



CONSULTING ENGINEERING INCORPORATION

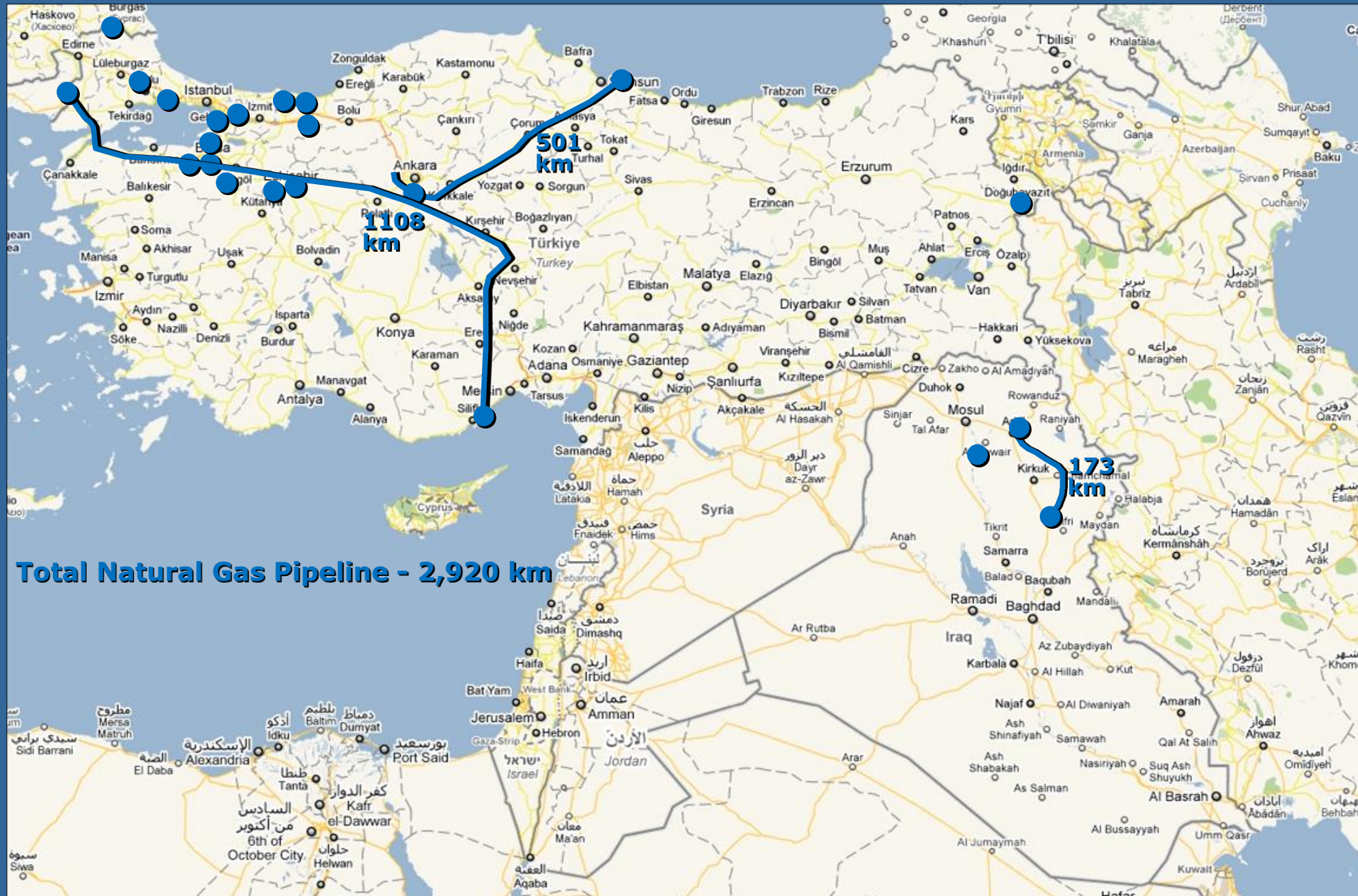
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KEY REFERENCES

**GAS DISTRIBUTION AND
METERING**

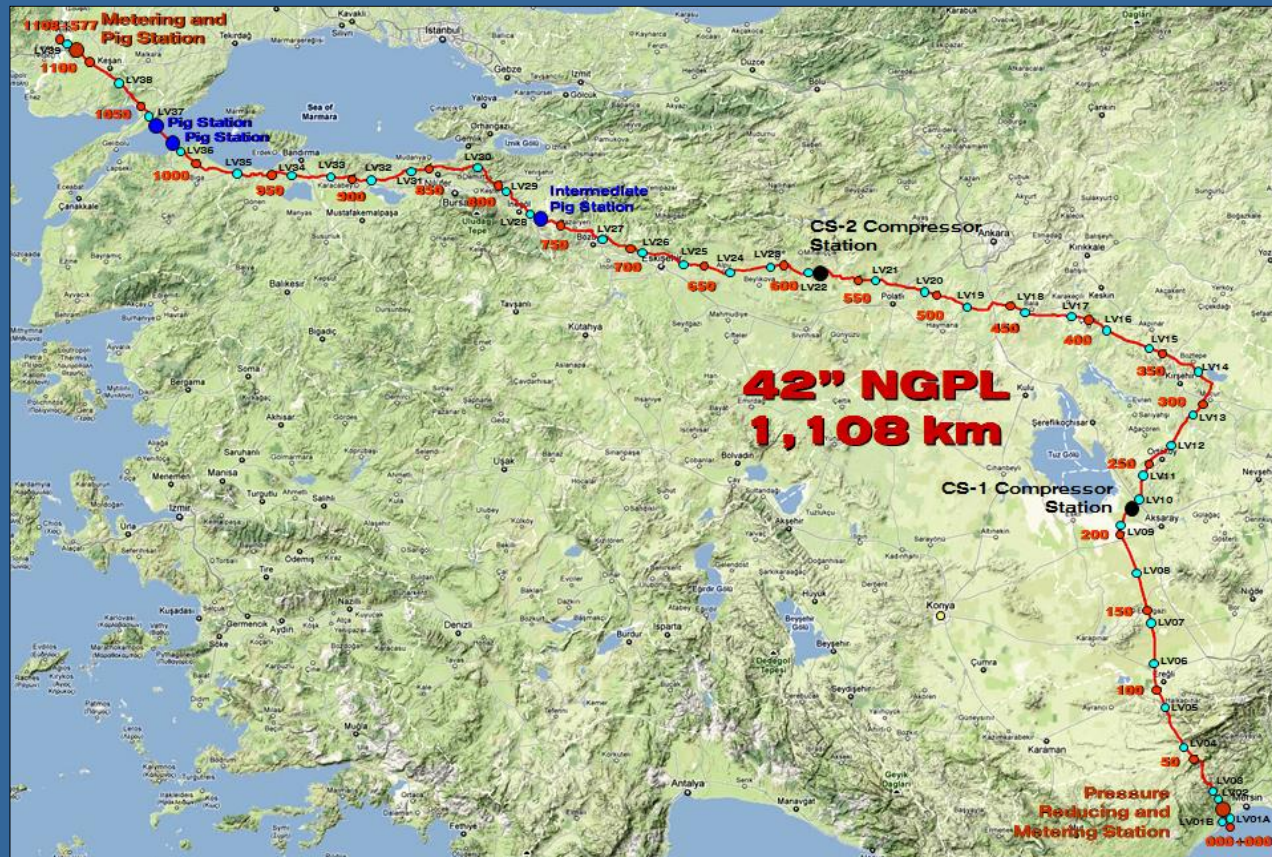




Cost Estimations
Pre-Feasibility Study
Conceptual Engineering
Licence Application

Turkish Section of the Natural Gas Transit Pipeline
From Mediterranean Sea to Europe
15 bcm/year, 1108 km

1,108 km PL



Pipeline Length (1,108 km)
Pipeline Diameter (42")
Pipeline Wall Thickness (17.88 mm)
Pipeline Op. Pressure (52-100 barg)
Pipe Material (API 5LX65)
Marmara Sea Crossing (17 km)
Entry Pres. Red. Metering Station (1)
Exit Metering Station (1)
Compressor Stations (2x22 MW)
Pig Stations (5)
Line Valves (39)
Pipeline Crossings (19)
Fault Crossings (15)
Railway Crossings (10)
Highway/Road Crossings (327)
River / Stream Crossings (408)
Over Head Line Crossings (114)



Detailed Engineering
Geophysical Studies
Geotechnical Studies
Topographical Surveys

Geological definitions and description of
soil/rock physical properties along the alignment

Geological evaluations of hazardous regions

Assessments, analysis and design for
existing and/or expected geotechnical problems

Slope stability analysis for pipe trenches

Geotechnical evaluation of specific

Crossing techniques such as

Microtunnelling and auger boring

Geotechnical evaluation of wet and

Liquefiable regions and

achieving buoyancy calculations and

designing screw anchor spacings

Mechanical Protection for Crossings

Method Statements for :

Major River Crossings (5)

Other River Crossings (8)

Steep Slopes (23)

Road Crossings (4)

Pipeline Crossings (5)

Karstic Area Crossings (1)





As-Built Documentation
Detailed Engineering
Construction Shop Drawings
Construction Supervision
Construction Specifications
Start-up Inspections
Procurement Documentation
Topographical Surveys

173 km PL



Khormor - Chamchamal - Erbil
Underground Natural Gas Pipeline
Khormor Gas Field - Erbil Power Plant

24" Natural Gas Pipeline (173 km)

4 Main Line Valve Station

Khormor Pig Launching Station

Chamchamal Intermediate Pig Station

Erbil Pig Receiving Station

Zap River Crossing (135 m)

2 Road Crossing (36 m)

17 Road Crossing (24 m)

53 Road Crossing (12 m)

63 Water Course Crossing

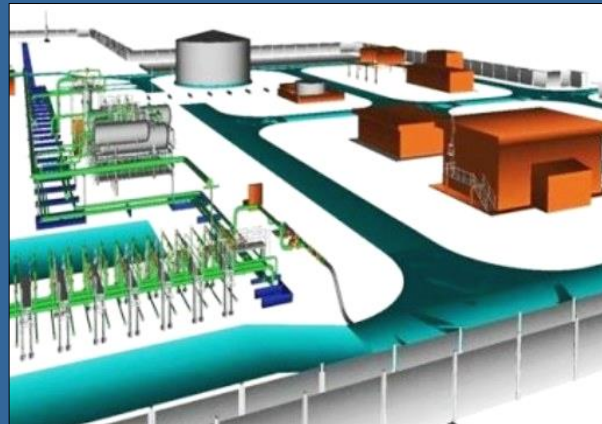
90 Dry Creek Crossing

Access Roads



Detailed Engineering
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230 km PL



Underground Crude Oil Pipelines

14 inch 1.2 km, 16 inch 17.5 km, 20 inch 55 km

Underground Gas Pipelines

20 inch 68.6 km, 24 inch 32 km

Aboveground Crude Oil Pipelines

Wells - Stations (6 inch 55 km)

Underground Water Pipelines

(4-8 inch)

Block Valve Stations

2 x Crude Oil Pipeline

2 x Gas Pipeline

2 x Temporary Water Piggging Station

Finalization of Alignment Sheets

Hazardous Area Classification

Access Roads

Special Crossings



As-Built Documentation
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**RMS - A Type Pressure Reducing
 and Metering Station**

Class : ANSI 600

Maximum Capacity (1,000,000 Nm³/h)

Operation Inlet Pressure (25-75 barg)

Operation Outlet Pressure (12-40 barg)

Design In/Out Pressure (75-49 barg)

Hydrostatic Test Pressure (112.5 barg)

3 Silicon Filter

4 Heater (Water Bath)

Control System (3+1)

6 Metering System

Temperature Control Unit

Ultrasonic Metering System

Inlet and Outlet Pig Stations

Control Building (90 sqm)

Security Building (32 sqm)

Stormwater Drainage System

Piping and Steel Supports

Access and Internal Roads (300 m)

Concrete Paved Areas (10,000 sqm)





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Geotechnical Studies
Procurement Documentation

16 bcm/year



**Durusu Pressure Reducing
 and Metering Station (Blue Stream)**

Class : ANSI 1500

Capacity : 16 BCM/Year

Operating Pressure (100- 135 bar)

Design Pressure (250 bar)

Hydrostatic Test Pressure (375 bar)

2 Pig Receiver, 1 Pig Launcher

Slug Catcher (120 cum)

5 Filter, 8 Heater

Temperature Control Unit

Control System (2+1)

Metering System (5+1)

Station Control Building

Transformer / Heating Center

Guest House, Warehouse

Administrative Building

Maintenance and Repair Building

Restaurant and Cafeteria Building

Vehicle Parking Area

Entry Building, Security Building



501 km PL

As-Built Documentation
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Samsun - Ankara Natural Gas Pipeline

48", 501 km (Blue Stream)

Wall Thickness (14.3, 17.5, 20.6 mm)

Pipe Material (API 5L Gr X65)

3 mm Polyethelene Coating

4 Pig Station

17 Line Valve Station

4 Take-off Valve Station

12 Lock-O-Ring

15 Highway Crossing

7 River Crossing

6 Railway Crossing

50 KVA Power Supply

Cathodic Protection System





Detailed Engineering
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14 bcm/year

Increasing the Capacity of the
Existing Malkoclar Natural Gas
Pressure Reducing and
Metering Station to **14 BCM/Year**



Filter and Metering Skid
Pressure Reducing Skid
3 Filter
2 Gas Chromotograph
2 Receiving Scraper Trap
1 Launching Scraper Trap
Slug Catcher
Control and Instrumentation Systems



Pipeline Construction
Between Bulgarian Border
and the Station 2 x 40 inch (2,616 m)



1,143 km PL

Detailed Engineering
Feasibility Study
Cost Estimations
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City of Adapazari and Surrounding Municipalities
Natural Gas Distribution Systems

Phase - 1

3"-20" PE Coated Steel Pipe (83 km)
20-160 mm PE Pipe (900 km)
32 RMS B Station (19/4 bar)

Phase - 2

4"-20" PE Coated Steel Pipe (6 km)
20-160 mm PE Pipe (36 km)

Phase - 3

4"-20" PE Coated Steel Pipe (18 km)
20-125 mm PE Pipe (100 km)
10 RMS B Station (19/4 bar)



NG Main Line System Schematics
Highway, Railway, River Crossings
Pipeline Plan and Profiles
Cathodic Protection Systems
Control and Instrumentation
Valve Rooms Schematic Diagrams
Hydraulic Analysis of NG Network



121 km PL

Detailed Engineering
Construction Shop Drawings
Construction Supervision
O&M Manuals
Commissioning
Start-up Inspections
Topographical Surveys

Bursa, Gursu, Demirtas, Gemlik, Orhangazi,
Yalova, Eskisehir, Bozuyuk, Corlu,
Cerkezkoy, Cayirova, Dilovasi
and Buyukcekmece Cities and Towns



Pressure Reducing & Metering Stations

2 each 75/19-28 Bar RMS A

61 each 40/16 Bar RMS B

1 each 16/4 Bar RMS B

Heaters, Filters and Regulators

Metering Sets

Control & Instrumentation Systems

Natural Gas Pipelines

2" PE Coated Steel Pipe (14.5 km)

4" PE Coated Steel Pipe (16.5 km)

6" PE Coated Steel Pipe (18.7 km)

8" PE Coated Steel Pipe (28.4 km)

12" PE Coated Steel Pipe (37 km)

18" PE Coated Steel Pipe (5 km)

Highway, Railway, River Crossings

Cathodic Protection Systems





Detailed Engineering
Construction Shop Drawings
Construction Specifications
Commissioning
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Topographical Surveys

30 km PL



1 each 75/19-28 Bar RMS A Type
Pressure Reducing and Metering Station

18 inch PE Coated Steel Pipe (3.3 km)

12 inch PE Coated Steel Pipe (24 km)

6 inch PE Coated Steel Pipe (1 km)

4 inch PE Coated Steel Pipe (1,170 m)

3 inch PE Coated Steel Pipe (790 m)

Control Building
Heaters, Filters, Regulators
Metering Sets at Station
Pipeline Plan and Profiles
Highway, Railway and River Crossings
Station Piping Plans and Isometrics
LV and HV Power Supply to Stations
Cathodic Protection Systems
Grounding Systems
Control and Instrumentation Systems



21 km PL

As-Built Documentation
Detailed Engineering
Construction Shop Drawings
Construction Supervision
Operating and Maintenance Instructions
Commissioning
Start-up Inspections
Procurement Documentation

1 each 6,700 cum/h RMS-B Type
Pressure Reducing and Metering Station

3 x Line Valve with Earthquake Sensors
In Plant NG/LPG-Mix Gas Piping System

20.5 km, 6 inch API 5L GrB X52 Pipeline

257 m Concrete Coated River Crossing

148 m Road and Railway Crossing

Cathodic Protection Systems





Qualitative Risk Assessment Studies
Quantitative Risk Assessment Studies
Economical Analysis
Financial Analysis

Qualitative and Quantitative
Risk Assessment Studies
Economical and Financial Analysis
for Natural Gas Supply to
Baku-Tbilisi-Ceyhan Crude Oil
Pipeline Pump Stations





Economic and Financial Analysis
Cost Estimations
Geophysical Studies
Geotechnical Studies
Topographical Surveys

**225 km, 42 inch Shah Deniz Natural Gas Pipeline
Within the Selected Corridor for the Turkish Section**

225 km PL

Geo-Hazard Analysis by Considering the Route Constraints

Potential Liquefaction Areas

Potential Landslide Areas

Potential Karstic Zones

Fault Zones and Seismic Zones

Geo-Hazard Analysis

Economical and Financial Analysis





**Detailed Engineering
Construction Shop Drawings
Construction Specifications
Procurement Documentation**

**Additional Cyclone Separators
Civil, Steel, Instrumentation, Piping and
P&ID Construction Shop Drawings**





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