indonesia:



Feasibility Study on Improvement of 7 Selected Roads (700km), the Philippines:

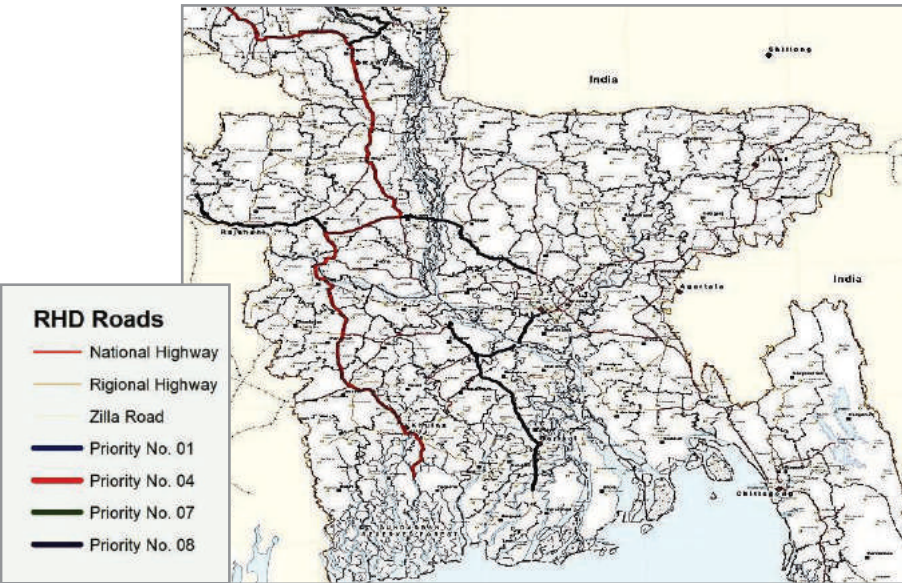


Feasibility Study of Trans-Caucasus Highway (104km), Azerbaijan (1); and Detailed Design of East-West Highway (Yevlakh-Ganja, 86km), Azerbaijan (2)

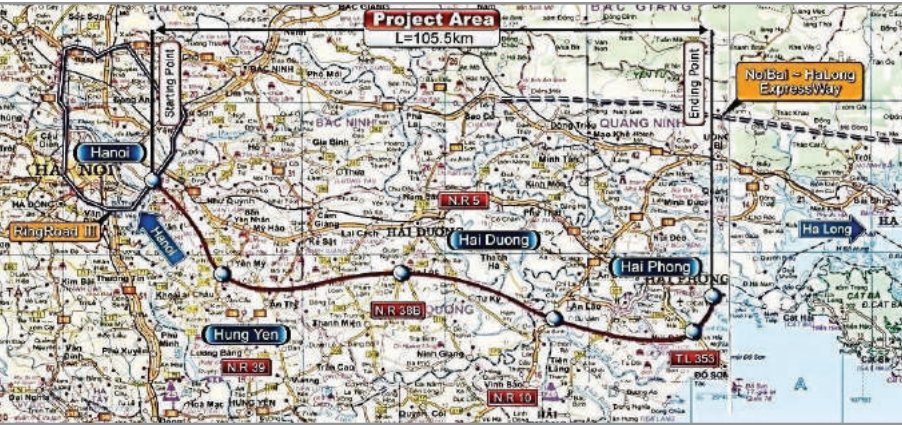
# Roads & Highways

Software R&D | Feasibility Study | Design | Supervision

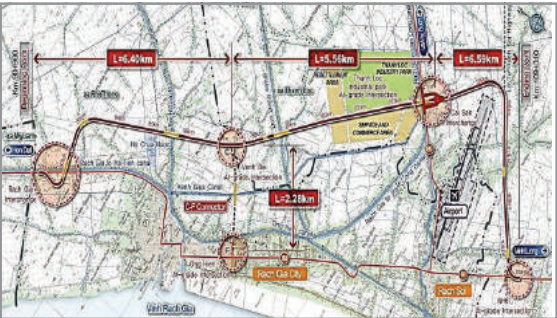
Global Diversification – Sample Projects



ADB PPTA: Sub-regional Transport Project, Bangladesh: Feasibility Study & Detailed Design of Priority Sections involving approx. 1000km



Hanoi-Haiphong Expressway PFI Project (105.5km), Vietnam: Detailed Design & Authorial Supervision of the First Vietnamese Domestic Institutional Investor Funded Toll Road



GMS Southern Coastal Corridor: Rach Gia Bypass, Vietnam: Detailed Design & Construction Supervision including 22 bridges



ADB Regional Road Development (450km), Mongolia: Design Guidance, Contract Documentation & Local Staff Training

PPTA (Project Preparatory Technical Assistance) Study & Design

Detailed Design, Design Guidance & Training



# Railroad

High-Speed Railway | Conventional Railway | Mass Rapid Transit | Light Rail Transit

## Railway Engineering Expertise

With multidisciplinary bases of expertise, our railway experts provide a comprehensive line of professional services with feasibility study, design, construction supervision to operation and management of various railway infrastructure projects incorporating the latest technologies involving bridge and drainage structures, tunnels, slope stability expertise, etc. at home and abroad.

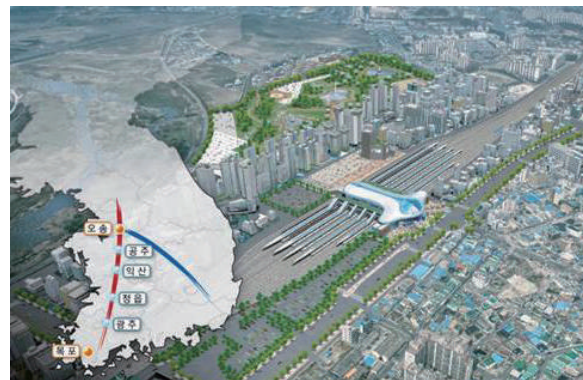
Our services cover;

- High-Speed Railway,
- Conventional Railway ,
- Urban mass rapid transit (MRT), and
- Light rail transit (LRT) and monorail.

## Alignment Design Technology

PEC has developed two world-class design tools - “Ei-Road/Railroad” and “RD-SmartPro” - for streamlined road and railroad design. The former is a powerful alignment optimization tool that is capable of identifying the most optimal alignment. Output data from the Ei-Road/Railroad can be imported directly into RD-SmartPro for subsequent detailed design on the selected alignment, and these intuitive tools also deliver more climate resilient and sustainable solutions.

## High-speed Railway



Honam High-speed railway, Korea  
[Design speed : 350km/h]  
Design Supervision service for the total length 225 km with SYSTRA & DBI

Detailed design for Honam line (Lot No.8)  
L=22.76km, Earthwork : 12.76km  
Bridge : 5.26km(9ea), Tunnels : 4.7km (5ea) and 1 station



Supervision service for Suseo high-speed railway (Lot No. 2 and 3-1), Korea  
[Design speed : 350km/h]  
Supervision service with the total length 13.9km, 1 station, 5 ventilations and 1 tunnel(13.9km)

# Railroad

High-Speed Railway | Conventional Railway | Mass Rapid Transit | Light Rail Transit

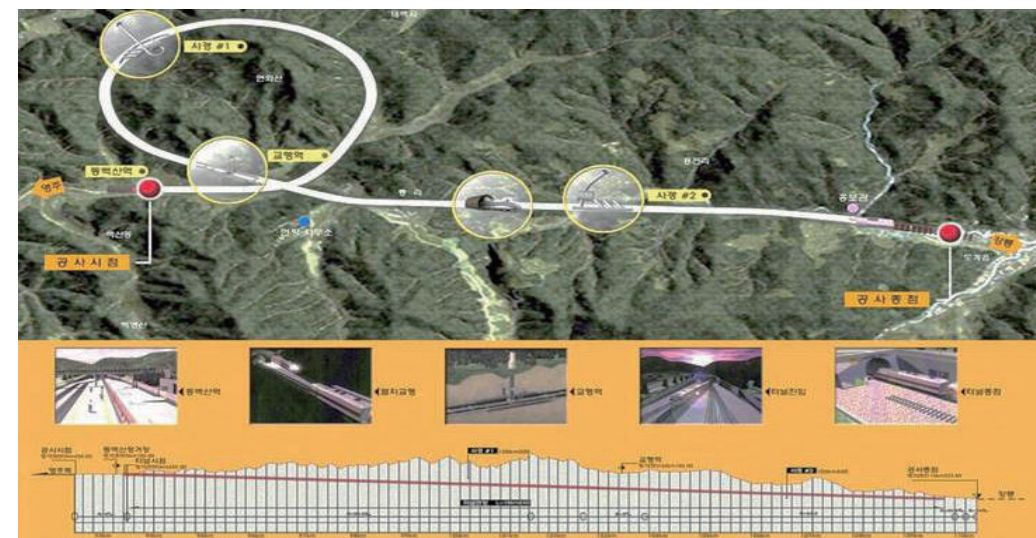
## Conventional Railway



Construction Supervision services for Bujeon~Masan Double Track Railway[Lot No.4,5], Korea  
Length : 13.5km, Station : 1EA, Earthwork : 4.6km, Bridge : 3.0km(14ea), Tunnel : 5.9km(2ea)



Detailed Design for improvement in Janghang line [Phase 2, Lot No. 1], Korea  
Length : 18.3km, Station : 1EA, Earthwork : 12.7km, Bridge : 4.5km(13ea), Tunnel : 1.1km(2ea)



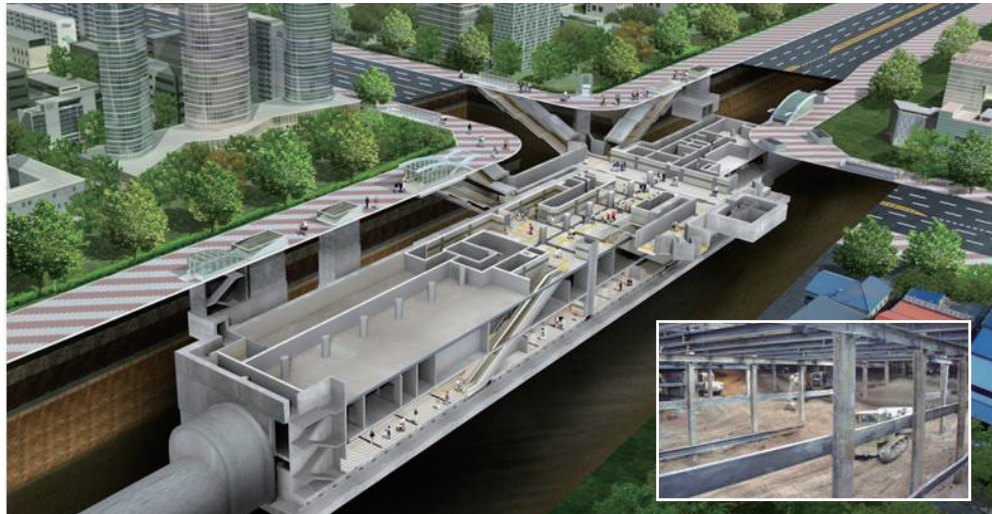
Supervision service for railway relocation in Yeongdong railway : the longest (16.7km) railway tunnel in Korea and two new stations for Korea Rail Network Authority



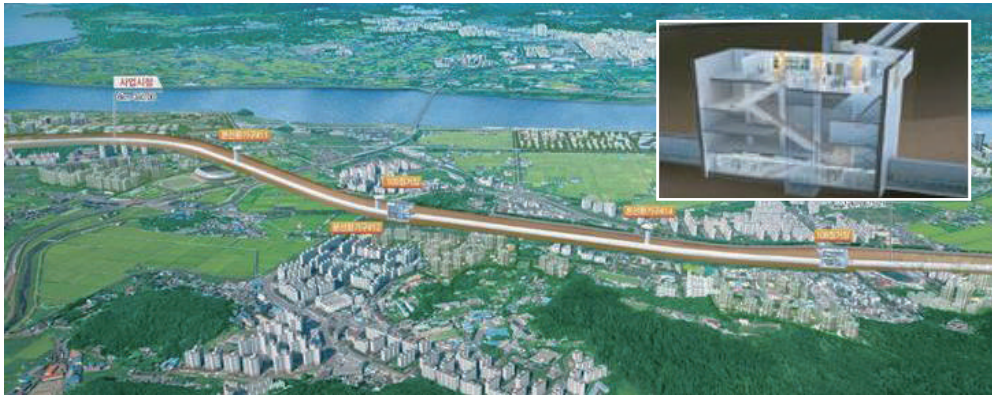
# Railroad

High-Speed Railway | Conventional Railway | Mass Rapid Transit | Light Rail Transit

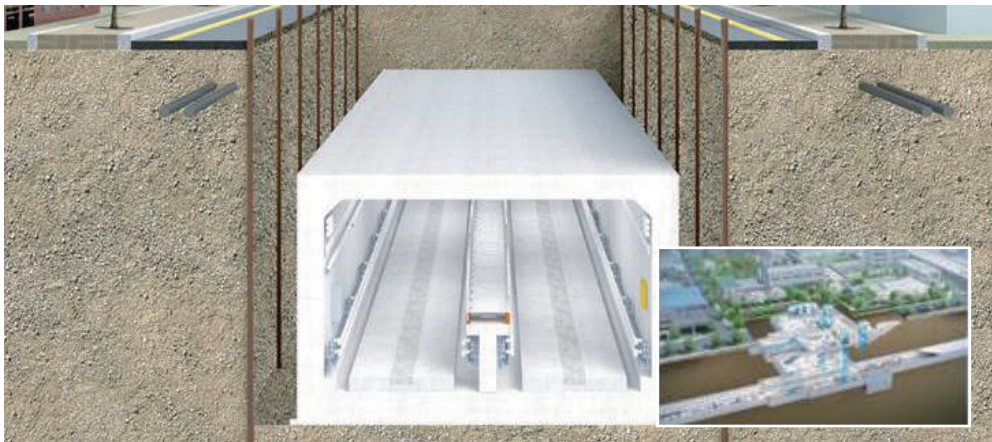
Mass Rapid Transit (MRT)



Preliminary & Detailed Design of Shinansan subway line (Underground station), Korea



Preliminary & Detailed Design for Kimpo urban railway[T/K, Lot No.3], Korea  
Length : 4.2km, Station : 2ea, Tunnel : 4.2km, Ventilation : 6ea, Architectural and Electrical System : 1set



Preliminary & Detailed Design for Busan(Sasang~Hadan) Urban Railway[Lot No. 1], Korea  
Length : 1.5km, Station : 2EA, Tunnel : 1.3km, Ventilation : 4ea, Architecture, Electrical System : 1set

# Railroad

High-Speed Railway | Conventional Railway | Mass Rapid Transit | Light Rail Transit

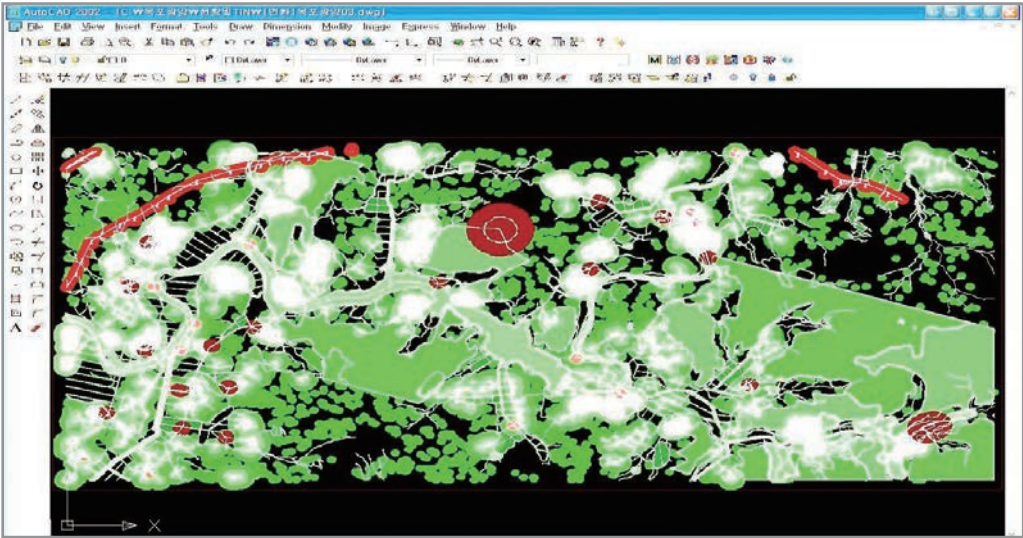
Light Rail Transit (LRT)



Goyang City Light Rail Transit Project, Korea



Supervision service for Daegu urban railway (No.3) in Daegu, Korea  
Length : 6.1km, Station : 7ea, Bridge : 6.1km, Architecture, Track and Electrical System : 1set



GIS Analysis with the Ei-Road/Rail Optimization Software : Expert Services for Alignment Identification and Optimization with its Proprietary Optimization Tool

Railway Alignment Engineering Software



# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

## Structural Engineering Capability

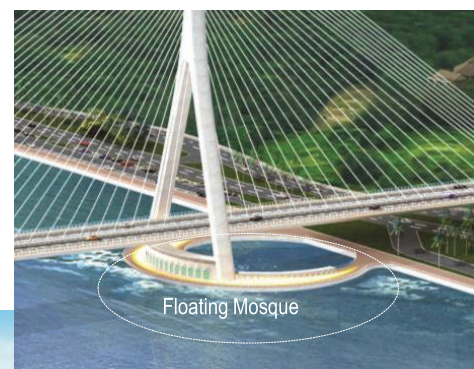
PEC provides a full line of structural engineering services, including super long span coastal island link bridge and state-of-the-art mountain gorge crossings, expressway and urban overpasses, small pedestrian eco-bridges as well as various types of river hydraulic structures such as concrete dams, lock gates and weirs, underground development structural works, etc.

Structural engineering division has the full capability with empirical knowledge and experience to plan, design, supervise and manage the construction process for all types of the structural design, methods of erection and handling of materials, while preserving the environment and managing adverse natural conditions such as flooding, typhoon and other likelihood of hazards during and after the structural works construction.

## Structural Engineering Core Teams

The Structural Division currently has six specialist task sub-groups as follows:

- Super Long-Span Bridge Team;
- Overseas Bridge Team;
- Underground Structure Team;
- Railway Bridge Team
- Hydraulic Structure Team; and
- Research & Development Team



Sungai Brunei Bridge, Brunei Darussalam: New symbol of Brunei with a Floating Mosque  
 - Client: Daelim Industrial Co., Ltd. / Employer: MOD, Brunei Darussalam  
 - This bridge is the 2<sup>nd</sup> longest concrete cable-stayed bridge with a single pylon in the world.  
 - Span Arrangement: 40+87+300 (main span) + 180 = 607m  
 - Stiffening Girder: One-cell Concrete Box Girder / Concrete Pylons / FCM Construction  
 - The bridge features a unique Floating Mosque at its Substructure

# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

## Super Long Span Bridges

Our expertise and experiences in high-tech bridge engineering, especially in Super Long Span Bridges, are integral to the breadth of our services.

**Suspension Bridge** is the most appropriate structural form for long clear spans. However, characteristics of the flexible main cables present technical problems for the design and construction. Our experts have wide experience in production of a safe and economical design and erection scheme for suspension bridges, including the technical tasks such as:

- Complex non-linear analysis of cable structures, w/ deformation analysis;
- Familiarity with physical behavior of the structure;
- Preferred and proven erection methods of various structures; and
- Understanding on dynamic behavior of the structures under wind loading, with knowledge of ways to deal with undesirable excessive vibrations, etc.



Dandeung Bridge on Gogunsan Islands Link Road, Korea:  
 - Turn-key Basic & Detailed Design - Single Pylon with 400 m Main Span, B=20m  
 - D-shape Pylon (H=105m) represents a sail hoisted to a boat, symbolizing local fishing industry



The Third Bosphorus Bridge, Istanbul, Turkey: Tender Design and Implementation Design for the Contractors  
 - Location: Bosphorus Garipce - Poyraz, Istandub; 3-span continuous bridge (L=1,598m, Main Span = 1,645m  
 - Illustration above is the artist's impression of the project at the time of the tender design



# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

## Suspension Bridges



Hwayang Grand Bridge to Naro Space Center, linking Hwayang and Jukkeum Island, Korea:  
-Turn-key Basic Design, Main Suspension Bridge Span 810m, B=12.7m



Design Supervision of Ulsan Grand Bridge, Ulsan, Korea:  
- Main Span Length = 1,150 m, B=25.6m



The Second Namhae Bridge, Korea:  
-Alternative tender design single span suspension bridge (Main span=815m, B=24.5m)

# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

## Super Long Span Bridges

**Cable Stayed Bridge** has gained popularity as the cost-effective solutions for bridge spans which were previously considered to be the range only applicable for suspension bridge. However, construction and erection of cable stayed structures present major engineering challenges, i.e.:

- It requires greater expertise and sophisticated analytical techniques in design;
- The erection methodologies and conditions are very different and difficult in many ways, and are more onerous than those of suspension bridges; and
- Particularly, the effects of wind on the incomplete structures become very crucial.



Detailed Design and Construction of Vamcong Bridge Project, Vietnam:  
The main bridge with 3-span continuous composite girder cable-stayed bridge (main bridge span arrangement: 210+450+210=870m). Total length of the river crossing 2.97km.



Sheikh Jaber Al-Ahmad Al-Sabah Causeway Bridge in Kuwait: Turnkey tender design & detailed design of main cable-stayed bridge for the Contractor



Design & Construction of Mtkvari Bridge, Tbilisi, Georgia: Asymmetric concrete cable-stayed bridge. Span = 200m, girder w = 32.0m; Interchange, ramps & landscaping



# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

Cable Stayed  
Bridges



Miho River Bridge, Korea: Alternative Design and Detailed Design



Mahanama Bridge, Sri Lanka: Turnkey Design of Cable-stayed bridge with PSC Beam girder



Sepoong Bridge on Sepoong-Junggun Bypass, Korea: Alternative Design and Detailed Design. Span: 57.5+85+2@220+85+57.5=725 m



Anjwa Grand Bridge, Korea: Turn-key Basic Design, Span: 90+200+90+5@50m, Stiffening Girder: PSC Box Type



Sandal Island Link Bridge, Korea: Turnkey Basic Design and Detailed Design

# Bridges & Structures

Long Span Bridges | Conventional Bridges | Underground Structures, Etc.

Miscellaneous  
Other Bridges



Angol Multi-span Arch Bridge as a New Landmark of Busan New Port at Angol Bay, Korea: Multip-span arches of 110m each with Parallel strand system & FCM construction.



Mtskheta Bridge on Aragvi River, Georgia: Design of a 150m, 4-lane carriageway road bridge



Yoido Eco-Stream Park Pedestrian Bridge, Korea: Composite Cable-stayed Bridge with V-shaped Inclined Pylon



Uigok Overpass: Korea's First Hybrid Arch Bridge



# Tunnel & Geotechnical

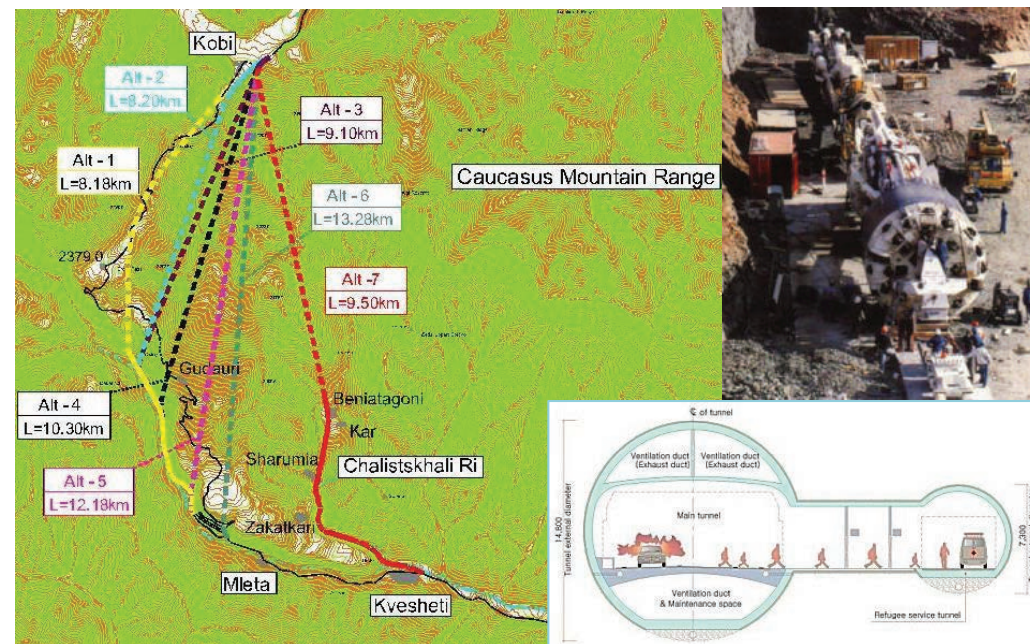
Road & Railroad Tunnel | TBM Technology | Geotechnical Engineering

With more than 70% of Korea's land mass that are hilly and mountainous, our expertise in tunneling and geotechnical engineering has always been one of the most vital elements for all infrastructure development projects in Korea such as in construction of highways, railways, subways, multi-purpose dams, water conveyance/sewerage and utility lines, urban renewal, underground space developments, etc.

Our engineers always strive to deliver solutions to satisfy the client's expectations, placing greater importance on cost effective technologies such as:

- NATM, High Power Shield TBM, and conventional cut-and-cover methods;
- Tunnel safety, ventilation and environmental monitoring; application of latest advances in geotechnical expertise; and
- Soil investigation, slope stability, foundation design, soft soil treatment and construction methodologies, etc. through continuous R&D of new technologies.

Tunnel  
Feasibility  
Study

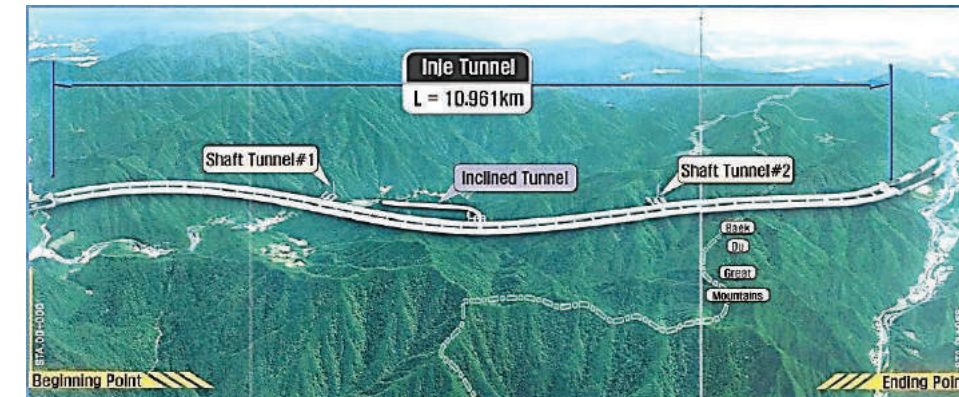


Construction of Mleta-Kobi Road Tunnel and Access Roads, Georgia: Feasibility Study of a Open TBM tunnel (D=14.8m, Selected Alignment Length 10,300m) under the Caucasus Mountains and access roads

# Tunnel & Geotechnical

Road & Railroad Tunnel | TBM Technology | Geotechnical Engineering

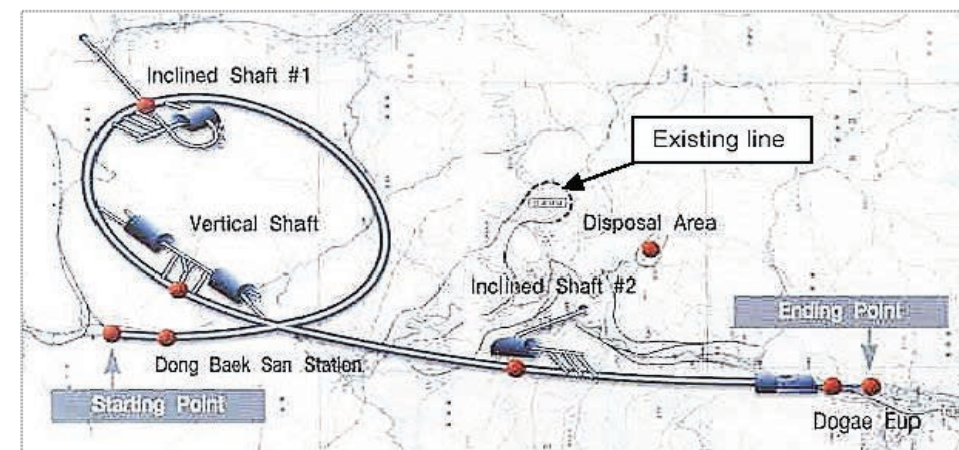
Road &  
Railroad  
Tunnels



Construction of East Hongcheon-Yangyang Highway - Lot 14, with the longest Road Tunnel in Korea (10.9 km)



Construction of Busan Outer Ring Road - Lot 6, Korea: Design of NATM Tunnel (4.3 km)



Solhan Railroad Tunnel (NATM method): The longest Rail Tunnel in Korea (15.9 km)

- The tunnel system comprises 2 inclined shafts (2,095 m), 2 cut-and-cover tunnels (290 m) and a vertical shaft.
- Construction of a new alignment as a loop-tunnel to overcome the constraints of old alignment with steep gradient in this rugged mountain section that made heavy freight trains to operate in zigzag fashion.

Simulation Model to Test Smoke Ventilation under Tunnel Fire Condition in Solhan Tunnel (15.9km)



# Tunnel & Geotechnical

Road & Railroad Tunnel | TBM Technology | Geotechnical Engineering

TBM Technology

“High-Power TBM” is our commercially registered brand identity for shield TBM tunneling in difficult locations that feature composite geological conditions with brittle rock or soft rock formations.

Under Sea Tunnel



Construction of Boryung - Taejeon Highway - Lot 1, Korea:  
1) Design of TBM tunnel portal area landscaping plan; and  
2) Design of Shield TBM Tunnel (Length = 6.9km) at Under-sea Tunnel Section on the Highway Lot 1 Section

Under River Tunnel

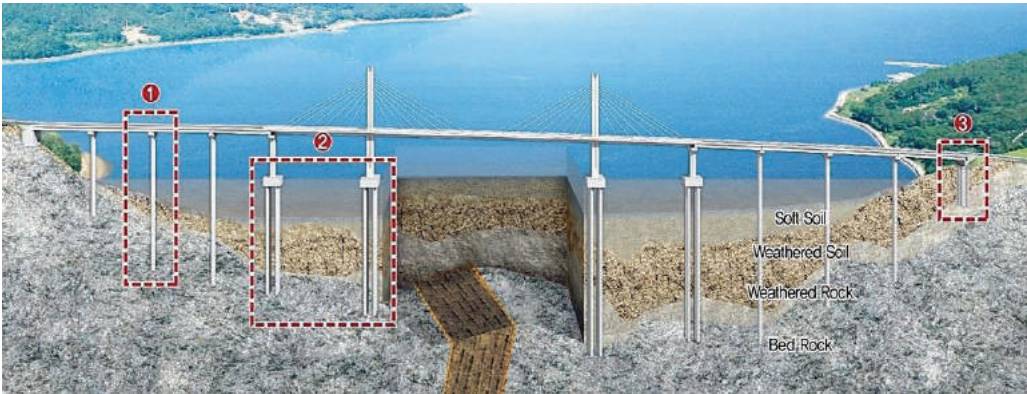


Riverside Expressway Lot 2, (Mangwondong-Wonhyoro), Seoul, Korea:  
Technical Services for Shield TBM Tunnel (D=12.0m, Design Speed 80km/h, Under-river Tunnel 4,430m)

# Tunnel & Geotechnical

Road & Railroad Tunnel | TBM Technology | Geotechnical Engineering

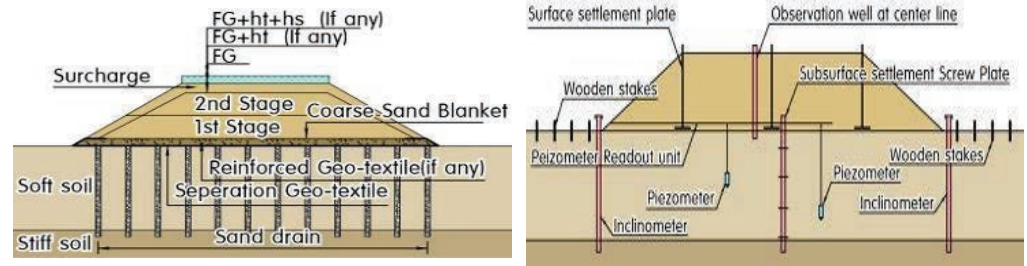
Foundation Engineering



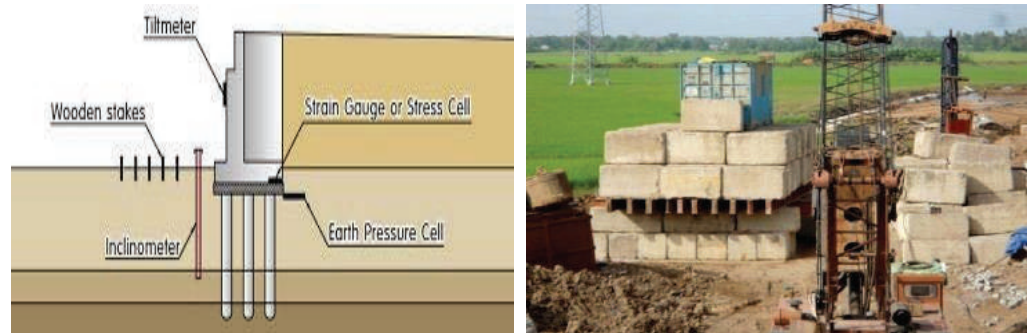
Construction of Bridge Linking Sandal Island, Korea: Deep Foundations Design on Very Weak Rock



Construction of Busan Light Rail Transit, Korea: Strengthening of Foundations for the Existing Structures of LRT tunnel and Piling Works



Detailed Design of Hanoi-Haiphong Expressway, Vietnam : Soft Soil Treatment Measures (PVD, Sand Drain, Etc.)



Substructure Foundation Design of Rach Gia 1 Bridge, Vietnam: Photo shows Static Load Test at Pier P2



# Port, Coastal & Maritime

Port & Harbor | Coastal & Maritime Infrastructure

Port & Coastal  
Engineers'  
Services

The maritime medium is particularly hostile to infrastructure works due to its corrosive nature and also because of the tidal energy released on maritime structures. The technologies concerning the maritime hydraulics and soil mechanics under coastal environment are still experimental; and hence a greater understanding and empirical experiences are required.

PEC's marine engineering team is a natural outgrowth from our core infrastructure engineering services that increasingly call for in-house marine engineering expertise. As such, PEC's port and coastal engineering activities are primarily centered around three main aspects: maritime hydraulics, soil mechanics and civil engineering in respect to the coastal infrastructure works. Maritime engineers also provides key input to the Renewable Energy Team in design of foundations and structures for coastal/off-shore developments, such as wind farms and marine energy projects. The services provided include, among others:

- Feasibility study and design of coastal infrastructure development;
- Basic and final design of public waters reclamation;
- Location selection and detailed design of industrial complex;
- Ocean plant design including oil storage sites;
- Marina harbour and marine leisure complex development;
- Trade port/fishery harbour basic planning and final design;
- Location selection and design of tidal/wind power farm civil works; and
- Design of floating infrastructure and utilization of ocean space, etc.

Port  
Development  
Master Plan



Pontang Maritime Industrial Complex Preliminary Master Plan (19,000,000m<sup>2</sup>) in Indonesia; and Master Plan Proposal for the Pulau Muara Besar Development Project, Brunei Darussalam (Inset)

# Port, Coastal & Maritime

Port & Harbor | Coastal & Maritime Infrastructure



Construction Wharf for Petron Refinery Master Plan 2, Limay, Baatan, the Philippines



Construction of Busan New Port - Songdo Dredging Ground Revetment Works, Korea:



The World Expo 2012, Yeosu, Korea:  
Design of Expo Aquarium Seawater In-take



Sub-marine Power Cable Works to Youbu Island,  
Korea: Design and Installation Method Service



# Water Management

Water Resources Development | Climate Change Adaptation | Flood Control & Drainage

## Type of Services

Water is the most precious natural resource, and management of water cycle for human habitat and natural environment forms an important part of our business.

Our integrated approach brings in skills of hydrology, hydrodynamic modeling, and the environmental (aquatic and riparian ecology, water quality, landscape and amenity) impact assessments, etc.; and we offer comprehensive range of expert services in our specialized fields.

Water Resources Development:

- Watershed Management and integrated flood prevention of river basins;
- Stream water security and maintenance plan;
- Water quantity and water balance review

Climate Change Adaptation and Disaster Prevention:

- Integrated plan for mitigation of storm and flood damage;
- Flood map preparation, and pre-disaster impact assessment;
- Planning and design for improvement of disaster risk prone areas

River Engineering:

- Master planning for river maintenance;
- Natural river development and river environment maintenance design;
- Ecological river creation and restoration

Agricultural Development Engineering:

- Structural improvement of estuary barrage;
- Drainage sluice gate and seawall projects

The water sector experts provide important inputs for hydrologic and hydraulic studies which are crucial to **climate resilient design** in the company's infrastructure project assignments at home and abroad.

## Water Resources Development



Detailed Design (Turn-Key) for Juam-dam waterway: tunnel Construction Project, Korea  
Water conduction tunnel : 11.23km ; TBM(Tunnel Boring Machine Method, 10.913km)  
NATM(New Austrian Tunneling Method, 0.317km)  
Intake tower 2ea ; (B 3.3m × H 3.3m × 2ea, entrance & outlet section), etc

# Water Management

Water Resources Development | Climate Change Adaptation | Flood Control & Drainage

## Water Resources Development



Consulting Service for Detailed Design and Construction Supervision for DauntriDam Development project, Cambodia  
Water supply ;  $264.35 \times 106\text{m}^3/\text{yr}$ (Irrigation water  $232.79 \times 106\text{m}^3/\text{yr}$  , River maintenance water  $31.56 \times 106\text{m}^3/\text{yr}$ )  
Flood control ; Maximum inflow(design flood,  $1,178.4\text{m}^3/\text{sec}$ ), Maximum outflow :  $696.9 \text{ m}^3/\text{sec}$ , Maximum reduction amount :  $481.5 \text{ m}^3/\text{sec}$

## River Regime Management for Climate Change Adaptation



The Geum River Improvement Project – Section 5 (Buyeo District), Korea:  
Improvement of river regime for climate change adaptation and preservation of river ecology;  
Restoration/Improvement : 9.08km / Riverbank Reinforcement: 6.07km ;  
River channel dredging of  $5,370,000 \text{ m}^3$ ; Flood control and drainage structures at 9 places ;  
Bicycle lane 22.4km and creation of ecology park, cultural and leisure activity spaces



The Yeongsan River Improvement Project - Section 2 (Dasi District), Korea:  
River improvement of 12.29km; with movable weir 184m; water gates (L=36.5m, H=7.13m);  
Spillway bridge (L=622m, B=5.34m); Stop-log bridge (L=235m, B=5.3m);  
Small hydro plant (610kw x 2ea); Bicycle lane, ecology park, cultural and leisure spaces, etc.



# Water Management

Water Resources Development | Climate Change Adaptation | Flood Control & Drainage

Agricultural  
Engineering



Structural Improvement of Yeongsan River Estuary Barrage, Korea

- Drainage Sluice Gates 41.5m(B) x 11.1m(H) x 8 = 332.0m;
- Road Bridge (36.5m x 374.3m) at seaside of drainage sluice gates;
- Flood Drainage Channel: 368.0m x 1,563m (Seaside: 591m / Lakeside: 972m);
- Foot Bridge: 11.0m(B)x46.0m(H)x8 = 368m (Landscape lighting and flood control telemetry system)



Drainage Sluice Gate Expansion of Asan Bay Tidal Barrage, Korea

The project is to prevent sea water intrusion, and preserve irrigation water for farmland by improvement and upgrading of structures including sluice gates and bridge

Stormwater  
Storage



Underground Storm-water Storage Structure, Korea: Detailed Design



Rehabilitation of Yeoju Irrigation Dam, Korea: Detailed Design

# Water Management

Water Resources Development | Climate Change Adaptation | Flood Control & Drainage

Disaster  
Prevention  
and Mitigation



Ex Ante Disaster Impact Assessment and Preparation of Comprehensive Plan for Reduction of Storm and Flood Damage for Disaster Risk Areas. Illustration shows the analysis of slope and elevation, using “arcview” on the Wolmido Mono-rail Project, Incheon, Korea



Nakdong River System Multipurpose Improvement Project, Korea: Construction Supervision



Dukpyung River Flood Control Project, Korea: Detailed Design



Suwon Stream Renaissance Project, Suwon City, Korea: Demolition of concrete covered CBD section to restore the eco-system and create riverside public amenity spaces, six new road bridges and two pedestrian foot-bridges.

Our hydrologists also provide expert input for overseas projects as necessary. For example:

- Hydrologic and hydraulic review and analyses fore Feasibility Study and Detailed Design of the ADB Sub-regional Transport Connectivity Project Priority-1 sections of about 1,000 km in Bangladesh; and
- Study of dry streams (wadi) in basic and detailed design of High Plateau Bypass Expressway in Algeria.
- Hydrologic and hydraulic study on Upper Tamakoshi Hydro Power Project, Nepal;
- River hydrologic study on the Rach Gia Bypass, Vamcomg Bridge and Hanoi-Haiphong Expressway Projects in Vietnam;



# Water Supply & Sewerage

Water Treatment & Supply System | Sewage, Wastewater Treatment & Sewerage System

Supply of high quality water for domestic and industrial use, sewage treatment and disposal of wastes, preservation of water-borne environment and pollution control are the keys to sustainable development.

## Type of Services

We provide a full line of services for clients at home and abroad on water supply and sewerage infrastructure engineering consultancy and water-based environmental solutions associated with the modern municipal infrastructure development. We are also active in environmental infrastructure PPP/PFI projects, such as sewage treatment plant and sewerage system rehabilitation BTL (build-transfer-lease) projects, and eager to broaden our portfolio of services in line with the changing needs of our clients.

In addition to the civil works design, our in-house team of engineers can provide one-stop service for the complete water and wastewater treatment plant facilities design including all mechanical and electrical works - in which case the Water Supply & Sewerage Engineering Department can draw upon resources of our Environmental Plant Engineering Department.

## Water Treatment Plant



Municipal Water Treatment Works Project, Uiwang City, Korea: Detailed Design



Wa City Water Supply Project, Ghana: Feasibility Study and EPC Detailed Design Intake 16,500 m<sup>3</sup>/day, Treatment Plant 15,000m<sup>3</sup>/day; Transmission Line 35km, Distribution line 99km. Public water taps: 150 places. (In Ghana, we also carried out Water Supply FS for the Cities of Techiman and Secondi-Takoradi)

# Water Supply & Sewerage

Water Treatment & Supply System | Sewage, Wastewater Treatment & Sewerage System



Water Supply System Expansion Project, Gwangju City, Korea: Detailed Design



Dongbok Dam Raw Water Intake and Conveyance Tunnel, Korea: 12.1 km tunnel / dia. 2100mm / 83,000m<sup>3</sup>/day

## Water Conveyance Tunnel



Drinking Water Development in Awendo, Kenya: Master Plan, Detailed Design and Construction Supervision (Water Treatment Plant, Reservoir, Pipelines)

Small Town Water Supply Project in Vientiane, Laos PDR: Design and Construction Supervision (Water Treatment Plant, Reservoir, Pipelines)

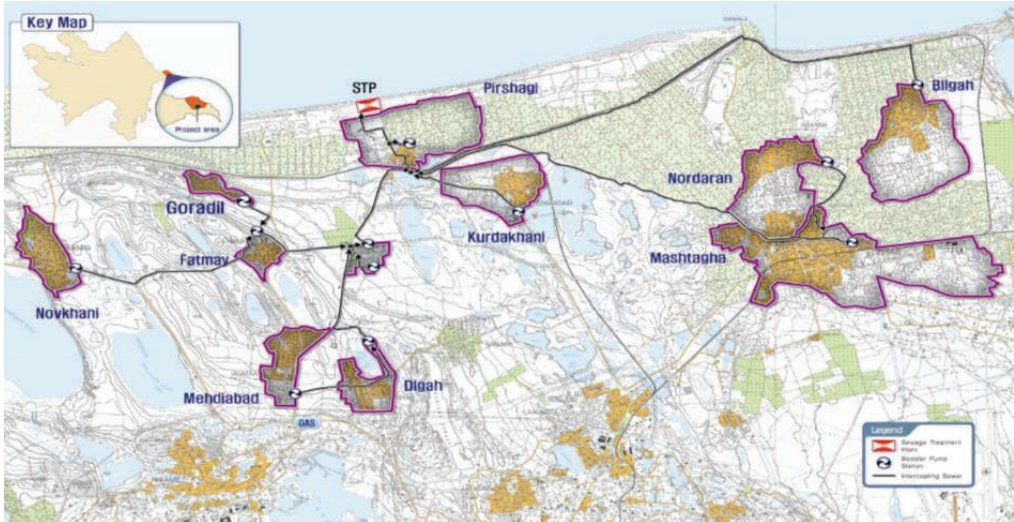
## Small Towns Water Supply Service



# Water Supply & Sewerage

Water Treatment & Supply System | Sewage, Wastewater Treatment & Sewerage System

Sewage Treatment



Pirshaghi Sewage Treatment Project, Azerbaijan: Feasibility Study for Rehabilitation of Dilapidated Sewerage System and Reconstruction of Disused Treatment Plant (Inset)



Huacho City Sewage Treatment Project, Peru: Feasibility Study (25,000m³/day; KIDEA Process)



Larkana Sewage Project, Pakistan: Feasibility Study (30,000m³/day)



Jeonju Advanced Sewage Treatment (T-P Removal) Plant, Korea: Basic & Detailed Design on the turn-key basis (403,000m³/day, ACTIFLO Process)

# Water Supply & Sewerage

Water Treatment & Supply System | Sewage, Wastewater Treatment & Sewerage System

Sewage & Wastewater Treatment



Pohang Blue Valley Industrial Complex Wastewater Treatment Plant, Korea: Basic & Detailed Design



Iksan Industrial Complex Integrated Sewage & Wastewater Treatment Plant, Korea:



Cheongjoo City Sewerage System BTL Project, Korea: Basic & Detailed Design

Sewerage System PPP-BTL



# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure

## Urban & Regional Planning

Human settlement development planning require comprehensive and complex approaches that inherently explore various aspects of the social and built environments of differing and conflicting nature in multi-faceted society.

We provide full range of professional services on physical and social development projects, from planning advisory and preparation of master plan to detailed design, in due reference to the various hierarchies of national and regional development guidelines, policies and regulations of the government for balanced socio-economic development.

### Type of Services

The services cover among others:

- Urban and Regional Development Planning,
- Urban Regeneration, Residential Environment Improvement,
- Tourism, Leisure and Landscaping Architecture, and
- Site Civil Design & Military Infrastructure Projects.

As a front-runner in spatial use of information technology, ecology technology and energy saving technology we provide engineering services throughout the technical and social development to promote the balanced development of regions with abundant and state-of-the-art knowledge in Information Technology, Ecology and Energy-saving Technology.

Also, utilizing the new town development know-how and experience accumulated in the country, we will take the lead to create Smart City with human & nature and coexistent with local culture.



Hipong New City Development Project Phase1, Vietnam

# Human Settlement Development

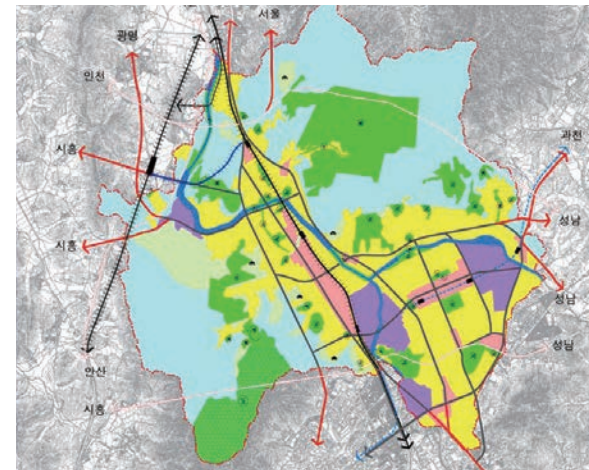
Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure



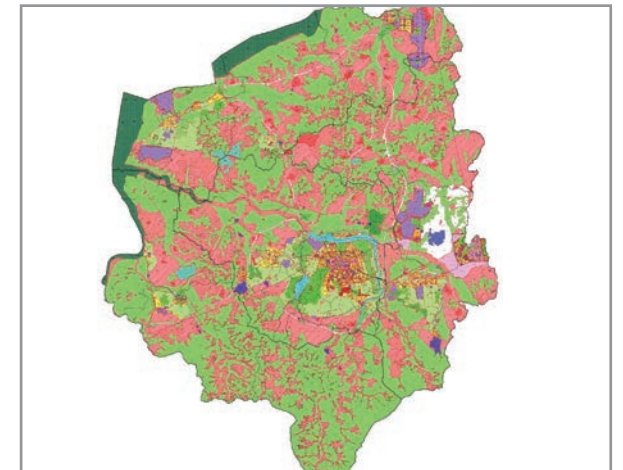
Dabachi-gun Yeni kandeu New City Development, Azerbaijan



Iseumailli-gun Gara Yazı New City Development, Azerbaijan



Urban Master Plan of Anyang City, Korea



Urban Management Plan of Asan City, Korea



Baegot New Town Development Project, Korea



Shiheung Maewha District Development Project, Korea



# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure



Pyeongchon Smart Square (High-Tech Industrial Park) Project, Korea



Samsung Apartment  
Residential Environment Improvement Project, Korea



Songlim Residential Environment Improvement Project, Korea



Waterfront Proposal of Dongtan 2 New Town, Korea



Special District-Unit Plan of Baegot New Town, Korea

# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure



Hai Phong New City Development Air View Phase2, Vietnam



Deteriorated Factory Facilities Renovation Project of  
Incheon City, Korea



Complex Transfer Station Project of Iksan City, Korea



Gyeonggi-do Metropolitan Funeral Facilities Master Plan, Korea



Accommodation District Project of Baekje Festival, Korea



# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure

## Residential / Industrial / Commercial Complex Design, Military Infrastructure

Complex Development requires a comprehensive, integrated, multi-disciplinary approach to conduct such various projects of public and private sector development as industrial complex, free economic zone, resort complex, military complex, etc. Using wide ranging specialized skills, we provide integrated solutions for the challenging and high complex nature of the development process.

Oversea  
New city  
Site Design



Santa Cruz New City (A: 5,778ha), Bolivia



Expo Area, Bolivia



Central Park Area, Bolivia

# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure

Industrial  
Complex  
Design



Development project of Kimpo aviation industrial complex, Korea



Development project of Iljin industrial complex, Korea

Military  
Infrastructure



M1-Project



M2-Project



M3-Project



# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure

To cater to the changing demands of human settlement development, we endeavor to create a comfortable environment by delivering ecologically sustainable solutions for the infrastructure projects so that the human activity spaces come into balance with natural environment with aesthetically pleasing landscape elements.

We also plan and design tourism and leisure development incorporating functional elements with commercially sustainable solutions; we aim to improve our methods with the latest advances and trends in planning and design from the perspectives of inseparable interaction between human and nature, and thereby deliver environment-friendly solutions. Our services include:

- Public parks, water-front leisure space, river ecology restoration, pedestrian path and bicycle lane as a sustainable urban transport;
- Golf resorts, ski resorts, tourist resorts and attractions; and
- Theme park, arboretum, cultural and heritage site preservation, etc.

## Golf Resort Development



HongCheon Doomi Country Club, HongCheon , Korea



Naksan Golf Resort, Korea: Landscape Master Plan and Detailed Design

# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure



Arboretum  
Landscape  
Design



Hongcheon Arboretum Construction Project , HongCheon , Korea : Master Plan & Detailed Design



Haeundae Arboretum Project, Busan, Korea: Landscape Planning and Detailed Design



# Human Settlement Development

Urban & Regional Planning | New city & Industrial complex Design | Tourism & Leisure

Urban  
Landscape  
Design



Highway Route No.30 Sang-ju to Uiseong Landscape Design, Sang-ju, Uiseong, Korea



Gwanggyo New Town Eco-Bridge on Youngdong Expressway, Suwon, Korea : Landscape design including Street museum, Safety fence, Microhabitat, Pedestrian amenity and safety facilities



Landscape Design of the 2nd Lotte World Complex, Seoul, Korea. Image on the right is the 123-story Lotte Super Tower within the 2nd Lotte World Complex.

# 04

## PLANT ENGINEERING

- Thermal Power Plant
- Industrial Materials Recovery
- Waste Heat Recovery
- Bio-Mass Power Plant
- New & Renewable Energy
- Waste to Energy Plant
- Sanitary Landfill Gas
- Municipal Waste to Energy Plant
- Organic Waste to Energy Plant
- Food Waste to Energy Plant
- Automated Waste Collection Plant
- Water & Wastewater M&E Design