I. NON-TECHNICAL SUMMARY

This EIA is carried out to identify and assess the future environmental impacts associated with the project of Constanta By pass, identify potential environmental improvement opportunities and recommend any measures needed to prevent, minimise and mitigate adverse impacts.

The Environmental Impact Assessment (EIA) has been based on the The European Council Directive 97/11/EC and the Romanian Environmental Law in force (GD 918/2002, Order of the Water and Environmental Protection Ministry n. 860/2002 and n. 863/2002)

The EIA shall identify, describe and assess in the appropriate manner, in the light of each individual case, the direct and indirect effects of a project on the following factors:

- Human beings, fauna and flora;
- Soil water, air climate and the landscape;
- Material assets and the cultural heritage;
- The interaction between the factors mentioned in the points above.

This EIA should address the following issue:

- Description of the project;
- Outline the alternatives considered by the project proponent,
- Description of the environmental baseline,
- Description of the anticipated impacts,
- Description of mitigation measures.

I.1 Project summary

The Constanța By-pass is section of the Pan-European corridor IV: Berlin – Bucharest – Istambul and in this perspective receive maximum support from the EU organizations and the Romania Government (as expressed in the transport strategy of the National Development Plan 2004 - 2006). The Bucharest – Constanța transport corridor is an important link between the Pan – European corridors (IV and VII Corridor) with the TRACECA Routes through Caucasus and Central Asia.

The designed route of the variant comes from the National Road NR22 (E87). Further on, the route goes towards the south until the intersection with CR87 and then meets CR88, R89 and a series of earth roads and canals. The intersection with NR 3 is an overpass followed by an overpass over the Bucharest – Constanța railway. In the last part the route overlaps over CR1A and ends at the intersection with NR39 where another multilevel interchange is proposed. Then the project links with the local road system in the area of the port of Constanta.

On the route geometrical units adopted allow the performance of a minimum speed of 140 km/h according to the stipulation TEM standards.

The main characteristics adopted for the motorway are the listed below:

, main endracteristics adopted for the motorway are the listed		
\succ	The platform width	26m
\triangleright	Carriageway	2x7.5m
\succ	Central area	4m
\succ	Emergency stopping lane	2x3.0m
\succ	Shoulders	2x0.5m

Typical Cross section standard TEM, 2002



The main structures along the bypass are:

No.	Structure description
1	Overpass on DC 88 over Constanța By-Pass
2	Overpass on DC 89 over Constanța By-Pass
3	Bridge on Constanța By-Pass over watering ditch
4	Bridge on Constanța By-Pass over watering ditch
5	Overpass on Constanța By-Pass over DN 3
6	Overpass on Constanța By-Pass over Bucarest-Constanța Railway
7	Bridge on Constanța By-Pass over watering ditch
8	Bridge on Constanța Bypass
9	Bridge on Constanța Bypass
10	Viaduct on Constanța Bypass over DN 39, irrigation canal and CF

I.2 The selected alternative

Five alignment alternatives have been defined for Constanța Bypass and analysed from the technical, economic, social and environmental point of view. The Consultant has made a comparative analysis of the alternatives, based on a Multi-criteria Analysis, which indicates the preferred alternative to be considered in the Second Phase of the Study for this Environmental Impact assessment.

The preferred alternative was alternative CBP M3, which presents the best score in the MCA. In fact this alternative presented the best respondance to Transport, Economy and Social criteria. This alternative was optimal for traffic flow attraction and distribution, accessibility to Constanța port, decreased transport costs, road safety, and support to development areas and decreased impact of traffic emissions. This preferred alternative was confirmed by a sensitivity analysis conducted with different weighing of criteria.

I.3 Description of the project area

The project area is located in eastern Romania, in the south part of Dobrogea Region and, in more detail, along the Black Sea coast between the Danube – Black Sea Canal and the Poarta Alba – Midia – Novodari Canal. The interested zone is a very flat agricultural area generally without relevant environmental characters. The alignment proposed for the bypass cross the eastern part of Constanta Municipality along the Black Sea coast. - *Geology*

A cover mainly constituted by loess deposits and Sarmatian limestone with a gentle E-W slope characterizes the area of the project. The bedrock consists of green schist belonging to the Moesic Platform, covered by a gently folded sequence of sedimentary rocks aged from the Mesozoic to the Quaternary. The major part of the area of the project has elevations ranging between 50 and 120 meters. The area is consequently characterized by negligible

longitudinal slope and poor superficial water drainage. These aspects are associated with the presence of soil characterized by poor bearing capacity and sensitive to very sensitive to the frost action.

The tableland is crossed by less deep valleys that are tributary upon two different basins: one is that of the Black Sea to the east and of the Danube River to the west. Excepting the Casimcea valley, also the Danube – Black Sea Channel, water absence is seen within these valleys, teeming precipitations periods being not taken into consideration.

The loess soil is the main material of the area. The loess can be characterized as having a mediocre quality, with high towards middle plasticity and very high towards high compressibility.

In the interested area are generally present:

- 0,00-0,70 m vegetal soil

- 0,70-20,00 m loess ground (dusty clays and clayish dusts) with the fluctuation level depth situated at 18-20m.

- Climate

As a consequence of the uniformity typical to field relief the general conditions of the climate, for the considered area, are enclosed in the sector of continental climate. The characteristics of the interest area hot summers, with low precipitation, down fall and relatively cold winters with strong snow storms but also with frequent periods of the weather getting warmer, which provoke discontinuity in the temporal and territorial distribution of the snow layer.

The area in which are situated the motorway is bordered in the coast plain climacteric flat characterized by an average annual temperature of 12,5 °C. and medium annual rainfall of 500 - 510 l/mm.

- Water quality

From the hydrologic point of view, taking into consideration the structural characteristics of the loess soil and their macro structural texture, on can consider those deposit as a soil with medium permeability characteristics. In the area crossed by the Bypass there aren't interesting surface waters and about the freatic waters it is important to know that the level of the underground waters are low (10 - 12 m).

The quality of the waters of the Danube-Black Sea channel and Poarta Alba-Midia-Navodari channel are very good/ drinkable (I river category in accordance with national standards STAS 4706/88). The quality modifications of the ground water created by the pollution with chemical impurity products have altered the physicochemical and biological properties of the water. Most hydro structures have suffered, in time, the nitrates contamination process. The contamination of the aquifer with organic substances, ammonia and especially bacterial pollution has been identified in rural settlements, where, due to the lack of social overheads, liquid waste reaches the ground directly as well as indirectly through the inadequate storage of stable and domestic waste.

- Noise

At that moment, in the interested area, the noise pollution sources are:

- the traffic on the railway line Cernavoda – Constanta and on main national road n. 3

- the traffic on national road DN39 and DN2A.

- Landscape

The study area is located in the large open land of south Dobrogea region deeply characterized by an intensive agricultural use, mainly arable land and grassland. The natural value of the area is very poor and the main ecosystem is the very artificial system of the crops that in this case don't present trees and shrubs along the local roads and between the different fields. In the area the only natural interesting site is the Botanic Reserve of Valul Lui Traian.

The landscape along the motorway is uniform with the interesting site of the fortification line named Valul lui Traian. Along this historical element is localised the botanic protected area with the same name. In this botanic reserve, composed of two different narrow areas are present Red List flora and fauna species characteristic elements of the original habitat of steppe zone. The *Valul lui Traian* protected area is a mixed reserve, botanical and forestry, part of the northern earth mound named "Valul lui Traian", 3-4m high, situated at the northern limit of the agricultural base from the locality with the same name, on the left side of the road that crosses the village.

- Air quality

The air quality on the interested area of the motorway line is good, below the National Standard Quality of MO 592/2002, determined prevalently by the actual traffic along the

national and local roads.

- Land use and settlement patterns

The alignment of the bypass traverses only rural areas and passes in the west part of Constanta town, near the Ovidu and Cumpana urban settlements and the settlement of Lazu. The General urban Plan of Constanța foresee in the same bypass interested zone, the area for a road of high traffic with, in the east part of the alignment a large green zone for protection.

- The affected population

The proposed alignment does not cross/by-pass directly major settlements and due to this, number of affected population is low. The number of population living in the direct area of influence is about 27.000. The investigation on the socio-economic status along the motorway shows that impacts on population are not a main critical issue, but critical points are more related to indirect impacts on population related to impacts on noise, impacts on landscape, historical and archeological sites, impacts on air quality, land use and settlement patterns.

The Critical Areas

As result of the environmental investigation relatively to the territory examined, the agricultural ecosystem is the main critical issue along the line indeed the main critical points are the urban area of Lazu and in the correspondence of the archeological site of Vallum Traiani and the coincident protected natural area with the same name.

In fact the interested area is deeply characterized from the intensive crop system and his facilities as the local roads and canals.

The area that present main environment problems are:

- the agriculture area along the line between km 0+500 km 11+000, km 13+000 km 18+500 and km 19+800 km 21+801 with a medium intrinsic value and impact level;
- the area (km 11+000 km 13+000) where the By pass cross the archeological site of Vallum Traiani and the coincident protected natural area with the same name, with a very high intrinsic value and impact level;
- the urban area of Lazu, where is foresee the bypass interchange the national Road n. 39 (km 18+500 km 19+800), and Ovidiu (km 0+000 km 0+600) with a high intrinsic value and impact level.

I.4 Environment impact

- Environment impact during construction period

The interferences and the criticisms linked to the construction period are connected with two kinds of problems. The more general come from the analysis of the total area involved by the opera's implementation, in order to identify the most compatible areas to realize the constructions, namely the overall vulnerability of the concerned environmental context.

The second kind of problem, more linked to the technical and operative management of the construction site, is connected to the proposed works peculiarities, that is the whole activities and logistics structures provided for each site, that in a different way could produce insertion problems.

The present impossibility to locate the construction site don't prevent to identify a set of basic principles that, considering either technical or environmental parameters, are reaching the following aims:

- the construction site should be placed close by the working area in order to reach easily the assembly place to reduce as far as possible the trouble brought about means of transport traffic;
- the construction site space should have surface area wide enough to permit the planned activities carrying out, but on the same time these areas should be limited as much as possible to reduce the (temporary) occupation of land;
- fixing the construction site position should be necessary to consider the right possibility of easy connection with the present services network (electricity, piping system for white or black drain water);
- it will be necessary to verify the materials supplying and waste management, that is the right conditions of the road system (small transport distances for supplied materials);
- the construction site should be realized so that to reduce at the lowest terms the insertion
 of the potential environmental interferences with the neighborhood (local people life and
 agricultural activity).

With reference to the environmental components it is possible synthesizes a list of the principal potential problems induced by the construction period:

Environmental	Potential effects
components	
Atmosphere	Alterations of air quality conditions Dust production
Water environment	Alterations of water quality conditions Alterations of water pattern conditions
Land and subsoil	Morphological modifications
Vegetation, flora and fauna	Vegetation damages due to powder production Departure / Damages to the fauna Interference with natural protected area
Noise – Vibration	Disturb due to means of transport traffic and work processing
Land use	Disturb to the agricultural activity due to means of transport traffic and work processing
Landscape	Alterations of the visual/landscape context Damages for interesting historical and witnesses elements

For the Constanta By pass works, the technological procedures are related to the construction period (3 years) and are here below presented on works categories:

- Earthworks

- Road superstructure

- Lateral roads

- Ditches and Drainage Canals
- Guardrails and barriers
- Road signs and marking
- Bridges and viaducts

- Culverts

The foreseen earthwork quantity is being calculated in $1.500.000 \text{ m}^3$, in large part for the construction of the embankments.

- Environment impact effects during operation period

Impacts on water and soil environment

After the operation of the road the soil pollutant sorces are represented by:

- Seasonal pollutant sources: During the winter, for the melting of the ice on the carriageway, about 2-4 m³ of salt are spread on 1 km of road. The effect of the seasonal pollution upon the roads to be rehabilitated is considered low. This evaluation took into consideration the works of collection and discharge of rainfall waters, works that mitigate pollution of the work adjacent lands.

- *Chronicle pollution sources:* Chronicle pollution refers to pollutant substances in solid, liquid or gas form that are discharged in the environment by the vehicles traffic running during the road operation.

In this situation, an important danger of the underground water is related to the qualitative changes of the water produced through the pollution with impure substances altering the water's physical, chemical and biological qualities.

The main sources of water pollution during the operation phase of the project has been analysed in this report are the followings:

- direct deposition on the water surface of the pollutants generated by the vehicles;
- the discharge of untreated water in surface streams; in this case waste water are considered water that comes form the roads surface, as for example the rain water that washes the roads and that flow to the river bed;

- the discharge of polluted water or of chemical compounds generated by the traffic accidents of tank cars that will transport dangerous substances on this road.

<u>Flora</u>

The motorway layout interfere with the protected area of Valul lui Traian, floristic reserve with presence of some shrubs and erbaceo species. The project solution with overpasse in correspondance of the protected area eliminete the potentially intererences with the flora presence.

Fauna

About fauna interference, this aspect it is not considered significant since these presence are limited and restricted to micro fauna and the reptile fauna (*Testudo graeca, Vormela peregusna, Vormela eversmanii*) in correspondence of Vallum lui Traian protected area. It necessary to put in evidence that the operation period don't provoke the direct fauna destruction, because the territorial context of reference don't result to be passing road and it is already altered from the intensive agricultural activities.

Atmospheric environment

Road traffic is the only source of atmospheric pollution for the objective under study. The foreseen impacts on the operation period are:

- *Population*. Should the traffic reach the prognosed intensity; there shall not appear risk situations for population in the adjacent areas of the analysed road.

- Vegetation. In the operations phase there shall appear short-term situations of chemical stress on vegetation due to exposal to NO_x impurification. In the mean time the recommended annual average EU guide value for ecosystem protection is slightly exceeded.

- *Soil and underground.* In the operations phase, in the road layout, the vehicles shall send forth particles charged with heavy metals that shall deposit themselves on the soil. Therefore, there is the possibility of soil contamination with Cd, Cu, Cr, Ni, Se, Zn, locally, in the above-mentioned area.

- Constructions. Acid gases (NO_2, SO_2) and the particles sent forth in the atmosphere during the operations phase have a low influence upon the increasing of the atmospheric aggressiveness.

Impacts on noise environment

The main sources generating noise due to the objective activity are represented by the equipment involved in technological process and by the road traffic.

The present assessment has show that the noise levels $L_{eq,24h}$ at the road limit will be 94 dB(A) for a speed of 80 km/h (max speed) and that the value of 50dB(A) (max admisible value of the external noise level of the building -STAS 10009/88) will be overran till a distance, away from the road limit, of 535 m. In this stripe are present some buildings of both town of Ovidiu (km 0+000 - 1+ km 000) and Lazu (km 19+500 - km 20+700) and some isolated receptors near the DN3 (km 11+250 - km 11+900).

Landscape impact effects

Although the actual landscape doesn't present an elevated value with the exception of the Vallum Traiani defensive system, the project area has been already significantly changed due to the presence of the motorway layout.

The project will significantly change the landscape, as almost for the complete length of the alignment, the main body of the road is not at grade with the prevailing terrain level. In particular the high embankments section (more of 3 m) and the motorway overpasses and bridges will significantly alter the topography. The kind and the level of impact however are different on the different section of the project in correspondence of the different landscape sensibility and of receptors presence. In particularly:

- from km 4+500 to km 7+650 the motorway runs on high embankments and on bridge, over passing two irrigation canals in the agricultural area;
- from km 11+250 to km 12+000 the motorway runs on high embankments and on bridges, over passing the national Road n. 3 and the railway line. In this case the views from the national road and from the railway will be blocked as the high embankments create a view barrier;
- From km 12+200 to km 12+850 the motorway runs on high embankments and on bridge, over passing the archeological site and the floristic reserved area of Valul lui Traian. In this case the continuity of the vallum line will be altered from the bridge structure;
- From km 18+000 to km 21+ 400 the motorway runs on high embankments and viaduct near the Lazu town.

Impacts on socio-cultural environment

In detail, the following impacts during operation period have been identified

- Population will be directly affected by operation of the new Motorway in the area of Ovidu and Lazu. The impact will be related to the construction period (short-term) but also to the operation period due to noise and air pollution.
- Due to completely new construction of the road, the bypass will have an impact aesthetic resource of landscape.

- The impact on cultural and aesthetic resources is important for the area where the Motorway crosses Valul lui Traian ancient dyke. During Construction period appropriate measures should have been implemented
- Due to completely new construction of the road, this alternative will have an impact on agricultural land properties. The impact on agricultural land is high and has to be considered for the whole Motorway section. Access to agricultural land should be guaranteed by the provision of local access roads.
- The bypassing of Constanța will bring reduction of accidents due to improvement of design, pavement and signaling, and as avoiding the dense settled areas of Constanța compared to the present road. On the other hand the project will contribute to the increase of accidents due to higher travel speed and increasing motorisation. During operation, the new road can improve traffic safety overall, but emergency response and service capabilities need to be developed. Traffic related safety difficulties due to operation of the road is expected to be significant at intersections.

The proposed Motorway in general will have a positive effect on the economic development in the area due to:

- Creation of job opportunities related to construction works and maintenance / management works in the operational phase works
- the alternative will provide direct access to the new Port of Constanța, avoiding the urban area in the south of Constanța;
- this Motorway Alternative will not affect directly the coastal area of Mamaia; access to the tourist area is guaranteed via National /Regional Roads.

I.5 Measures and recommendations

The recommended mitigation measures, both for the construction and operation period, that should be adopted to avoid or minimize potential adverse impacts are discussed in this paragraph, following the same categories for potential impacts. Such measures consist essentially of prescriptions for the construction period or rather project solutions or technical-realizations with the purpose of foreseeing the possible rising up of impacts in the territory. Therefore, both in the construction and operation period, the following should be undertaken:

- To contain the impact on the settlement keeping the layout of the project as further as possible from the houses/residential area and, where this wasn't possible, adopting technical solutions.
- To respect the areas of environmental special interest as the natural botanic reserve of Valul lui Traian and the archaeological site with the same name.
- To reduce the interruption of the agricultural continuum restoring the accessibility conditions of the local connections network.
- To maintain the continuity of the water network neither of main level nor of the secondary one.

It has been underlined two categories of the project:

- The one of mitigation measures
- The one of optimisation of the project on the contents at the outline

The mitigation measures are finalized to pursue the elimination/control of the potential interferences gathered during the environmental analysis that had taken into consideration all the elements involved.

The second category of activities carries out a double function: integrate the project infrastructure and the interventions of mitigation defined (for example the one of acoustic barriers) among the operation context. In the definition of these works, the landscape planning covers an extreme important role.

- Measures of environmental prevention and protection during construction period

The actual project level don't allow, for the construction period, an exactly location of the work site and operation phases. Then the mitigations measures are those generally verifiable for this kind of project.

Some of those are typical for all the sections as:

- Traffic management: plan location of sign/ traffic management measures (bumps) to be posted/ constructed;
- Reduction of the traffic speed especially in the urban areas;
- Application of water on construction roads and sites pavements as appropriate to prevent high dust emissions;
- Areas with activities producing excessive dust or for material stock should be screened;
- Reused of the waste stores from the rehabilitation, as much is possible;
- Rehabilitation of detours after construction;
- Scheduling construction activities near waterways fro seasonably dry period;
- Construction waste, waste oil and other liquids must be disposed in a proper manner;
- The storage of the hazardous materials by the construction camps and their use in construction must be appropriate;
- Protection drainage from flowing waters;
- Re vegetation of barren earth surface such as borrow pits and storage;
- Restore vegetation immediately after the end of the works;
- Waste land retrain with green plantation or agricultural use;
- Prevent water and soil pollution.

- Measures of environmental prevention and protection during operation period Water and soil environment

As for the construction period the prevention of soil and water pollution will need to pursue the same measures.

The main measures for the control and prevention of the water and soil pollution along the bypass area are:

-The presence of water drainage and wastewater treatment devices;

- The periodical check-up of the collection, treatment and discharging system of the meteoric waters;

- The periodical check-up of the quality of the soil (pH, heavy metals) from the road area. Noise environment

On basis of the measurements regarding the noise level for the sections of Ovidiu (km 0+000 – 1+ km 000) and Lazu (km 19+500 – km 20+700) and for the section near the DN3 (km 11+250 - km 11+900) could be established:

- Reduction of sound transmission by installations of phono-absorbent panels or creation of green screens with shrubs and threes
- Reduction the noise emissions at the sources with possible velocity restrictions or use of silent pavement (drainage asphalt).

Landscape

The nature of alteration of topography by a road project in general is permanent. However landscape impacts can be mitigate to some extent by green shielding of structures and architectural design to integrate structures into surrounding environment.

The realization of the infrastructure could cause an alteration of the continuity of the agricultural soils with a consequent possible alteration of the soils use conditions from the farmers. The continuity in the managing of the soils, especially in regard to the operating of the agricultural machineries, it is kept realizing flyover and underpasses that allow the continuity of the farm road network.

The morphology of the interested area shows a specific visual sensibility at the presence of the motorway. In particular the interventions estimated are focused to realize hiding elements of the bypass using:

- The creation of green screens along the motorway fence; the interventions will be calibrated following the type of motorway (in low or high embankment) and will be shrubbery areas.
- The realization of a green belt of shrubs and threes in correspondence of the towns of Ovidiu and Lazu. This belt could be a protection area against the noise.

I.6 Capital assessment of environmental protection measures

According to the capital estimate of mitigations measures to the environmental impact, the investment in the environmental protection of the bypass project is primarily defined in about 3% of the investment total.

The cost of mitigation includes:

- slopes stabilization, drainage and erosion control, protection drainage;
- re vegetation (workers, planting stock, transport of planting material);
- installation of noise barriers;
- Installations of traffic signs and road bumps.

In the process of the design, construction, construction supervision and others should pay much attention to the environmental protection and make perfect and detailed plans to put mitigation measures by the report into practice. The environmental protection facility construction must be carried out simultaneously with the rehabilitation project, as well as their design and operation.

I.7 The Environmental Management Plan and the Monitoring Plan

In the EIA have been identified and discussed the potential negative impacts and the recommended mitigation measures that should be adopted. Some of the measures involve good engineering practices while others are viewed from human and social angle.

The EIA define an Environmental Management Plan and a Monitoring Plan that will cover the period during the construction phase of the project and that of operation phase of the road programme.

The Environmental Management Plan has the following objectives: protection of the environment from potentially detrimental road and related activities, and vice versa; enhancement of road attributes, especially in regard to integrated local development; governmental institutional strengthening in conducting environmental protections and monitoring.

These objectives can be achieved by the following elements of the environmental program: a small environmental team, as guided by an advisory group; resources to assist the highway-related units; a diverse array of impact mitigation and enhancement measures; contractor requirements for environmental protection to be implemented during the rehabilitation of the road.

The Monitoring Plan is carried out, to assess any disturbance to the environment and to protect both RNCMNR, Romanian National Company Of Motorways And National Roads, and the affected parties from false charge. Although RNCMNR will retain administrative directive and management, certain part of this programme, as described below, will be performed by other agencies under contract to RNCMNR.

The monitoring will involve maximum use of information collected in existing regular channels for reasons of resources efficiency and to avoid adding to the workload of the organisation compiling data. The information will be used in three types of monitoring: construction activities; effects of the project upon the surrounding environment and vice versa; internal progress of the environmental management group.

Monitoring the environmental protection measures during construction mainly concern the progress of impact mitigation and enhancement and the construction activities that are required of the contractors.

I.8 Public consultation and Information

Public consultation has been agreed with the Romanian National Company of Motorways and National Roads (RNCMNR). The public was invited to take part in consultation sessions during the scoping phase of the EIA. The public consultation sessions were held in public venues in Constanta on March 2005.

The Scoping Document and Public Consultation and Disclosure Plan (PCDP) identify relevant environmental issues and an initial assessment of the anticipated environmental impacts. The PCDP describes the procedural steps for including the public within the EIA process.

The scoping meeting for the project was organised by RNCMNR and prepared with support of EBRD. Representatives from Ministry of Environment and Water Management, National Water Administration, County department for culture, religion and national heritage, local authorities (Constanța, Ovidiu, Valul lui Traian, Agigea, Cumpana), local network farm (Constanța Harbour Administration S.A., CONPET S.A., TRANSELECTRICA S.A.,

DISTRIGAZ S.A., ELECTRICA S.A., TRANSGAZ S.A., ROMTELECOM S.A.) and various NGOs (Grupul de Cercetare si Educatie Ecologica " Monachus", Asociatia "ECO DOBROGEA", ECOM Constanța, Asociatia pentru Protectia Mediului, Oceanic Club, TERRA Mileniu III, Mare Nostrum) participated.

A Report of Comments received by the public will be prepared by the RNCMNR. The results of this meeting were considered during the preparation of the draft report of the EIA.

The Executive Summary of the EIA will also to be placed on the website of the EBRD. (http://www.ebrd.com/projects/index.htm).

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