



## Transparency International - Bulgaria

### REPORT

on

the Public Procurement Procedure for the Design and Works of Struma Motorway, Lot 3.1 Zheleznitsa Tunnel with three lots, opened with the Decision no. 115/17.10.2017

#### PHASE IV

Implementation of the public procurement:

Design and first stages of construction

Sofia, 2020

## TABLE OF CONTENTS

<b>I. INTRODUCTION</b> .....	3
<b>II. FINDINGS AND ASSESSMENT RELATED TO DESIGN</b> .....	3
1. Design of Subsection (Lot) 1 .....	3
2. Design of Subsection (Lot) 2 .....	7
3. Design of Subsection (Lot) 3 .....	8
4. Conclusions and Comments on the Design Stage.....	8
<b>III. FINDINGS AND ASSESSMENT RELATED TO CONSTRUCTION</b> .....	9
1. Progress in the construction of Subsection (Lot) 1 .....	9
2. Progress in the construction of Subsection (Lot) 2.....	13
3. Progress in the construction of Subsection (Lot) 3.....	18
<b>IV. CONCLUSION</b> .....	23
1. General conclusions.....	23
2. Recommendations .....	24

## I. INTRODUCTION

1. This Report presents the findings of Transparency International Association from the independent civil monitoring of the implementation of the contracts assigned to implement the public procurement for the design and construction of Zheleznitsa Tunnel on Struma Motorway<sup>1</sup>. The civil monitoring of the procedure to build the longest motorway tunnel in Bulgaria is implemented in the framework of the European Commission initiative “Integrity Pacts – Civil Control Mechanism for Safeguarding EU Funds”. The monitoring was implemented by a team of observers – experts in law, social and engineering sciences – in the period **March 2019 – June 2020** based on the Integrity Pact concluded between the independent observer, Transparency International - Bulgaria, and the contracting authority, Road Infrastructure Agency (RIA)<sup>2</sup>.
2. The Report covers the activities related to the implementation of the contracts with the contractors chosen for the three lots of the public procurement which include design and construction for the respective lots<sup>3</sup>.
3. The monitoring of the implementation of the three public contracts concluded for the design and construction of the three lots of the public procurement is related to the use of two main methods: a) document analysis related to the examination of diverse information of technical, organisational and financial nature which is important to the implementation of the project; b) on-site monitoring – monitoring and participation in working meetings with the contracting authority and the contractors as well as visits to the construction site.

## II. FINDINGS AND ASSESSMENT RELATED TO DESIGN

4. The specifics of the activities in the public procurement under monitoring follow from the fact that it is an engineering procedure, i.e., it includes both design activities and construction and assembly works (CAW). Given that the tenders were held with projects at the conceptual design stage, the first activity of contract implementation with the contractors for the three lots is related to the development of a technical design of the respective lots.

### 1. Design of Subsection (Lot) 1

5. The design solution aims to ensure completion of Lot 1 from km 366+000 to km 366+720, 720 m in length and A29 standard, including the service tunnel road at the north entry of

---

<sup>1</sup> Procedure to assign the public procurement with the subject matter “Design and Construction of Struma Motorway, Lot 3.1 Zheleznitsa Tunnel with Three Lots” launched by virtue of Decision No. 115 of 17.10.2017 of the Chair of the Management Board of the Road Infrastructure Agency.

<sup>2</sup> The Integrity Pact for the public procurement making up the subject matter of this report was signed on 16.10.2017. The full text of the pact in English is available here:

[http://integrity.transparency.bg/en/wp-content/uploads/sites/2/2017/11/IntegrityPact\\_20171016\\_FinText\\_EN.pdf](http://integrity.transparency.bg/en/wp-content/uploads/sites/2/2017/11/IntegrityPact_20171016_FinText_EN.pdf).

<sup>3</sup> To make it easier for the readers, this report uses [both in Bulgarian and English] the term “lot” (Lot 1, Lot 2, and Lot 3), which has become popular, to refer to Subsections 1, 2 and 3 implemented as sites under the respective items 1, 2, and 3 of the public procurement for the construction of Zheleznitsa Tunnel.

Zheleznitsa Tunnel, displacement of the existing municipal road BLG 1071 (I-1 Blagoevgrad – Simitli) Standard G9, and 4 large facilities before the tunnel as follows:

- Bridge over the Struma river with seven openings L=33 m along the left lane and 8 openings L=33 m along the right lane;
  - Overpass over road I-1;
  - Overpass over the Sofia – Kulata railway line;
  - Overpass over the BLG 1071 road Simitli Blagoevgrad.
6. The plan is that the upper construction of the bridge and the overpass over the Simitli – Blagoevgrad road will make use of composite double-T prestressed steel concrete beams combined by a monolithic steel concrete slab. The foundation is pilot.
  7. The top construction of the overpass over road I-1 and the railway line will make use of composite steel concrete beams combined by a steel concrete slab. The foundation is flat.
  8. According to the ETEC record<sup>4</sup> of 29.05.2019, the technical design complements and/or changes the following: statistical calculations and justification for the deep excavation and high embankment are made; a design is made for the displacement and reconstruction of objects of the existing infrastructure and their coordination; discrepancies are found in the reporting and the documents provided under the “Geology” section of the technical design, furthermore the geological conditions were not clarified sufficiently clearly in the conceptual design; no designs are provided for reinforced embankments; the designer reports omissions and discrepancies in the solutions for the large facilities in the conceptual design; a new draft design solution is proposed – two separate facilities for each lane of traffic with a top construction using the incremental launch method and a pilot foundation.
  9. After the development of the technical design, two main risks are identified entailing the changes made respectively: 1) delay in the construction of the large facilities due to the failure of the conceptual design to take into account the future constriction of another railway track by Railway Infrastructure National Company (RINC); 2) the characteristics of the geological structures of the section at the connection with the preceding section being built by DZZD AM Struma 3.1 (with participants Groma Hold EOOD, Evropeiski Patishta AD, Patishta Plovdiv Group EOOD and Alve Consult EOOD) and the respective decision to reinforce the slope. The follow-up monitoring at the construction stage confirms the gravity of the said risks.

#### ***Construction of large facilities***

10. The main reason to change the facilities is the future development of the railway line and the need to have another railway track built by Railway Infrastructure National Company which was not taken into account at the conceptual design stage. Both the consultant and the RIA confirmed in writing and accepted the contractor’s proposal for another type of facilities.
11. In principle, the change can be seen as good and it attempts to resolve an issue which, for an unknown reason, was overlooked during the previous stage of conceptual design. The ETEC discussions make it clear that the comments are related mostly to the challenges for the contractor because such a construction will be implemented for the first time in the country. The change was accepted without any serious concerns.

---

<sup>4</sup> Expert Technical and Economic Council.

Photograph 1. Path of the large facilities over the railway line and E-79



### ***Geological features of a part of the terrain and need for reinforcement***

12. The research found a change in geological structure. It concerns a section of about 50 m at km 366+100 where neogenic sediments were found (in the two banks of the Struma – mainly clastic materials made up of gneiss and olistolithic objects). This necessitates further geological examination, including stability calculations for the construction excavation. The ETEC records make it clear that, according to the contractor, there was an issue with the access; later, it was clarified that it concerns a section on the right bank (close to the temporary bridge).
13. The ETEC record referred to shows that, due to different assessments of the geological structure, ETEC had to review a third round of changes in the technical solution to reinforce the slope at the same place.
14. During the visits of the independent observer on 3, 4 and 5 June 2020, it was clarified that there was an issue with the slope stability in a section on the right bank of the Struma. The matter concerns a landslide slope deformation whose main part is in a section being built by DZZD AM Struma 3.1. (contractor for Struma Motorway Lot 3.1, the lead participant being Groma Hold) and to a much lesser extent – in the scope of DZZD ZHELEZNITSA – SEVER (contractor for subsection 1 of the public procurement being monitored, the lead participant being GBS Infrastructure Construction AD).
15. Based on the (a) analysis of the records of the ETEC discussions and (b) visits on site, the following assessment and conclusions can be reached:
  1. No attention was paid to the discrepancy between the design solutions of the contractors for the two adjacent sections<sup>5</sup>. The responsibility for this lies with the contracting authority

<sup>5</sup> DZZD AM Struma 3.1 of the preceding lot and DZZD Zheleznița – Sever (with lead participant GBS - Infrastructure Construction AD) of subsection 1 of Lot 3.1 under monitoring.

which accepts the design solutions and should coordinate them. In this regard, in the event of other procedures, it would be good for the contracting authority to pay special attention to such a risk in order to avoid it in the future. This issue gives grounds to take a critical look at the approach applied frequently over the past years, namely the division of one infrastructure site into many small sections implemented by different contractors.

**2.** The circumstance that the data from the geological examination at the conceptual design stage differ from what was established in the process of development of the technical design poses difficulties in the design process, all procedures related to it and any following actions. For example, the RIA ETEC reviewed a geological report for this section for the third time and, respectively, considered proposed technical solutions to reinforce the slope three times.

*Photographs 2 and 3. The area between the preceding section and subsection 1*



## 2. Design of Subsection (Lot) 2

16. The project design (conceptual design stage) aims to ensure completion of Lot 2 from km 366+720 to km 369+000 with a total length of 2,280 m, including a motorway section standard A29, a service tunnel road at the south entry to Zheleznitsa Tunnel and two large facilities – bridges over the Suhata Reka River after the Zheleznitsa Tunnel at km 368+825 and the service tunnel road.
17. The plan is that the top construction will make use of composite double-T prestressed steel concrete beams combined in one construct by a monolithic steel concrete road slab. The foundation is flat.
18. The plan is that the main part of the tunnel will be constructed using the traditional underground boring method (New Austrian Tunnelling Method, NATM) by means of mine drilling, reinforcement and lining; the two entries will use the direct method.
19. The review of the information reflected in the ETEC minutes of 19.07.2019 highlights the following details:
  - an insignificant change in the construction of the facilities was made;
  - it is declared that opinions are expected from the Ministry of Environment and Water and a permit for the use of a water site in order to proceed with the issuance of the construction permit;
  - the consultant notes two main differences in comparison to the conceptual design caused by a change in the input data of the contracting authority and a substitution of the water supply with the building of a fire safety tank;
  - the consultant has provided a declaration that if the contracting authority accepts the design, the consultant is ready to issue a compliance assessment and technical control for the “Construction” section of the technical design.
20. As a result of the review of the available documentation, the following comments and assessments can be made:
  1. Omissions are in place with respect to the geological examination – certain places have not been examined sufficiently which poses risk at the following stages of project implementation.

The main risk during the following implementation is related to the insufficient details and clarity of the geological examination which results in a change in the reinforcement and lining of the tunnel. Whether this will result in other issues as well is yet to be seen in the course of construction.
  2. It is not right for the consultant to issue a compliance assessment after the acceptance of the design by the contracting authority. It should be the other way round – the contracting authority should accept the design following a positive compliance assessment issued by the consultant.
  3. The sections “Safety and Health Plan” and “Construction Waste Management Plan” are hardly discussed and reviewed by the ETEC. The reason is that they have a term of validity of six months and they are approved by local authorities. Still, these matters are in the observer’s focus of attention for two main reasons: first, due to the complexity of the facilities and the risk for the workers in the course of construction; also due to the large

quantity of ground material which will be excavated and, respectively, places for removal are to be ensured.

21. The heightened attention to these matters proved justified in the course of monitoring: until finalising the work on this report, there were accidents with workers in the tunnel and the issue with ensuring appropriate close places for removal of the ground material engaged the attention of all participants.

### 3. Design of Subsection (Lot) 3

22. The project design (conceptual design stage) aims to ensure completion of Lot 3 from km 369+000 to km 370+400 with a total length of 1,400 m, including a motorway section standard A29, an agricultural underpass and a temporary emergency connection.
23. The review of the information reflected in the ETEC record of 19.07.2019 highlights the following details:
  - there are insignificant notes with regard to the construction part and road safety;
  - a number of inaccuracies, incomplete details and technical errors are registered in the clarification note;
  - it is found that the restriction systems were not coordinated with the Institute of Roads and Bridges at the RIA;
  - omissions are found with respect to the measures under the environmental impact assessment (missing noise protection facilities);
  - no coordination with certain stakeholder institutions, including Traffic Police.

### 4. Conclusions and Comments on the Design Stage

24. **Potential risks of insufficiently comprehensive geological examination:** Based on the monitoring of the specific section but in an attempt to summarise beyond the scope of the specific public procurement under monitoring, in future procedures to assign construction through engineering<sup>6</sup> the contracting authority needs to carefully consider the risks stemming from insufficiently detailed geological examination. These risks are significant and exert an impact in the following aspects: (1) increased costs of construction (for example, increased cost of the site due to underestimating the conditions arising from surprises in the geological structure of the area; need to change the reinforcement of certain sections and need to change the construction materials used, including tunnel lining); (2) delay in implementation due to vagueness, additional examination or changes in initial design solutions; (3) flaws in slopes (for example, collapse or landslide) immediately after putting the respective site in use; (4) need to change the regulated lot plans already approved due to changes in slopes which results in a certain delay in implementation.
25. To minimise the risks during the design and construction of complex infrastructure sites, in the future the contracting authority needs to pay special attention to the geological examination. The comprehensiveness of the geological examination and the accuracy of the

---

<sup>6</sup> Technical design and construction within a single procurement procedure.

data obtained determine if the construction will be completed in accordance with the terms set and within the initial financial estimates as well as if additional coordination procedures with other institutions will be necessary.

26. **A coordinating role of the contracting authority during the construction of large infrastructure projects built in lots by different contractors:** During the design of large infrastructure sites built in subsections (lots) by different contractors, the contracting authority needs to play a more effective coordinating role. This is necessary in order to avoid the risk of discrepancies between design solutions of the contractors for adjacent lots as such was found in the first lot of the site under review.
27. **Consequences of the ETEC recommendations and solutions for the contracts with contractors:** Based on the analysis of the records of ETEC discussions and the amendments to contracts, a conclusion can be reached that it is necessary to establish a mechanism of detailed documenting and traceability of the implementation of the ETEC recommendations and decisions which will provide for clear connections between the recommendations and the final technical designs. The mechanism of documenting and traceability of the process could be included, for example, in the ETEC Work Regulations and be accompanied by a clear algorithm, including the following steps: find shortcomings, set a deadline for remedy together with new opinions of the specialised administrations in relation to coordination and the engineer's report, schedule a meeting for a final review and acceptance of the final technical design. As regards the traceability of the process, the contracting authority needs to develop and apply a procedure ensuring a stricter tracing and control as regards the implementation of ETEC recommendations, including through written records ensuring that all ETEC comments have been taken into account and reflected both in the records of follow-up discussions and in the final designs.

### III. FINDINGS AND ASSESSMENT RELATED TO CONSTRUCTION

#### 1. Progress in the construction of Subsection (Lot) 1

##### *Assistance from the contracting authority and from the contractor*

28. The information in this part of the report is based on visits to the construction site, monitoring of the monthly progress meetings and information provided in writing by the contractor<sup>7</sup>.
29. It should be noted that, at this stage of monitoring, the monitoring team received complete and adequate assistance both from the team of the contracting authority and from the contractor. The contracting authority set the practice to send information about the upcoming monthly meetings regularly and, during the meetings, the independent monitor team had the opportunity to become familiar with the oral progress reports and the discussions among the participants, to raise questions, to review some documents located in the site office<sup>8</sup> and to inspect the construction site together with the other participants

<sup>7</sup> The contractor for Lot 1 encompassing the design and construction of the first subsection is DZZD Zheleznitsa – Sever with the following partners: GBS - Infrastructure Construction AD, Glavbolgarstroy AD and GBS International EAD.

<sup>8</sup> For example, the observer team had the opportunity to review the records in the Order book. In view of the specifics of group visits on site, it was not appropriate to ask for access to other documents (for example, records from tests, quality certificates).

in the meetings. The team of the contracting authority also provided the necessary assistance to the observers to obtain systematised information in writing from the contracting authority<sup>9</sup> which was used in the preparation of this report.

#### ***Mobilisation of the contractor***

30. During the site visit on 14 January 2020, our team found that the site offices and laboratories were well organised close to the site. The necessary service roads with the respective temporary traffic organisation were complete. The next visits in the beginning of February, of March and in June 2020 found that the contractor had mobilised the equipment and staff envisaged.
31. In the period from 13 March till 14 June 2020, the contractor worked with reduced staff and equipment due to compliance with the requirements of the state of emergency and the emergency epidemic situation to restrict the dissemination of COVID-19.

#### ***Progress in construction works***

32. As of June 2020, the total progress of the activities laid down in the contract stands at 26%.

*Photograph 4. Construction works in the left lane*



33. In summary, the main types of activities completed as of the end of the period covered in this report are as follows: 100% completion of excavations of the facilities, reinforcement

---

During following visits, the observer will ask to make a review because construction works have already been performed and documented and reported as well as due to the confirmation from the contractor that they “maintain and update archives at the site office containing the approved technical design, the records of working meetings, the monthly progress reports, all acts drawn up and signed pursuant to Ordinance No. 3 of 2003, records of laboratory tests, declarations and quality certificates, and all other documents concerning the implementation of the contractual agreement.”

<sup>9</sup> After the site visit in the beginning of June 2020, Transparency International Association sent questionnaires to the three contractors in which they had the opportunity to reflect data about the progress of construction works, assessments and recommendations for the interaction with the contracting authority and other institutions. This approach is an expression of the understanding that the data and assessments from the monitoring need to be based on precise and accurate information and assessments reflecting the positions of all participants in the process. The contractor for Lot 1 provided information in writing which assists for a more accurate and detailed reflection of the construction works completed in this report.

walls, transportation of excavated ground materials and disposal at the depot; 100% completion of the activities related to clearing the areas within the easement of the road, destruction of current surfacing and its removal to a disposal depot; supply of 100% of the materials for a drain pipe which is completed; 100% of reconstruction and moving of electricity distribution network equipment (medium and low current), communication cables of mobile operators, contact network and optic cables of RINC. With respect to the construction of the bridge at km 366+215, completion of 100% of the cast pilots; 100% of the activity to create a launching steel construction for the incremental launch and the construction yard for the left lane. The activity to build the pillars is completed 68% of what is envisaged; an abutment in the direction of Kulata is erected. Approximately one-third of the embankments and one-third of the top construction of the left lane are complete. The progress at the abutments on both sites is as follows: abutment on the side in the direction of Kulata – 74%, abutment on the side in the direction of Sofia – 30%.

### ***Deadlines***

34. Even though the construction of the facilities is unique and carried out for the first time in the country, as a whole the pace of activity implementation was rhythmical. This finding is valid until the state of emergency was declared on 13 March 2020 and the following emergency epidemic situation was declared on 15 May 2020 which are deemed to be the reason for certain work interruptions, delays, and reorganisations.
35. As of the date of preparation of this report<sup>10</sup>, the contractor reports a delay in the approved construction schedule of about 2 months. The reason attributed is the 2-month state of emergency in the country and other European countries which are suppliers of materials. The main consequence of the state of emergency is the restrictions imposed on transport among countries which result in uneven deliveries of construction chemicals and main construction materials for the site: pressed steel for the construction of the facilities supplied from Portugal; high-strength dry construction mixtures delivered from Italy; plasticizers for the production of concrete and injection solutions delivered from Italy, North Macedonia and Switzerland; pre-cast steel meshes for the pillars and top construction of the facilities.
36. In addition, it should be noted that the emergency epidemic measures require physical distance which resulted in the reduction in the number of workers and technical equipment working on site.
37. As of the time of development of the report, the contractor has declared that the emergency circumstances have delayed the pace of building the top construction, rope injection, temporary bearing assembly, building of foundations and pillars.
38. The said circumstances resulted in the objective impossibility of the contractor to observe strictly the construction schedule set and the contractor asked for an extension of the contract implementation deadline by 2 months which was accepted by the contracting authority.
39. Due to a landslide in the initial part (from km 366+000 to km 366+080) of the route, the implementation of the excavation work in the said area has been suspended.

---

<sup>10</sup> Note: 20 June 2020.

### ***Quality of construction works and materials***

40. The control over the quality of the materials used is carried out in the accredited laboratory set up and functioning on the site. The contractor reports that they perform the necessary tests and exercises regular control over the quality of the materials used in CAW. During following visits, the observer intends to inspect records of tests and quality certificates and, to this end, the observer will rely on assistance from the contracting authority and from the contractor.
41. The physical inspections during visits to the construction site did not find issues or discrepancies with respect to the quality of the construction works implemented.
42. The review of the order book shows that it is maintained, and the site designer has made entries concerning details in the implementation of the technical design.

### ***Issues and potential risks***

43. In the beginning of the route, in Lot 1 (from km 366+000 to km 366+080), there is a landslide process which hampers the excavation works. Measures need to be taken first to reinforce the area and then implement the construction works.
44. As the work in Subsection 1 entails contact with the existing road network, periodic pollution of adjacent roads due to the construction equipment has been recorded. A similar finding and a respective recommendation for cleaning up were made by the contracting authority during the working meeting held in January 2020.
45. Delay in deliveries of materials from abroad and reduction in the number of construction workers and equipment due to the dissemination of COVID-19 – as noted, these are referred to as grounds to update the construction schedule and the contractor is making efforts to reorganise the work in order to minimise the delay.

### ***Payments***

46. During the monthly meeting held in January 2020, the engineer expressed the opinion that the progress in the implementation of the complex facilities would have been more pronounced if it were paid for in instalment and not when fully completed.
47. At the end of the period under monitoring, the contractor declares that the respective payments for all design activities certified at the time and advance payments have been made in line with the contractual agreement.

### ***Control by the contracting authority***

48. The observations during the monthly meetings and the information provided in writing by the contractor establish that the contracting authority exercises regular control over the implementation of the contract activities. The control on the part of the contracting authority exercised through the regular monthly meetings and the weekly monitoring of the progress of construction works is complemented by maintaining communication with the contractor, assistance in the communication with other institutions (government institutions, local authorities) and formulation of recommendations related to the work organisation.
49. During the monthly meetings, the team of the contracting authorities seeks information about the progress of the construction works and about the implementation of recommendations made during previous checks; actively seeks information about potential

risks in the work process, makes proposals and assists in the elimination of issues and minimizing/eliminating potential risks.

50. Based on the observations on site, a conclusion can be reached that the team of the contracting authority is aware of its responsibility in the construction of the infrastructure facilities being monitored and exercises adequate and effective control.

## 2. Progress in the construction of Subsection (Lot) 2

51. The information in this part of the report is based on visits to the construction site and monitoring of the monthly progress meetings. Unlike the contractors for Lot 1 and Lot 3 which provided written summarised information about the progress of construction, the contractor for Lot 2<sup>11</sup> did not provide a written response as of the date of development of this report. The reasons cited are that the contractor has entered into a contract with the contracting authority RIA and the fact that there is no contract with the independent observer does not obligate them to provide data to the observer.
52. The contracting authority set the practice to send information about the upcoming monthly meetings regularly and, during the meetings, the teams of observers had the opportunity to become familiar with the oral progress reports and the discussions among the participants, to raise questions, to review some documents located in the site office<sup>12</sup> and to inspect the construction site together with the other participants in the meetings.

### ***Mobilisation of the contractor***

53. During the site visit on 8 November 2019, the independent monitor's team found that the site offices and laboratories were well organised close to the site. The necessary service roads with the respective temporary traffic organisation were complete. The following visits in the beginning of December 2019, January, February, March, and June 2020 found that the contractor had mobilised the equipment and staff envisaged.

### ***Deadlines***

54. As of the date of preparation of this report<sup>13</sup>, the contractor reports a delay in the approved construction schedule of about 2 months. The reason attributed is the 2-month state of emergency in the country and other European countries which are suppliers of materials. The main reason for the delay, according to the contractor, is the restrictions imposed on transport among countries which result in uneven deliveries of the necessary construction materials.

### ***Control by the contracting authority***

55. The observations on site and the monthly meetings attended allow us to conclude that the contracting authority exercises adequate control. In this regard note should be made of several topics which have been brought to the attention of the contractor: 1) exercising

---

<sup>11</sup> The contractor for Lot 2 which covers the design and construction of the second subsection is DZZD AM Struma Tunnel 2018 with partners GP Group AD, Global Construction OOD and Via Plan EOOD.

<sup>12</sup> For example, the observer team had the opportunity to review the records in the order book and a record of the examination of the characteristics of excavation material. In view of the specifics of group visits on site, it was not appropriate to ask for access to a broader range of documents; during follow-up visits, the observer will ask for a similar review.

<sup>13</sup> 20 June 2020.

control over ground deformations, including as a result of detonations; 2) taking organisational measures to ensure disposal depots for the ground materials in order not to hamper the work process; 3) measures related to water removal, radiation measurement and other measures related to ensuring safe working conditions; 4) measures to ensure traffic safety, including maintenance of roads in the republican road network used by construction equipment.

56. The order book of the construction describes the conditions of construction. Rock samples are tested, and the results of geotechnical analyses are noted. The entries show that the data obtained is considered during the construction works.

***Progress in construction: findings from site visits and attendance at monthly working meetings in the period 1.10.2019 - 6.03.2020***

57. By 06.03.2020, almost ¼ of the total length of the tunnel has been drilled: approximately 160 m on the north side and 300 m on the south side. The geological structure determined on the basis of the preliminary examination is confirmed during construction works. This has also been established during site visits of the observer team.
58. The progress of excavation is achieved through detonations; the instances vary depending on the strength of the rock mass in the range of 0.8 to 1.5 m, an average of 1 m. At each step of progress of boring, a photograph is being taken and an inventory of the conditions of the rock mass is made. The rock mass is classified using the Rock Mass Rating (RMR) of Bieniawski and the Geological Strength Index (GSI). The following indicators are included: uniaxial comprehensive strength (UCS), rock quality designation (RQD), distances between discontinuities, conditions of discontinuities, hydrogeological conditions, and direction of discontinuities. The description also includes lithology of the heading rocks, a description of the main discontinuity systems (J1, J2 ....), stratification (F1, F2....), degree of weathering, a description of the filling of discontinuities. The degree of heading stability is determined.

*Geological structure*

59. As of the beginning of March 2020, according to the contractor, there is no need for additional geological examination. The geotechnical indicators of the rocks show that the geological structure found on site corresponds to the one from the preliminary reports. Furthermore, it is found that the conditions are better in the foundation and weaker going to the roof. There are variations in the quality of the rock mass, for example passing through grainer areas which, on their part, require solutions in determining the type of lining, measures, monitoring, etc.
60. The discussions during the monthly progress meetings clarify that the grainy structure of the walls found poses certain problems in reinforcing and placing the hydro insulation which necessitate relevant measures. In this regard, the plans are to repaint the reinforcement and control the unfilled spaces and possible disruptions in the insulation.
61. For example, the contracting authority drew attention to a possible impact of the early detonations on the primary lining and a recommendation was made to closely monitor if there would be deformations after the detonations. The contractor confirmed that they carried out ongoing monitoring. In this regard, benchmarks are placed and measured making use of total stations. The benchmarks are placed 2 on the walls and 1 on the roof (in an interval of 40 m) and are measured daily. At this stage, it is established that the

deformations are ceasing or have ceased. The maximum deformation found during the period under monitoring is approximately 1 cm.

62. The risk for the site workers, equipment, and the facilities themselves to go into a highly disturbed/ground area and water-rich (fault) zone is monitored constantly. Every attack is preceded by horizontal boring of 3-4 m in order to establish water inflow, weak (ground) areas and others. All changes in the geological structure, the characteristics of the mass and the existence of indications typical of entering a fault zone are being monitored.
63. The on-site inspections on 06.03.2020 found an issue with the exhaustion of the disposal depots for material removed. The contracting authority emphasised that there was a need to find plots and the contractor should take measures for a more active communication with the local authorities in order to find plots. The contractor provided information that several thousand cubic meters of material could be used in the construction and maintenance of forest roads, including in the construction of Lot 3, but still new plots for depots were being sought.
64. As regards the safety measures, three matters were discussed: risks of collapse; taking samples from the water and the air and control for possible radioactivity; water removal.
65. The contractor commented that there were plans for periodic taking of samples from the water and the air. A recommendation was made that, in the event of water inflow, water samples should be tested. A decision was taken to examine the radioactivity in the produce (of a water sample) which has not been done by the date of the monthly meeting (06.03.2020).

#### *Potential issues and risks*

66. Based on the observations carried out in the period October 2019 – March 2020, potential issues and risks can be identified in two areas:
  1. In relation to the excavation works in dangerous areas located: 1) under the ravine where alluvial sediments will be passed through (anchoring will be applied in this section and issues are expected); 2) at the right pipe which passes close to a proluvial cavity at about 10 m and issues might occur; 3) existence of several fault zones crossing the tunnel routes. The most pronounced of them is a slanting fault zone approximately in the direction 120° demonstrated in several subparallel faults in the south part of the tunnel. There are possibilities for caving, water inflow and mud flows.
  2. Exhaustion of the capacity of the depots for material removed which could slow down the work process.

#### ***Progress in construction: findings from site visits and attendance at monthly working meetings in the period 06.03.2020 – 04.06.2020***

67. Progress of the construction works as of the date of on-site inspection<sup>14</sup>: completion of 26.5% of the general works; 380 m bored on the north side, 538 m bored on the south side.

#### *Geological conditions*

68. The contracting authority asked if an area with deteriorating engineering and geological characteristics had been reached, what work safety measures were taken and if the

---

<sup>14</sup> Note: Due to the restriction measures imposed during the state of emergency, the first possible on-site visit and the monthly working meeting took place on 04.06.2020.

deformations were increasing. The representatives of the contractor confirmed that zones with unstable ground mass had been reached. These are ground, tectonically processed and, respectively, unstable areas in the rock mass. The movement processes of the ground mass are monitored closely, and measurements are made. After the intensive rainfall, an increase in deformations and water inflow were found.

69. The on-site inspection from the south entry confirmed the findings that an area of unstable ground mass had been reached.

*Photographs 5 and 6. Rock samples taken from the tunnel section bored (about 538 m): mica gneiss, tectonically processed, mylonitised.*



#### *Safety conditions*

70. The contractor commented that samples and test had been taken in the work environment (water, noise, background radiation). The background radiation at the north entry is higher but still below the threshold.
71. The contracting authority recommended measures for safe work emphasising safety during excavation works because the project would be entering a zone with very unstable and slippery rock mass. The contracting authority also made recommendations about water removal and sound alarms in the event of denotations.

#### *Ground mass storage*

72. During the working meeting, the contracting authority once again raised the question about ensuring disposal depots for the ground mass. The contractor emphasised that the local authorities from nearby locations were unwilling to provide areas and, hence, the contractor had concluded agreements with local authorities in an area in the direction of town of Dupnitsa<sup>15</sup>. Some of the ground mass is used in the construction of Lot 3.

<sup>15</sup> About 50 km from the construction site.

*Temporary traffic organisation and maintenance of the road network*

73. The section from the Class IV road is being periodically cleaned but there are reports from citizens that the roundabout is polluted. In this regard, the contracting authority recommended that it should be cleaned regularly. The contractor noted that the pollution in this section was also exacerbated by the contractor for the adjacent Subsection 3.
74. As regards the temporary traffic organisation, the contracting authority recommended that the road marking should be repainted in order to ensure the safety of travellers taking into account the summer season and the busy traffic going south.

*Quality control for construction materials – taking samples from the concrete in a tunnel section*

75. During the on-site visit, the observer had the opportunity to attend the taking of a sample from the thickness of the concrete. The profile sample was taken in the south tunnel, at m 279.90. While the sample taking was underway, a parallel measurement of the thickness of the concrete at the emergency exit of the left tunnel was carried out. The measurement showed good performance covering the benchmarks set<sup>16</sup>.

*Photographs 7, 8 and 9. Sample taking at m 279.90 in the right tunnel tube. Measurement at the emergency exit of the left tunnel*



<sup>16</sup> The thickness at the stross on one side has the following values: 50 cm; 52 cm and 45 cm (significantly higher than the required 35 cm); on the other side, the values are: 32 cm, 43 cm, 32 cm. The measurement at the calotte also shows good performance: 60 cm and 82 cm.



### ***Deadlines and payment***

76. As noted, as of the date of the inspection on 4.06.2020, 26.5% of the works envisaged has been completed. The construction schedule has been updated and, due to the state of emergency, the completion deadline has been extended by 2 months. The main reason stems from the difficulties with supplies of construction materials from abroad.
77. As regards payments, the contractor emphasised that it had provided certificate No. 6 on 22 May 2020 and was expecting payment. The question about the overall payment under certificate No. 5 was also raised as there had been only a partial payment. In this regard, the need for timely payments in order not to frustrate the work process was emphasised.
78. The contractor has already benefited from the contractual right to request payment for a part of the amount of the additional expenses<sup>17</sup>. The reason is that, in the course of work, the builders reached sliding unstable ground mass and additional works were necessary.

18

### **3. Progress in the construction of Subsection (Lot) 3**

#### ***Assistance from the contracting authority and from the contractor***

79. The information in this part of the report is based on visits to the construction site, attendance at the monthly progress meetings and information provided in writing by the contractor<sup>18</sup>.
80. It should be noted that, at this stage of monitoring, the observer team obtained assistance both from the team of the contracting authority and from the contractor. The contracting authority set the practice to send information about the upcoming monthly meetings regularly and, during the meetings, the teams of observers had the opportunity to become

<sup>17</sup> Pursuant to the contract, the contractor has the right to incur additional expenses of up to 5% of the value of CAW.

<sup>18</sup> The contractor for Lot 3 encompassing the design and construction of the third subsection is PST Group EAD.

familiar with the oral progress reports and the discussions among the participants, to raise questions and to inspect the construction site with the other participants in the meetings. The team of the contracting authority also assisted the observers in obtaining systematised written information from the contractor<sup>19</sup> which has been used in the development of this report.

***Mobilisation of the contractor and progress in construction: findings from site visits and attendance at monthly working meetings in the period 01.01.2020 – 06.03.2020***

81. The site office is located in the community centre in the village of Zheleznitsa which is quite far from the construction site itself and it is not very effective because time is wasted on travelling from the construction site to the office in Zheleznitsa. Some meetings are held in insufficiently acceptable conditions – on the construction site.

*Matters discussed at monthly meetings*

82. The monthly meeting held in January 2020 made it clear that CAW implementation had begun but the project design regarding environmental protection had not been provided and, respectively, the contractor did not obtain approval or a place for waste disposal. The contractor clarified that one of the reasons was that the Ministry of Environment and Water provided the same site to them and to the contractor for the next section of Lot 3.1 in the direction of Simitli town (i.e., DZZD AM Struma 3.1). This circumstance makes it necessary to look for another site because the one provided has already been occupied by the other contractor. This issue needs to be reviewed and a solution needs to be proposed to avoid such problems in the future.
83. During the working meeting on 14 January 2020, it became clear that the up-to-date schedule for CAW implementation had been provided to the contracting authority right before the meeting. This is the place to emphasise that the schedule for CAW implementation is a fundamental document which determines the progress and control of site implementation as well as the connections between the types of CAW. It is understandable that it may change due to various reasons, but this should not be done at the last minute.
84. Questions about the temporary traffic organisation were also discussed during the meeting. In this regard, the contracting authority remarked that the site entry/exit was not marked sufficiently well and issued oral instructions to involve an additional person – a traffic guard who would give signals and complement the temporary organisation.
85. In this regard, the independent observer recommends to the contracting authority that, in addition to the oral communication, there should also be communication in writing or an order on such matters which are set out in the project design parts “Temporary Traffic Organisation” and “Safety and Health Plan”.

---

<sup>19</sup> After the site visit in the beginning of June 2020, TI-Bulgaria sent questionnaires to the three contractors in which they had the opportunity to reflect data about the progress of construction works, assessments and recommendations for the interaction with the contracting authority and other institutions. This approach is an expression of the understanding that the data and assessments from the monitoring need to be based on precise and accurate information and assessments reflecting the positions of all participants in the process. The contractor for Lot 3 provided information in writing which contributes to a more accurate and detailed reflection of the construction works completed in this report. During the follow-up visits, the observer will request to become acquainted with the order book, records of laboratory tests, declarations and quality certificates which are being stored in the archive of the site office.

### *Visit to the construction site*

86. The visit in January 2020 was conducted immediately after the start of the implementation of construction works. The CAW carried out in the beginning are primarily ground works – excavations where no materials are used and, in practice there was no essential CAW to be inspected or controlled. The site laboratory for tests was not installed yet. As of the date of development of this report<sup>20</sup>, the accredited laboratory is already functioning.
87. During the monthly meeting held in January 2020, a question was raised about subsidence found of the road embankment which was greater than the admissible one. It required additional reinforcement measures which, on its part, entailed a change in the work organisation plan.
88. During the inspections carried out in the beginning of February, March and June 2020 the independent monitor team found that the contractor had mobilised the equipment and workers envisaged to implement the activities laid down in the contract.

### ***Progress in construction: findings from attendance of the monthly working meeting and on-site visit on 05.06.2020***

89. The monthly working meeting and the on-site inspection were conducted at the construction site. The area was inspected, including checks of the reinforcement wall, the shaft to collect waters from the area and the emergency connection.
90. The discussions held made it clear that the contractor had found weak soils in an area located close to Subsection 2 (the tunnel) and deemed it necessary to continue the reinforcement wall via additional works<sup>21</sup>. In this regard, the contracting authority recommended that the request should be justified with the respective documented samples from an examination of the area and the contractor should present them to the RIA for a decision.

*Photographs 10 and 11. Subsection 3 on the side located next to the future tunnel*



<sup>20</sup> 20 June 2020.

<sup>21</sup> Pursuant to the contract, 5% of the total contract amount may be used for additional works.



*Control by the contracting authority*

91. Based on the attendance at discussions in monthly working meetings and the on-site inspections, an assessment can be made that the contracting authority exercises adequate and effective control over the work of the contractor which, at certain points, gives grounds for comments of criticism. In this regard, the following remarks should be pointed out: 1) a more detailed documentation is necessary (more detailed entries in the order book, sample taking and presentation of the respective records, testing of the characteristics of the materials used); 2) regular control should be exercised over the quality of the ground mass used<sup>22</sup>; 3) good drainage is needed is a shaft which will collect water from the area in order to prevent future water inflows and undermining of the existing road E-79; 4) the measures for safe working conditions must be observed taking into account the circumstance that the workers and the machines work immediately next to the busy road E-79.

*Photographs 12 and 13. Laying the foundation of the road. Building an emergency connection*



<sup>22</sup> During the visit referenced, the contracting authority levelled serious criticism at the contractor on account of the quality of the ground mass the contractor intended to use in the foundation of the road in one of the sections under monitoring. As a result of the timely reaction of the contracting authority, this was not allowed.

92. According to information provided by the contractor, as of the date of on-site inspection, the progress of construction works is as follows: overall completion of 32% of the works.
93. The percentage of completion of the individual works is as follows:
- General ordinary excavation ground, including loading, transportation at a distance, unloading at a depot and setting in line with the requirements of the Technical Specifications (TS) – 41%;
  - General ordinary excavation rocks, including loading, transportation at a distance, unloading at a depot and setting in line with the requirements of the TS – 91%;
  - Excavation for equipment, reinforcement walls, including loading, transportation at a distance, unloading at a depot and setting in line with the TS requirements – 47%;
  - Excavation for equipment, depth of up to 4 m, including loading, transportation at a distance, unloading at a depot and setting in line with the TS requirements – 6%;
  - Excavation humus, including loading, transportation at a distance, unloading at a depot and setting in line with the TS requirements – 100 %;
  - Building an embankment with an appropriate material as per the TS and Part 4 of the Norms of Road Design – 37%;
  - Building an embankment of type-1 material for reinforcement walls as per the requirements of the design and the existing TS and Part 4 of the Norms of Road Design – 36%;
  - Clearing the areas within the easement of the road, including felling trees, branches and bushes, grass mowing and removal of all waste as well as the expenses related thereto as per the instructions of the engineer – 100%;
  - Building a water pipe, diameter NPS 150 cm, ravine adjustment, as per the plans and the requirements of the TS, including all expenses related thereto – 22%;
  - Building composite steel concrete rectangular elements, average type СПВ-ПТ 200/200Б, including all expenses related thereto, as per the plans and the requirements of the TS – 44%;
  - Supply and on-site concrete pouring C12/15/B15/ as per the requirements of the TS, for equipment, including casing and all necessary elements without the reinforcement and all expenses related thereto – 19%;
  - Supply and on-site concrete pouring C25/30 as per the requirements of the TS, for equipment, including casing and all necessary elements without the reinforcement and all expenses related thereto – 43%;
  - Building reinforcement embankment walls, including all expenses related thereto as per the TS requirements – 14%;
  - Underpass at km 370+110 – 45%.

### ***Deadlines***

94. The overall deadline for contract performance has been extended by 2 months and the reason is the restriction measures against the dissemination of Covid-19 imposed during the state of emergency. In view of the specifics of the work and the materials used, these measures concern primarily the requirements for the work of the personnel.

## IV. CONCLUSION

### 1. General conclusions

95. The issue with the insufficiently detailed data from geological examination poses certain difficulties both in the design and the construction of sections from the infrastructure site under monitoring. The lack of sufficiently detailed data creates certain obstacles in the work process which results in the need for a series of additional examinations, changes in proposed design solutions, additional ETEC discussions and new coordination with institutions, changes in deadlines for the completion of certain construction works and in the construction materials used.
96. The on-site monitoring found that the construction activity began on time<sup>23</sup> and is being implemented, generally, within the schedule. At the time of development of this report (mid-June 2020), no material difficulties have been found in the work to pose a risk of critical delay in building the infrastructure facility. An exception to this assessment could be made in relation to Subsection 1 where there is a risk of a more substantial delay.
97. The on-site monitoring gives grounds for the assessment that the contractors created the necessary work organisation; in the first lots, management site offices were built immediately next to the area of the construction works while, at the third lot, the office is located in a building in the nearby village of Zheleznitsa.
98. The quality control for the construction materials is carried out both by accredited laboratories built on site and by the contracting authority and experts engaged by it.
99. The monitoring of the monthly working meetings and the on-site inspections give grounds for the assessment that the contracting authority exercises systemic control over the work of the contractors. The RIA team maintains good interaction with the contractors, construction supervision and other experts involved in the meetings and (1) actively seeks information about the progress, emerging issues, and potential risks; (2) gives recommendations on the work organisation and keeps track of their fulfilment; (3) strives to provide assistance in the communication with other government institutions and local authorities within its competence. Based on the monitoring, an assessment can be made that the team of the contracting authority exercises adequate and effective control.
100. During the on-site visits, the independent observer team received the necessary support from the contracting authority and the contractors, getting the opportunity to attend the monthly coordination meetings, to ask questions and to visit the construction site. Two contractors (for Lot 1 and Lot 3) also provided written summarised information about the progress of construction works.
101. To ensure effective monitoring of the implementation of the three public contracts concluded and to develop comprehensive reports, the independent observer needs fast and effective communication with the contracting authority (not only with respect to the access to the construction site but also to the documentation available at the RIA premises) as envisaged in the Integrity Pact.

---

<sup>23</sup>The on-site inspections carried out by the independent observer team show that activities which were preparatory in nature were carried out even earlier than the formal initial deadline set, and they probably aimed to ensure the possibility for a quick start of the essential work.

## 2. Recommendations

102. **Impact of insufficiently comprehensive geological examination on design and construction:** The contracting authority should pay special attention to the geological examination. The comprehensiveness of the examination and the accuracy of the data are key factors to minimise potential risks related to the failure to observe the deadlines set, changes in financial breakdowns, performance of unforeseen activities, use of other materials, performance of additional coordination procedures with other institutions.
103. **A coordinating role of the contracting authority in the design and construction of lots from the same infrastructure site:** In the design of large infrastructure projects built in separate sections with different contractors, the contracting authority needs to play a more effective coordinating role. This is necessary to avoid risks of discrepancies between the design solutions of contractors of adjacent sections. Analogous is the matter with the need to coordinate permits for areas for ground removal issued by other institutions.
104. **Documenting and following up on ETEC recommendations for designs:** When reviewing and approving design solutions, the contracting authority should develop a procedure to provide assurance, by means of documents traceable in writing, that all ETEC notes have been taken into account and reflected both in records of follow-up discussions and in the final designs. In this regard, a possible solution could be to include rules and procedures in the ETEC Regulations which will ensure traceability and control with respect to the recommendations given.
105. **Control over the observance of safe working conditions and traffic safety:** In view of the complexity of the building of the facilities and the risks during excavation works for the tunnel, the strict observance of the requirements for the safety of those working on site needs to continue. Efforts also need to continue to maintain the road marking and clean the international road E-79 which carries intense traffic.

---

The present report has been prepared within the European Commission initiative „Integrity Pacts – Civil Control Mechanism for Safeguarding EU Funds, Phase 2”. The project involves civil monitoring of public procurement procedures funded by European resources in a total of 11 EU Member States. The initiative has been implemented in partnership with 17 non-governmental organizations and is coordinated by the global anti-corruption movement Transparency International.

The initiative aims to establish, through promoting a wider implementation of Integrity Pacts, a preventive mechanism for safeguarding public spending. The application of this instrument in practice demonstrates its importance for complying with the principles of competition, equality and non-discrimination. The Integrity Pact lays down rules for independent civil monitoring of public procurement procedures thus contributing to enhancing transparency and integrity in public procurement.

In Bulgaria the project is implemented by Transparency International – Bulgaria. It conducts monitoring of the call for an open tender for the design and works of Struma motorway, lot 3.1 Zheleznitsa tunnel.

This document has been prepared for the European Commission, however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

© 2020 Transparency International – Bulgaria. All rights reserved.

TRANSPARENCY INTERNATIONAL – BULGARIA

50, Sandor Petofi Str., 1463 Sofia, Bulgaria

T: +359 2 9867713, +359 2 9867920

[mbox@transparency.bg](mailto:mbox@transparency.bg)

<http://integrity.transparency.bg>

<http://transparency.bg>