

*3 rd International Conference on Ecological Protection of The Planet Earth  
10-11 July 2005, İstanbul*

*Urban Transport and Environment: Assessment of Probable Environmental Impacts of “Black Sea Coast Double Lane Motorway”*

*Cenap Sancar, Şinasi Aydemir, Ahmet Melih Öksüz, KTÜ, Trabzon*

**Abstract**

*Urban transport and environment or, transport and urban development are two sides of a coin which are not separable; like the chicken egg dichotomy.*

*On the other hand, urban transport plays vital roles in moving people and goods. Urban and environmental (regional) planning facilitates and provides liveable environments for people living in towns and cities. So; the transport, the human settlements and the surrounding environment should be in harmony to provide people with living environments.*

*In achieving to supply healthy living environments; transport, urban planning and environmental concerns have to be integrated; planned and designed in such a way that the outcome should be beneficial to urban (and rural) society.*

*In line with the above objectives transport, planning and environment should support the concept of sustainability which ‘must contribute to economic and social welfare without depleting natural resources, destroying the environment or harming human health, and which allows the basic needs and development of individuals, companies and societies to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between generations’ (URL 1,2).*

*It is well known fact that transport causes environmental impacts on climate, acidification, ground level ozone, air pollution, noise, and impacts on the landscape.*

*In this paper, it is aimed to investigate and test the above probable impacts that are expected to come from much talked “double lane Black Sea Coastal Motorway” which crosses towns and cities of Black Sea Coast, parallel and edging to the shore line.*

*The Double Lane Road is mostly constructed, atplaus where it touches to the ground, and at other plaus where it is elevated from the ground fencing the waterfronts of towns and cities by blocking views and visions of buildings facing to the sea. The immediate impact is visual and scenic and blocking prevailing winds through the sea.*

*Key words: urban transport, planning, environmental impact: noise, emissions, ecology,*

## **Introduction**

“Urbanisation is a process resulting from the movements of people, freight and information have persistently been fundamental for human societies. Present economic processes have been accompanied by a significant growth in mobility and accessibility (URL3). Land use and transport or transport and land use are the terms that refer to the two dominating components of urban growth, these being the co-evaluation of urban settlements and urban transportation infrastructure (URL 4).

Developing transport systems have been a continuous challenge to satisfy mobility needs and, to support economic development. So, transport represents one of the most important human activities which is an indispensable component of economy and has a major role in spatial relations between human locations creating links between settlements, activities and populations”

“Transportation in urban areas is so complex because of the modes involved. The multitude of origins and destinations and the amount and variety of traffic and urban transit are an important dimension of urban transportation”(URL 3).

The purpose of transportation is the fulfilment of a demand for mobility; that is, transportation can only exist if it moves people, freight and information around (URL 4).

## **Transport and Development/Growth**

Significant growth in overall transport volume has occurred over the past decades, and this growth is expected to continue in countries and the regions.

“While transport services are essential component of economic and social development, negative side effects are causing considerable concern and drawing corresponding political concerns to the social cost of transport.

A steady increase in mobility gives rise to large costs in terms of air pollution, climate change, degradation of landscapes and ecosystems, deterioration of cultural monuments, noise, congestion and accidents” (URL 5).

Mobility is supported by transport sector which is a complex matter: mobility is not an end in itself, but rather a means of accessing services or goods. Transport demand depends on many factors such as, lifestyles, location of facilities and services, residential trends, productive systems, retail patterns etc. Transport demand is generated as result of the characteristics of social, cultural, territorial and economic models. To reduce the transport demand it is necessary to look at inter linkages of: land use planning, the organization and model of cities, with special emphasis on issues such as public spaces, car parking and location of facilities, services and activities, urban and regional planning, the adoption of new lifestyles, attitudes to travel and beliefs about its impact, etc.

Planning for transport is an important element in spatial planning in that networks and infrastructures must confront the problems of uncontrolled growth, both in terms of pollution and impact on public health, and the risks that ecosystems are facing, landscapes and the structure of open spaces. To achieve these, planning should be carried out in a way that minimizes land-take, encourages the use of brown fields over Greenfield development, and

establishes limits on land dedicated to transport infrastructures at the different level of planning.

### **Does transport guides development**

Until the 1990s environmental sustainability played a small role in transport infrastructure planning. This situation has changed by considering the reciprocal influence of transport and the physical environment, the environmental management of transport operations and the commercial implications of environmental performance for the transport industry.

The relationships between transport and the environment are multidimensional. Some aspects are unknown and some new findings may lead to drastic changes in environmental policies as it did in regards of acid rain and chlorofluorocarbons in the 1970s and 1980s. The 1990s were characterized by a realization of global environmental issues, namely the impacts of carbon dioxide emissions on the greenhouse effect.

Transportation became an important dimension of the concept of sustainability, which is expected to become the prime focus of transport activities in the coming decades. These impending developments require a deep understanding of the reciprocal influence between the physical environment and transport infrastructures. The main factors considered in the physical environment are geographical location, topography, geological structure, climate, hydrology, soil, natural vegetation and animal life.

The impact of the transport sector on climatic change is not solely restricted to the production of greenhouse gases from the combustion of fuels by transport vehicles but also have led to modifying the relationship between vegetation and animal life. Many animal species are becoming extinct as a result of changes in their natural habitats.

Highway vehicles are the sources of pollution in the form of gas and particulate matters emissions that affects air quality and that can create noise causing damage to human health. Carbon monoxide (CO), when inhaled affects bloodstream, reduces the availability of oxygen and can be extremely harmful to public health. Emissions of nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>) reduces lung function, affects the respiratory immune defence system and increases the risk of respiratory problems, and transport noise emanating from the movement of transport vehicles. Long term exposure to noise levels above 75dB seriously hampers hearing and affects human physical and psychological wellbeing.

Unless the above considerations are not taken in to account urban and regional development can not go hand in hand.

### **What are and what can be the role of transport in regional spatial structure?**

Urban infrastructure that is any kind of road routing and construction influences the development of settlements adjacent to the route passing through settlements, gives way to linear or corridor type growth. Further extension of the settlements could only be possible by re-routing-by passing congested settlements.

“Whatever the routes and the construction of it, the resultant outcome should be sustainable transport system and sustainable and living human settlements contributing to economic and social welfare without depleting natural resources, destroying the environment or harming

human life. The term of sustainable transport refers to system as one that is affordable, operates efficiently, offers choice of transport mode, and supports vibrant economy, and regional development; without endangering public health or ecosystems“ (URL6).

Transport systems that are in operation contribute significantly to the environmental problems we know today.

Environmental impacts and contribution from transport sector are as follows:

Environmental impacts	Contribution from transport sector
Climate change	CO2
Ozone depletion	ODS
Acidification	SOx, Nox
Eutrophication	NOx, NH3
Ground level ozone	NOx, VOC
Air pollution in urban areas causing health impacts like increased breathing resistance, cancer, acute fatalities	NO2,PM,Pah,benzene.etc
Noise	Noise levels,
Impact on the landscape like land take	
Eco cycle adaptation (URL 6).	

### Transportation on the Black Sea Coast

Almost sixty percent of the Eastern Black Sea Region’s population live on the coastal zone which is defined as urban density region. This zone takes place between 0-500 m altitude from the sea level. Urban settlements line up approximately 10-15 km apart from each other as in the form of urban agglomeration and one can hardly identify where settlements start and where they end up. So, the main road-state highway- is heavily congested by inter and intra traffic between settlements on the coast which serves transit and inner city traffic, causing traffic congestion, delays and accidents.

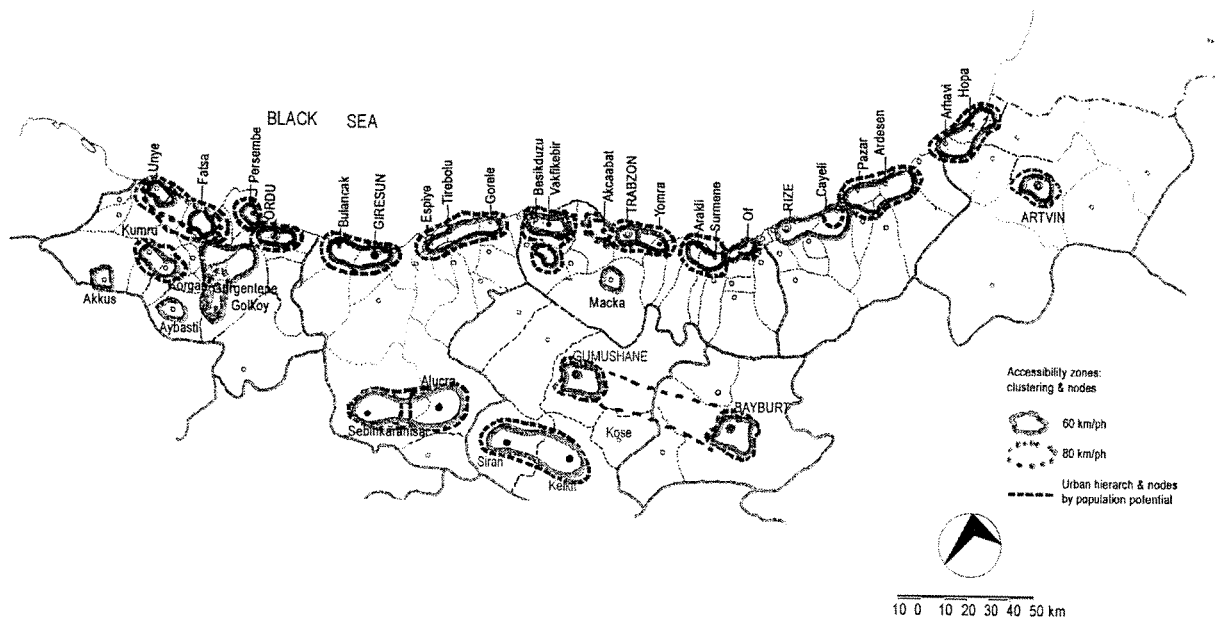


Figure 1. Growth Points and City Clusters in Regional Development  
Source. Aydemir ,et all,2000

By the 90s, after the break up former Soviet Union, international or cross border transportation has started between Euro Asian countries and Turkey from the border. Trading and tourism have started and accelerated in time, giving way to transportation of passengers, foods and goods that resulted in increase in the volume of domestic traffic on the highway.

It was time to integrate transport planning and land use to ease the traffic congestion and to prevent accidents, and to enable land use patterns to change and mobility.

### **Intra and inter urban transport in Black Sea Region**

Black Sea Coastal Road construction that was crossing in between towns and cities earlier was started in 1950s. New route has been diverted to the sea shore exploiting natural beaches, floras and faunas, and natural and architectural heritages. By the 80s Black Sea Highway was completed. In time marine geomorphology and ecology recovered itself some way.

The new route has resulted in sprawl of population towards the shore, the settlements are governed, new settlements emerged and this increased motor traffic between towns and cities. The pace of growth and development make the extension of the transport infrastructure necessary to accommodate the traffic generated between settlements.

The sea side of the highway has been used in filling of household wastes and debris. New types uses of in filled land have emerged such as ports, fishermen boarding houses, small scale industrial plants, factories and housing. In a way, the road has been squeezed between the land uses on both side of the road, traffic volume is increased, and the speed slowed down.

By mid 1990s congested road has driven attention from politicians, local people, and NGOs that all the actors above were willing and asking either an extension on the road surface or a new double lane express way to be built.

A new route starting from Samsun through Sarp came into public agenda. It is called Southern passage that was proposed to be built linear to the existing route at 20km distance ( at an altitude of 500m from sea level). The idea behind the southern passage road was to promote urban extensions towards to south and to control the sprawl of settlements.

The policy of government and ministry of transport was changed, and then the southern passage way was withdrawn from the agenda.

On the other hand, increasing trade was demanding fluent traffic for lorries, trucks and other traffic modes. The answer to the problem put forward was "Double Lane Road" which is the term used for. The distance is roughly 600km between Sarp-Hopa and Samsun which was divided into 16 sections and contracted to firms to be constructed.

However, the new route has been seen as an engineering work rather than a regional transportation and regional growth policy implementation. The ongoing construction will partly help the growth of towns and cities and the villages on the route because their growth are restricted towards north to the sea. There are no inner city arterials, no facilities to pull growth to the southern parts of the settlements.

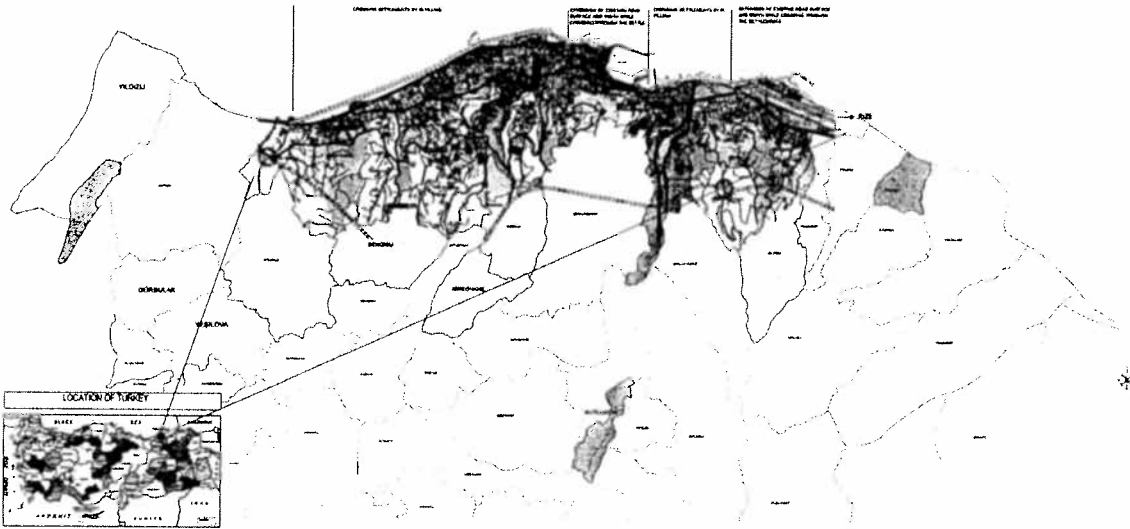


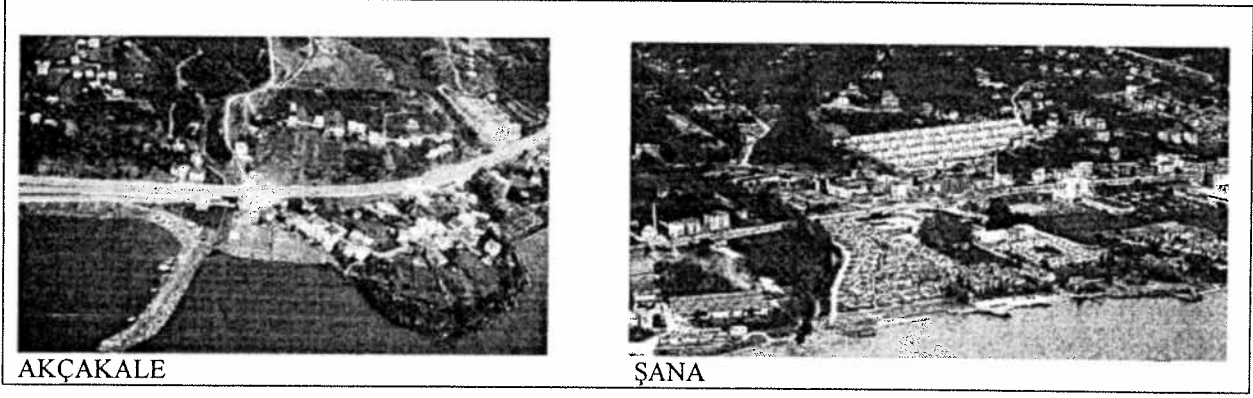
Figure 2. Double lane road route in Trabzon

The construction of road is following different routes as shown in the figures.

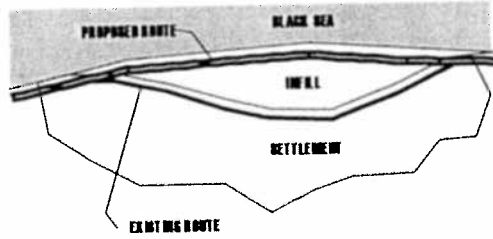
1. Extension of existing road surface while crossing through the settlements:

<p>1- Extension of existing road surface and width while crossing through the settlements (example: Akçakale, Mersin, Çarşıbaşı, etc)</p>		<p>Existing route widened and separated as double lane, and road standards are upgraded. Not so much benefit gained because of continuity in land use habits and crossing junction. Damage to the environment considerably fewer. There is no change in user conception of the new route. Some compulsory purchases are inevitable</p>
---	--	--

EXAMPLE PHOTO:



2- Crossing settlements by in filling (example: Yeşilyalı, Sürmene, etc).



Existing route left as service road. New route applied just on the edge of in fill without leaving an opportunity for public use. In filled area designated for recreational use (compulsorily). There is no compulsory purchase

EXAMPLE PHOTO:

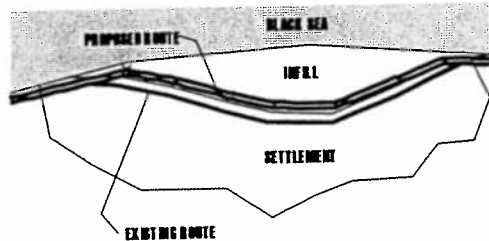


YEŞİLYALI



SÜRME NE

3- Crossing settlements from the land side of in filled are (example: Akçaabat)

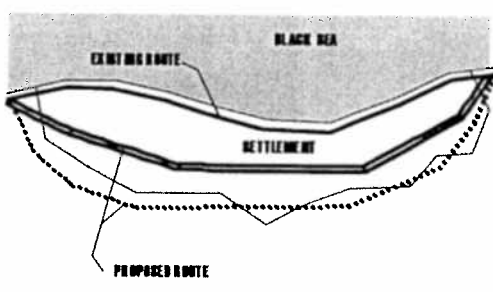


Existing route left to services, new route crosses parallel to the previous road. In filled area between the sea and the new route could be used for recreation, but crossing the roads by pedestrians are open to dangers such as accidents. Existing shore line is lost, incurred no compulsory purchase.

EXAMPLE PHOTO:



AKÇAABAT

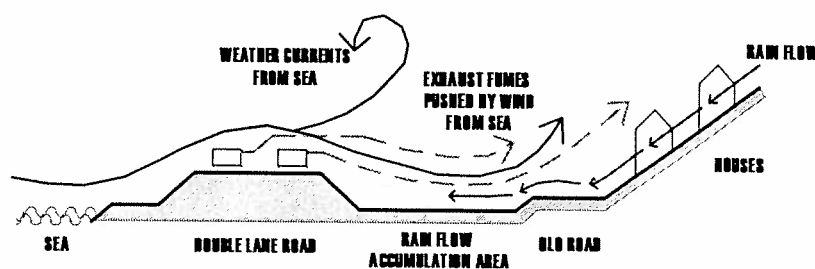
<p>4- Crossing from south of in fill (example: Ordu, Tirebolu,)</p>		<p>Existing route serves to inner city transport.</p> <p>Shore line is conserved for recreational use. New route in or out of plan boundaries which promotes decentralisation toward to south..</p>
---	---	---

### Inner city crossings and environmental impact

Some qualitative impacts cited below will be the outcomes of inner city through, or side crossings seems to be problematic in terms of traffic volumes to be generated and the probabilities of accidents to occur. There will be risks for pedestrians in crossing of road in the above forms from side walks. There will be limited ride and park spaces, and spaces for bus stops. Children, elderliness' and handicapped people will face some kinds of dangers. Home to work journeys also will be in danger. There will be risks during the use of in filled sea side zones, too. Inner city crossings may produce more noise and air pollution which will stem from vehicles.

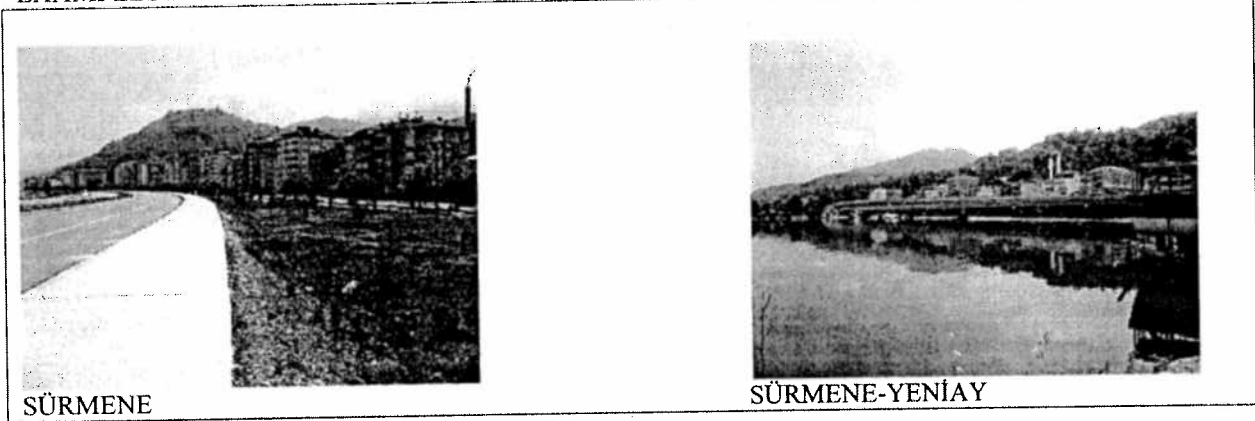
There is and will be visual impacts from the elevated crossings which block the scenery towards to the sea and violate the privacy of residents facing to the road as shown in figures below . Pollution from vehicles will be spread on to residents and premises. The prevailing winds will be partly blocked, too. However, there are quantitative assessments of environmental impact of the double lane road, because the highway authorities are exemplified themselves from doing 'Environmental Impact Assessments' studies (!).

Environmental effects stemming from exhaust gases are estimated by using Highway Authority's traffic volume figures by modes. Results are as follows:  
 $CO = 50-56 \text{ m}^3$ ,  $SO_x = 0.1 \text{ m}^3$ ,  $Aldahit = 0.08 \text{ m}^3$ ,  $NO_x = 0.10 \text{ m}^3$



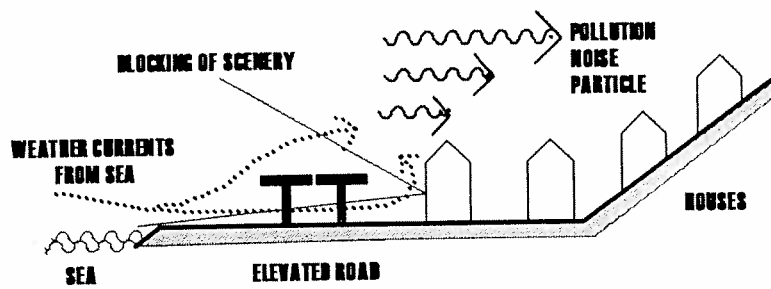


EXAMPLES FROM IN FILL AND ROAD CONSTRUCTION:

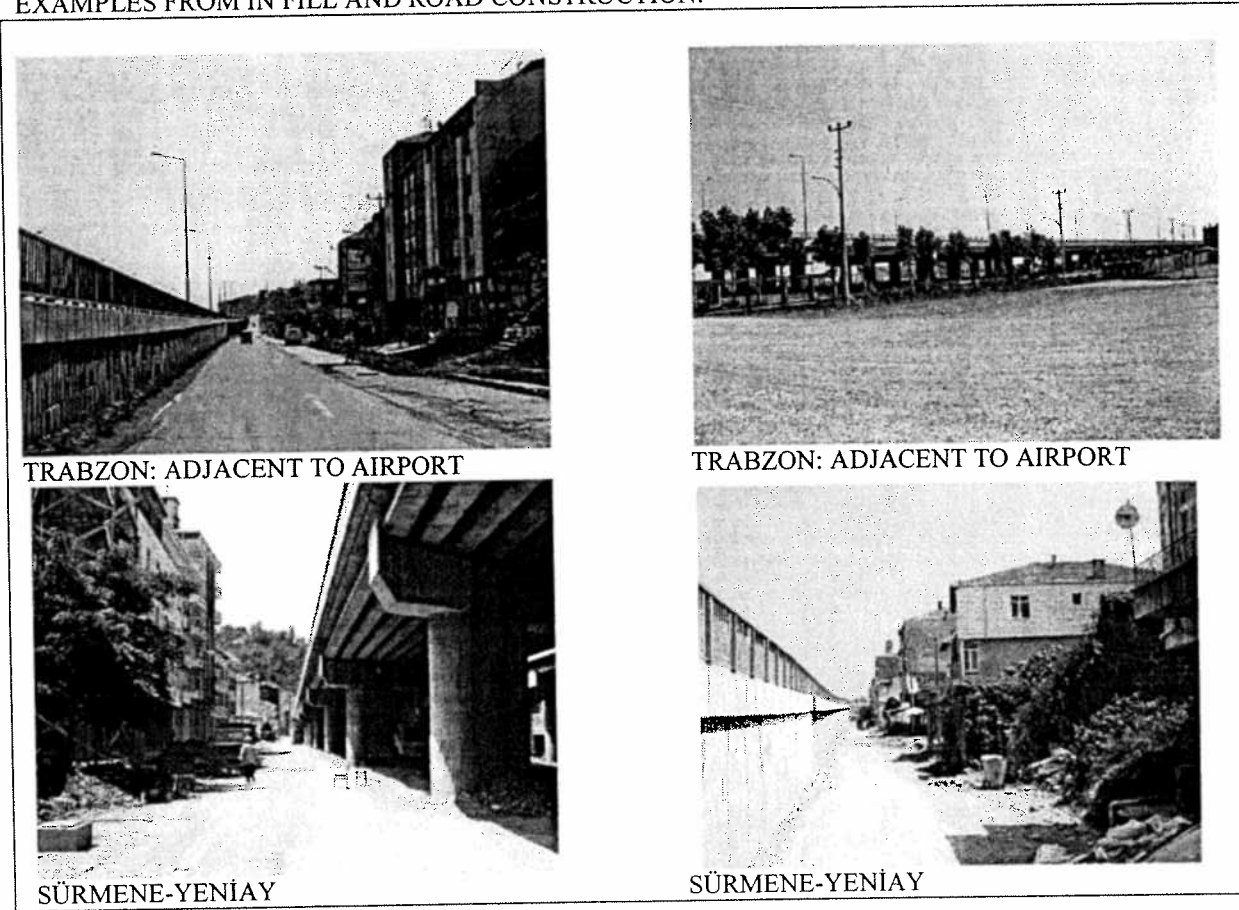


SÜRMENE

SÜRMENE-YENİAY



EXAMPLES FROM IN FILL AND ROAD CONSTRUCTION:



TRABZON: ADJACENT TO AIRPORT

TRABZON: ADJACENT TO AIRPORT

SÜRMENE-YENİAY

SÜRMENE-YENİAY

## References:

URL1 “Defining an Environmentally Sustainable Transport System”, 6 September 2000,  
<http://europa.eu.int/comm/environment/trans/reportingwg1.pdf>

URL2 “Transport Demand and Behavioural Change”, 18 September 2000,  
<http://europa.eu.int/comm/environment/trans/reportingwg3.pdf>

URL3; <http://people.hafsta.edu/geotrans/eng/content.html>;  
The Geography of Transport Systems.

URL4, [www.tps.org.uk/library/0001bartlett.pdf](http://www.tps.org.uk/library/0001bartlett.pdf); PPGs and Transport Planning.

URL5, [europa.eu.int/comm/environment/air/transport.htm](http://europa.eu.int/comm/environment/air/transport.htm);  
Transport Demand and Behavioural Change.

URL6, <http://europa.eu.int/comm/environment/trans/reportingwg1.pdf>;  
Defining an Environmentally Sustainable Transport System.

Aydemir, Ş., Öksüz, A.M., Şen, D., Aydın, Y., 2000., DOKAP Kentsel Etki Alanları  
Araştırması, KTÜ Mühendislik Mimarlık Fakültesi, Mimarlık Bölümü, Trabzon