

TACIS Regional 2000 TRACECA programme

Azerbaijan Highway Project

**Contracts CW2003-1 to Cw2003-4,
Rehabilitation and Upgrading of the Shemkir –
Gazakh Road Sections**

Review of tender documents

August 2003



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A project implemented by
Louis Berger SA Paris France



Louis Berger S.A.
Mercure III 55 Bis quai de Grenelle
75015 Paris



**Rehabilitation of Caucasian Highways
Azerbaijan Georgia and Armenia**

EUROPEAID/113179/C/SV/MULTI



This Project is funded by the European Union

Project Manager's Representative
Baku
Reference PS277113179/SD/003
Tel + 994 12 98 84 31
Fax + 994 12 93 24 76

IGC Traceca

12 August 2003
Subject: Review of the Contracts CW2003 – 1 to CW2003 - 4

For Attention Mr Marc Graille

Dear Sir

With reference to above matter, please find attached the Review of the Contracts CW2003 – 1 to CW2003 - 4 for your attention and consideration.

Yours Sincerely

S I Dotchev
Resident Engineer

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I. Executive summary

The M1 highway forms part of the TRACECA corridor from Baku, Azerbaijan to Poti by the Black Sea. The Road connects the three capitals of the Trans – Caucasian republics: Baku Tbilisi and Yerevan.

The Shemkir – Gazakh road forms part of the main road corridor extending from Alyat near the Caspian Sea in the East to the Georgian border and on through Georgia to the Black Sea coast in the West. In addition to acting as the main link between Azerbaijan and Georgia the road connects a series of cities, regions and their chief towns.

The Shemkir – Gazakh road section begins on the major roundabout Shemkir / Deliler / Gazakh / Baku (km 390) and takes a North-Westward course between Shemkir and Tovuz, keeping on the South side of the Kura valley and crossing a series of tributaries, most notably the Zayam Chay, which descend from the mountains to the South. The alignment of the road is generally good, traversing flat to rolling terrain and with only occasional bends. Its route avoids major settlements, for example it passes between Shemkir and Deliler, both served by short access roads from M1. The exception to this routing is Tovuz which is effectively bisected.

From Tovuz the M1 continues north – Westwards over gently undulating land on the western side of Kura valley. The alignment of the road remains generally good. Agstafa is bypassed to the West, the M1 turning sharply Westwards to run parallel to the Agstev river for the short section to Gazakh. This change of direction takes the road away from the railway which heads north to cross the Kura River near the mouth of the Agstev. Gazakh is also bypassed, the road running along the Southern and Western limits of the town. The road section ends at km 463.8

This is a review of the design and tender documents by the Resident Engineer (Mr. S Dotchev) and the site supervisory staff and in accordance with the Louis Berger SA service contract with European Commission and the Technical Proposal item B.2.1.3 (Project component II, Segment 1.). The purpose of this review is to develop an overview of the design, summarise the experience to date (from the running adjacent section contract CW2002-1, which is a part Lot 1 of the whole Project) and current situation and anticipate follow up action.

The Projects were initially designed by KOCKS CONSULT GMBH. KOCKS prepared contract drawings.

II. Introduction

The Project aims are to sustain the existing and planned World Bank and EBRD programs for financing and co-financing with other International financing Institutions and investors of the reconstruction and rehabilitation of the road connection between the three capitals of the Trans-Caucasian Republics Baku, Tbilisi and Yerevan.

The World Bank has agreed (Credit 3517 AZ) to finance the Rehabilitation and upgrading the existing two lines of Ganja to Gazakh road sections (Azerbaijan Highway Project). The works shall be carried out through International Competitive Bidding (ICB). The first year bidding has been complete for the section from Ganja to Shemkir / Deliler. At present the Contractor is on site and start with the Road works on the first Lot 1, Contract CW2002-1. The second section (Lot 2 from Shemkir / Deliler to Gazakh) has been slice in 4 Contracts 2003-1 to CW2003-4 and package bidding (please see the attached Location Map)

Bidding number	Bidding name & Road section	From road km	To road km	From Project Chainage	To Project Chainage	Section Length km
CW2003-1	Shemkir to km 410	390.8	409.8	0+000	19+000	19.0
CW2003-2	Km 410 to Tovuz	409.8	430.8	19+000	40+000	21.0
CW2003-3	Tovuz to km 445	430.8	451.8	40+000	61+000	21.0
CW2003-4	Km 445 to Gazakh	451.8	463.8	61+000	73+000	12.0

III. Methodology

In absence of a Team Leader – Project Manager the review was undertaken by the Resident Engineer (Mr. S Dotchev) and the local site Supervisory staff employed by Louis Berger SA, for construction of the Lot 1, Contract CW2002-1.

The purpose of this design review has not been to undertake a detailed check on the designers work. Instead it is to develop an overview of the design. In this process it is inevitable that some quite detailed points will be observed in the course of looking at the functionality of the design and these points have been noted as well as those of greater significance.

The first stage involved a review of all the documents. This process identified where design were not completed. The following dominant issue was the appropriateness of the design.

The review has been conducted with the following objectives:

- To assess the suitability of the design with out examination in fine detail
- The need to minimise additional cost from Contractor's potential claims situations
- To establish that the design include rehabilitation and reconstruction on whole existing structure along the Road sections

IV. Background

The Project initially designed by KOCKS CONSULT GMBH. KOCKS prepared contract drawings. The KOCKS's project objective was quote "...To prepare detailed designs with cost estimates, economic appraisal, environmental impact assessment and preparation of tender documents including bill of quantities for the Ujar to Gazakh road section".

The Engineering report goes further – quote "The topographical survey was tied in to the Azerbaijan national grid. Prior to the survey of topographical details a polygonal traverse are established. Permanent concrete traverse points were levelled and connected to the national elevation system. The existing road centre line, cross sections and the proposed corridor of the additional carriageway are surveyed in 50 m intervals, which were reduced to 25 m or less when required by side constrains (e.g. at junctions, build-up areas). The survey also included topographical details like existing roads, tracks, drainage structures, buildings etc." However the bidding documents we have been furnish did not content cross sections".

For the preparation of the detailed design of the road section from Shemkir to Gazakh the Designers claim that – Geotechnical investigations and test have been carried out to provide detailed and updated information and data of the sub grade and existing pavement condition. As the road design follows mainly the existing road alignment, the investigations and the test have been carried out on the existing road and the immediate vicinity taking into consideration a future upgrading.

From Shemkir to Gazakh landscape becomes more hilly. This area consists of sandy-clayish deposits of the quaternal period. Lower quaternal deposits are consisting of clay with changing contents of sand and silt. The upper quaternal deposits are mixture of gravel, coarse sand and bigger stones from alluvial-proluvial periods. Riverbeds consist of course to fine gravel, sand and sandy slit to silty clay.

The design was reviewed by AZERAVTOYOL State Corporation. The Local road design code stipulates that for category II roads (max speed 120 km/hr) the max allowed gradient is 4%.

V. Review of Design and Tender (Bidding) Documents Contracts CW2003-1 to CW2003-4

5.1. Tender Documents to be review

We have been furnished in two lots - firstly July 15 2003, (Contracts CW2003-1 and CW2003-2), and then July 25, 2003 (Contracts CW2003-3 and CW2003-4) with the following bidding documents:

Item	Description	Units
1	Rehabilitation and upgrading of section Shemkir/Deliler to Road km 409.8 Contract CW2003-1, Bidding Document	1
2	Rehabilitation and upgrading of section Road km 409.8 to Tovuz (road km 430.8) Contract CW2003-2, Bidding Document	1
3	Rehabilitation and upgrading of section Tovuz (km 430.8) to road km 451.8 Contract CW2003-3, Bidding Document	1
4	Rehabilitation and upgrading of section road km 451.8 to Gazakh (km 463.8) Contract CW2003-4, Bidding Document	1
5	Rehabilitation and upgrading of section Shemkir/Deliler to Road km 409.8 Contract CW2003-1, Appendix: Drawings	1
6	Rehabilitation and upgrading of section Road km 409.8 to Tovuz (road km 430.8) Contract CW2003-2, Appendix: Drawings	1
7	Rehabilitation and upgrading of section Tovuz (km 430.8) to road km 451.8 Contract CW2003-3, Appendix: Drawings	1
8	Rehabilitation and upgrading of section road km 451.8 to Gazakh (km 463.8) Contract CW2003-4, Appendix: Drawings	1
9	Rehabilitation and upgrading of the Shemkir – Gazakh road section, Engineering report	1

5.2. Review of the Traffic studies

The required traffic survey has been done base on manual classified and automatic counts and the origin destination surveys at selected locations.

Due to restraint with the resources and time we have been able to produced one manual count at km 421+000 only. The count has been done August 8, 2003 from 8.00 to 20.00 hours only. The results as follows:

Year	Car	Pick up	Bus	Truck 2-axle	Truck 3-axle	Truck 4-axle	Truck 5-axle	MB and Tractor
2001 from ER	1612	321	193	46	107	27	81	0
2003 from ER	1943	387	233	53	124	31	94	0
2003 Review	1930	291	45	2001	134	34	26	62

Notes:

- a) First row represent the result from the counting done originally by the Designers (2001), for section Tovuz – Gazakh taken by the Engineering Report, Annual average daily traffic (AADT) by vehicle type
- b) Second row represent the forecast done by the designers
- c) Third row represent the actual figures counted by the Review members
- d) To the benefit of the designers the counting figures are very close to the prediction done. However there are few differences as follows:
 - Bus counting - We have been told that the Buses usually travel during the night and that explain why the Bus figures are quite different.
 - Motorcycles and tractors - During the counting done 2001, numbers of Motorcycles and tractor have been count but because of some unknown reason not included latter on (probably that explain why the numbers in our Review are different).

5.3. Review of Road safety

The design takes into considerations safety of all motorised users. All the road design safety requirements for upgrading the Road are in place (excluding few sections where the gradient is more than the maximum of 4%).

However the request from the World Bank's Representative comes in time and takes into consideration the pedestrian and non-motorised users in the urban area. The request have been accepted by the Client - Ministry of Transport (letter 32/2YNS dated July 22, 2003) and the site walkways shall be build 2 m width for the section Tovuz – Gazakh Road section

5.4. Review of the Existing road conditions

The existing road is mainly a 2 lane road with 7.5 m carriageway and 3.75 m shoulder. The road was constructed to a generally adequate design standard for the reduced traffic. However, poor drainage provisions, poor compaction, poor control of vertical finish, incorrect grading aggregate and the use of poor quality bitumen have resulted in a road with many problematic areas where strengthening/reconstruction is now required.

The present condition of the pavement is subject of large variations. Some parts of the sections along the road are still in acceptable working condition whilst others already reach a critical phase with typical indications such as cracking, potholing and the advanced disintegration of the structural layers.

For more details please see Jacobs Gibbs expert's report on the matter

5.5. Review of Geotechnical Investigations

For more details please see Jacobs Gibbs expert's report on the matter

5.6. Review of Construction material investigations

The designers did extensive field investigation and sampling.

- Have been done more than 15 trial pits at about 6 km apart for determining the structure of existing pavement.
- The Dynamic Cone Penetration Test (DCP) has been done at nominal spacing of 1 km to determine the structural properties of the existing pavement.
- To assess the sub grade condition at the adjacent to existing road area, number of smaller percussion borings (more than 13) has been executed by the Designers.
- Core drillings (more than 18) to provide reliable info for the thickness of the existing asphalt layers at 5 km intervals.
- More than 7 borrow areas have been located.
- Laboratory test has been carry on soil / aggregates and existing asphalt and samples of crushed and uncrushed material and bitumen.
- Soil investigation for bridge foundations has been carry out
- Residual pavement strength has been determined
- Pavement distress and road roughness have been determined

Presently running Lot 1, Contract CW2002-1 which is a part of the whole project is with very similar condition of materials and thereafter is reasonably to expect that the new Contracts should not have any problems with quality materials for construction available with in easy reach.

5.7. Review of Topographic survey

The Designers Engineering report stated – quote “The topographical survey was tied in to the Azerbaijan national grid. Prior to the survey of topographical details a polygonal traverse are established. Permanent concrete traverse points were levelled and connected to the national elevation system. The existing road centre line, cross sections and the proposed corridor of the additional carriageway are surveyed in 50 m intervals, which were reduced to 25 m or less when required by side constrains (e.g. at junctions, build-up areas). The survey also included topographical details like existing roads, tracks, drainage structures, buildings etc.”

Similar statement has been given into the Engineering report for Lot 1, Contract CW2002-1. The Contract is presently running and at the start of the

Contract was evident and latter established that the same Designers did not used a government bench marks and coordinate system but there owns and the surveyed data are not tied in to the Azerbaijan national grid. As a result of that redesigning the longitudinal profile is required for that Project.

The lack of resources, time and painfully long procedure to obtain data for Government bench marks in the vicinity of the Project restricted us to do a detail check up on the topographical survey.

However we have been provided with two government Bench Marks in the vicinity of Gasan Su Chay Bridge. The bridge is separate contract financed by EU and running at present and fully with in the Works of Contract CW2003-3. For the same two Bench Marks we have been provided with elevations given twice by the same Designer ones as Bench Marks as part of the Bridge Project and for second time as Bench Marks as part of the Road Project. From the table below is obvious that the absolute elevation data given for those Bench Marks for each Project are different and not the same. As a part of the running Project we have checked the elevations of those Bench Marks against and tied in with the Government Bench Marks. The results as at the table below.

Bench Mark	Elevation given for the Bridge Project	Elevation given For the Road Project	Elevations tied in with the National grid
	Bridge	Road	Review
108	343.899	343.212	343.314
109	348.078	347.501	347.582

The surveyor works have been done by the same team done the Lot 1, Contract CW2002-1 and Shemkir and Gasan Su Chay Bridges thereafter it's reasonable to be expected that the problems with the surveyor data occur at those Projects shall be similar and is likely that same problems occur on Lot 2 - Contracts.

Recommendations as follows:

- In order to avoid time delay and potential Contractor's claim situation, fully equipped and staffed Surveyor team to check up and verify the design coordination system and elevation marks as soon as possible.

5.8. Review of Detailed planning and engineering design

Proposed road improvement measures include rehabilitation and upgrading on the project road taken into consideration spectrum of standards and investigation studies as follows:

- SNIP 2.05.02-85 Road Design Standard

- Junction design standard 503-0-44
- Marking standard drawings 503-0-04
- Pavement dimensioning in accordance with the TRL road note 31
- Consideration of pavement strength field investigation results
- Consideration of traffic volumes
- Consideration of equivalent standard axles

As a result the existing carriageway shall be rehabilitated/reconstructed or overlaid. Improvement shall include:

- Reconstruction, resurfacing, and/or levelling of selected sections as necessary to achieve a high quality road
- Widening of the road to a uniform road width
- Replacement, widening or strengthening of bridges in need of repair
- Improvement of drainage
- Installation of road marking and road signs

Depending on the existing road condition, rehabilitation cases have been identified, ranging from pavement repair and surface sealing to overlay and to reconstruction.

5.8.1. Road design standards

The geometric design has been carried out in accordance to SNIP 2.05.02-85 for design speed of 120 km/h – flat terrain and 100 km/h – hilly terrain and main determinants as follows:

5.8.1.1. Design parameters

Design element	120 km/h	100 km/h
Minimal radius	800 m	600 m
Maximum gradient	4 %	5 %
Minimal crest curve	15000 m	10000 m
Minimal sag curve	5000 m	2500 m
Minimal Superelevation	1.5 %	1.5 %

5.8.1.2. Transition curves

Radius m	30	50	60	80	150	180	200	250	300	400	500	1000	2000
Transition	30	35	40	45	50	60	70	80	90	100	110	120	100

5.8.1.3. Widening of curves

Radius	850	650	575	425	325	225	140	95	80	70	60	50	40
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Widening	-	0.4	0.5	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.4	1.5	1.8
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5.8.1.4. Road cross section

Description	Meter
Lane width	3.75
Carriageway	7.50
Width of shoulder	3.75
Paved shoulder	0.75

5.8.1.5. Superelevation in curves

Radius m	Superelevation %
1000 to 2000	2.0 – 3.0
800 to 1000	3.0 – 4.0
700 to 800	3.0 – 4.0
700 to 650	4.0 – 5.0
650 to 600	5.0 – 6.0
500 to 600	6.0
450 to 500	6.0
400 to 450	6.0
Less 400	6.0

5.8.1.6. Horizontal alignment

For most of the curves located within the town passage of Tovuz (19 locations) the design has consider the improvement of small existing radius (vary from 95 to 375 m) and improved them mostly to 400 and 500 m

5.8.1.7. Vertical alignment

Improvement of vertical alignment has been done as follows:

- For improvement of gradient purposes – at 5 locations has been done. However due to existing buildings close to existing road it is not possible to improve the gradient at Tovuz Chay road section
- For improvement of vertical curves purpose – at 11 location improved crest curve and at 1 location improving of sag curve has been done

5.8.2. Pavement design

5.8.2.1. Review of Realignment sections

Contracts	Section length (metres)	Realignment length (metres)	Percentage %
CW2003-1	19,000.00	1,654.00	8.70
CW2003-2	21,000.00	1,236.00	5.88
CW2003-3	21,000.00	1,286.00	6.12
CW2003-4	11,869.00	4,313.00	36.25

5.8.2.2. Review of Overlay and Reconstruction sections

Contracts	Section length (metres)	Reconstruction section length (metres)	Percentage %	Overlay section (meters)	Percentage %
CW2003-1	19,000.00	10,763.00	56.64	8,237.00	43.35
CW2003-2	21,000.00	11,850.00	56.42	9,150.00	43.58
CW2003-3	21,000.00	11,230.00	53.47	9,770.00	46.53
CW2003-4	11,869.00	9,062.00	76.35	2,807.00	23.65

Recommendations as follows:

- The reconstruction section km 58+620 to km 61+050 has overlapped the theoretical border line between Contract CW2003-3 and CW2003-4 with in 50 m. The appointed Contractor might have a practical problem to work 50 m length of road section within full rehabilitating profile, thereafter might be advisable to move the border or to shorten the rehabilitated section with 50 m.

5.9. Review of Drainage designs

5.9.1. Review of Culverts structures:

In order to prevent the bad experience we have had with the required works on the culvert structures at the running Contract CW2002-1, comprehensive study has been conducted. The review of the design tender documents (for details see attachment 1) as follows:

- The design documents include 182 locations to work on, however our review have discovered the following,
- There were 2 locations were existing culverts have been quoted but not found in place where checked up. In our opinion on those locations should be build a culvert structures at least 1.0 m diameter pipe culvert.
- Existing culvert structures found in place and include into tender documents are 150
- Existing culvert structures not included into the tender documents but found in place are 30
- Design tender documents calls for 35 new culverts to be built. However 11 culverts structures have been found at the same locations.
- 19 culverts structures have been found completely blocked with ground. Resources and time prevent us from further investigation. During constriction detail information can be obtain.
- Badly displace culverts unit have been located at 3 culvert structures.

- 7 culverts structures have been found that longitudinally have been built with different size units

Recommendations as follows:

- Existing 32 culvert structures not included into the tender documents but found in place to be incorporated into the Contracts
- Those 7 culvert structures built longitudinally with different size culvert units to be replaced with recommended size culvert structure
- Those 3 culvert structures with badly displaced longitudinally culvert units due to poor foundations to be incorporated into the works as to be replaced.
- Those 11 culvert structures named into the tender documents as new, but located on site as existing to be incorporated into the works as to be replaced with recommended size culvert structure.
- Total numbers of culvert structures to work on - to be considered as 212

5.9.2. Review of Bridge structures

The review of the design tender documents (for details see attachment 2) as follows:

- The tender drawings include preliminary bridge design drawings for 11 locations. However no reinforcement drawings, calculations or other detail drawings have been provided for the design tender review. Whole of the structures are to be built with "T" type of reinforced beams.
- Have been noticed that the size of the reinforcement beams vary greatly from 12,15, 18, 21, 22 m long
- 6 new bridge structures to replace the existing ones, to be constructed with different size span configuration
- 3 of the existing bridges to be repaired
- 2 of the existing bridge structures to be replaced by Box culverts

Recommendations as follows:

- Might be advisable to consider standard size span for the new structures instead a spectrum of all different size
- The existing bridge structure at km 5+597 scheduled for repair works by the bidding documents it looks quite worn down (see attached photos – attachment 3) and might be considered for partially or full replacement. The lack of resources and time prevent us from further investigation. Independent expert to be employ and review the structure or

as soon as the prospective Contractor start work the required test can be done and proper advise can be provided.

5.10. Review of Pavement design

For more details please see Jacobs Gibbs expert's report on the matter

5.11. Review of Design road furniture, markings etc

Design takes into consideration the road marking and the required basic road furniture in accordance with the local and international safety and traffic regulation for both motorized and non-motorized traffic.

- Along the project road section minor roads join the main road. These side road connections are in general, unguarded with no road signs, no road marking and little or no signing. Typical road marking details for straight section, steep descent, approach roads and junctions incorporating SNIP 2.05.02-85 are given with drawing F1.
- Drawing F2/F3 consider the road marking applicable at the Bus stop and a Junction. Detail pedestrian crossing is included.
- In areas with high embankment Guard rail are specified - details incorporating standard drawing 503-0-4 are given by tender drawing F4
- Detailed description of placing road traffic signs, informative signs board, road side delineators are given with drawing F5
- Illumination of bus stops and town passages according SNIP 2.05.02-85 has been provided. Standard drawing for lightening of the streets has been prepare in accordance with SNIP II-4-79

5.12. Review of Design drawings

The review on the design drawings as shown below revealed the following:

- The basic required drawings are provided. The drawings are in A3 format and some of the data are difficult to read. We would like to suggest that A1 format is also available to prospective Contractors during the construction works.
- The surveyed existing cross sections, which were taken at 50 m as per the info provided by the Engineering report (item 3, page 9), are not given as an existing cross section drawing (usually provided)
- In our opinion the tie in details (transition) for different type and thickness of pavement structures and required length should be given as well as. Especially that is important for sections where the longitudinal gradient is fixed between two points (by the design drawings), but the type and thickness of the pavement structures is different.

Description	CW1	CW2	CW3	CW4
Index map for general location	Yes	Yes	Yes	Yes
Plan and longitudinal profile	Yes	Yes	Yes	Yes
Profile of Realignment	Yes	Yes	Yes	Yes
Detailed Plan Junctions	Yes	Yes	Yes	Yes
Tie in detail overlay to overlay	No	No	No	No
Tie in detail overlay to reconstruction	No	No	No	No
Tie in detail for realignment	No	No	No	No
Typical cross section of reconstruction road	Yes	Yes	Yes	Yes
Typical cross section of overlaid section	Yes	Yes	Yes	Yes
Typical cross section of road in urban areas	Yes	Yes	Yes	Yes
Existing Cross sections 50 m (25 m) intervals	No	No	No	No
Bridges plan, longitudinal and cross section	Yes	Yes	Yes	Yes
Bridges standard detail drawings	Yes	Yes	Yes	Yes
Typical pipe culverts	Yes	Yes	Yes	Yes
Typical box culverts	Yes	Yes	Yes	Yes
Typical culverts for irrigation canal	Yes	Yes	Yes	Yes
Culverts standard details drawings	Yes	Yes	Yes	Yes
List of culverts structures	Yes	Yes	Yes	Yes
Standard drawings for marking	Yes	Yes	Yes	Yes
Standard drawings for Bus stop	Yes	Yes	Yes	Yes
Standard drawings for Bus stop and junctions	Yes	Yes	Yes	Yes
Standard drawings for Guard Rail	Yes	Yes	Yes	Yes
Standard drawing for Road signs, marker post	Yes	Yes	Yes	Yes
Standard drawing for illumination	Yes	Yes	Yes	Yes
Standard drawing for retaining walls	Yes	Yes	Yes	Yes
Standard drawing for widening of carriageway	Yes	Yes	Yes	Yes
Standard drawing minor junction	Yes	Yes	Yes	Yes
Standard drawing for drainage urban area	Yes	Yes	Yes	Yes
Standard drawing pedestrian crossing	Yes	Yes	Yes	Yes

Recommendations as follows:

- Tie in detail drawings for transition of one type and thickness pavement structures to the other to be provided
- Existing cross sections taken at design stage to be provided in order to verify the earthworks volumes of work.

5.13. Review of Special technical specifications

The Technical specification takes into consideration existing road condition and describes the required appropriate technical action. To the benefit of the project should be noted that the designers has make them self knowledgeable

and aware with the local applicable technical specification codes and standard for construction available into the country.

However when the execution of Works and testing is concern, the reference has been made to too many different standards as follows:

- SNIP – Standard of the Former Soviet Union
- GOST – Former Soviet Union Standard
- DIN – German standard
- BS – British Standard Code of Practice
- BSCP of CP – British Standard Code and Practice
- AASHTO – American Association of State Highway and Transportation Officials
- ASTM – American Society of Testing and Materials
- ISO – International Organization for Standardisation

From the recent experience we have gain into the country running similar projects is that apart form SNIP and partially AASHTO the other standards are not readily available and the Local Contractors are reluctant to furnish with required copies since they face extreme difficulties to obtain copy for them self. On the other hand the testing equipment and laboratories available into the country are mostly equipped to do testing in accordance with the SNIP standard. Local contractors as well as are used to work as per the SNIP standard and take a time to understand and appreciate others standards.

Recommendations as follows:

- For the purpose of those Contracts to accept the used of SNIP and AASHTO standards only

5.14. Review of Quantity & cost estimates

Review and comparison report has been done on the Contracts Bidding Bill of Quantities (for details see the attachments 4). Some of the Contracts Bill of Quantities items when compared have striking differences with the estimated during the review, for instance as follows:

- Earth works item 212 – “Provide place and compact fill to embankment” - vary from 0 m³ (CW2003-4), to 500 m³ (CW2003-2) and from 52150 m³ (CW2003-3) to 6 times bigger quantities of 310550 m³ (CW2003-1). On the other hand in our review of sections required realignment item 5.8.1 above it's obvious that 4,313.00 km or 36.25% of Contract CW2003-4 is with new alignment. Surely some quantity of earthworks has to be constructed. However the cross sections (at 50 m interval as taken) are not provided and thereafter are not possible to comment further objectively on this item.

- For Bill item 301 – “Provide material for capping layer” in our opinion the original volumes of works in general have been underestimated for Contract CW2003-1 with 64%; for Contract CW2003-2 with 13%; for Contract CW2003-3 with 15%
- For Bill item 303 – “Provide granular sub base material” – in our opinion the original volumes of works have been underestimated for Contract CW2003-1 with 69%; for Contract CW2003-2 with 28%; for Contract CW2003-3 with 30%
- Other grossly underestimated item is Bill item 312 – “Provide sub base material to shoulders” – for Contract CW2003-1 with 72%; for Contract CW2003-2 with 42%; for Contract CW2003-3 with 29%

Recommendation as follows:

- Independent Quality Quantity surveyor to verify the tender estimate volumes of Works prior Contracts goes to tender

5.15. Review of Compliance with the Environmental Standards

Environmental impact relating to the rehabilitation of the existing road is direct physical intrusion on the land within the immediate construction corridor, to health and safety conditions within the works – related human settlements, construction camps and work sites and finally to the extraction, the handling and transport of construction materials. At the end construction stage the Contractors are to reinstate and rehabilitate the areas they have worked on and specially at the Borrow areas and along the road reserve.

The designers incorporated into the projects the requirements of the National Regulations and the International Conventions as follows:

a) Under National Regulations has been consider

- Article 31 and 49 – Law of the Republic of Azerbaijan on the Protection of the Environment and the Utilisation of Nature
- Law of Automobile Roads
- Draft Guidelines for Road Construction, Management and Design
- SNIP 2.05.02-85 Regulation on Road Construction
- BCH 8-89 Regulation on Environmental Protection in Construction, Rehabilitation and Maintenance of Road
- No 514 – 1Q July 1998 Regulation of Azerbaijan Republic on Industrial and Municipal Waste
- SNIP III 4 – 80 Norms for Construction Safety
- Safety Regulation for Construction, Rehabilitation and Maintenance of roads 1978 (SNIP III A -11 -70)
- GOST 13508 – 74

b) Under the International Conventions has been consider

- Convention on the Conservatory of Migratory Species of Wild Animals (CMS)
- African – Eurasian Waterbird Agreement (AEWA)

5.16. Review of the Utility relocation

Existing utility lines like water supplies, electricity and telephone services within the road reserve are shown on the drawings.

During the construction it has to be ensured that Contractor does not damage the lines and pipelines are properly protected from construction activities.

The tender documents draw the prospective Contractor's attention to the need to investigate any services diversions or alterations that may be necessary for the purpose of constructing the road.

If such problem emerged the utility relocation shall be coordinated with the concerned departments or agencies according to their requirements for implementing the relocation plan. Such problems are expected at the urban area and shall be dealt accordingly as soon as the problems arise.

5.17. Review of Traffic Diversion / Management during construction

Review of traffic control, safety and diversions plans shall be done during the construction on a particular Contract section. The appointed Contractor is to provide his own plan and method statement including the equipment, longitudinal profile, staff, signals, lane marking and etc.

5.18. Review of Contract Packaging

5.18.1. Review of Bidding document

5.18.1.1. Section I, Invitation for Bids

Para 2/3/6 – consider change the name of Azeravtoyol State Concern with the appropriate one.

5.18.1.2. Section II, Instruction to bidders

Part G, Bidding data, clause 2.1 and clause 19.2/23.1 - Since Azeravtoyol State Concern none exists then the Employer must be define and the name must be change to appropriate.

5.18.1.3. Section V. Contract data

Part G, Bidding data, clause 2.1 and clause 19.2/23.1 - Since Azeravtoyol State Concern none exists then the Employer must be define and the name must be change to appropriate.

5.18.1.4. Section VI Specification

The Project Manager's Representative (Resident Engineer) intentions are not to employ additional staff but to run and complete the new coming Lot 2 Projects with the same staff available, total of 8 Engineers including the Resident Engineer as follows:

- Resident Engineer
- Assistant Resident Engineer/ Highway Engineer
- Structures (Bridge) Engineer
- Structures (Culverts) Engineer
- Quantity Surveyor
- Material Engineer
- Senior Surveyor
- Surveyor

5.18.1.4.1. General Facilities for the Project Manager Staff

- The original idea of the Project (LOT 2, CW2003-1 to CW2003-4) was to be tender and run closely after the first Lot 1, CW2002-1.
- Due to administrative reasons the delay did occur and the tender is not open yet
- The Lot 1 project is running since April 21, 2003 and the Project (15 months) is due to be complete by July 21, 2004.
- In accordance with the last time table of the tender supply by the Client the expected date for the appointed Contractors to start work shall be some where in December 2003.
- The tender calls for completion time for those Projects to be 18 months.
- Thereafter between the end of July 2004 and June 2005 (11 months) the Project Manager's Staff must be facilitate by the nominated Contractors.

Recommendation as follows:

- Each Contract must include and provide basic facilities for the Project Manager's staff in order to facilitate a proper supervision.

5.18.1.4.2. Review of Accommodation for project Manager's staff

Review of the proposed Project Manager's Representative staff accommodations revealed that housing accommodation shall be not adequate and run short of 4 houses since the new Lot 2 projects calls for 4 houses to be supply only.

Recommendation as follows:

- Additional 4 houses must be included in order to facilitate the Project Manager's staff

5.18.1.4.3. Review of Field Equipment

Review of the proposed by the tender documents field equipments staff revealed that problems might arise with the supervision of the surveyor's works and usage of the Total station as only one is to be provided under the Contract CW2003-4 of Lot 2. Since it's not know how many Contractors are to be nominated to do the Works one total station is considered not adequate to do the supervisory surveyors works.

Recommendation as follows:

- Each Contract must provide for total station and required basic equipment and staff

5.18.1.5. Section VIII, Bill of Quantities

Consider verifying the estimated volumes of works as per the recommendations above (see item 5.14.) and implementing them in order to reduce the risk of Contractor's claim.

5.18.2. Review of implementation proposal

5.18.2.1. Resources and International Competitive Bidding

The nature of work as designed requires modern equipment and machinery for milling distressed pats, for the production of bituminous mixes and laying of the mixture, including compaction, and for concreting and bridge construction. However the way the Contracts are structured they suggest the use of locally available resources (materials, personnel, transport and etc). On other hand the regional experience suggest that international firms should associate with locals entities for full integration of locally available resources and for full or partial transfer of the latest technology and know how. The formation of associations between foreign and local entities may be encouraged and for contractual reasons (bonds, guarantees, currencies, insurance, international tender, contract conditions and international specifications).

Recommendations as follows:

- Tender to encourage the association between foreign and local entities.

5.18.2.2. Project Management and supervision of construction's view

The condition of the Contract assign rights, duties and responsibilities to the contracting parties, to the Road Administration and to the Contractor. For correct administration and to assure that the works quality and quantity are constructed as specified, and paid for as contained in the contract, the project Manager and Supervisor is appointed. Louis Berger SA has been appointed as Supervisor by TACIS.

Slicing and structuring the Contracts the way they are, might help for transfer of technology and know how and probably shall benefit the local community, however quality supervision of the works might be compromised if road section of 93 km is work out by 5 different Contractors. The day to day reporting shall take most of the time and the real site quality supervision might be compromised.

At present a local Bridge contractor "Azerkorpu" started with construction works and there are good chances that they might span their contract and overlap with the new coming lot. Thereafter supervising six Contractors at the same time shall be enormous and extremely difficult task.

On the other hand from local experience (Construction of Gasan Su and Shemkir Chay Bridges) gained (Feb 2003 to date) have been noticed that the local contractors do not understand the reason, the meaning, the requirements and necessitates for quality supervision and they do not willing to cooperate.

Recommendations as follows:

- In order to provide quality supervision with international standards it is advisable, the tender to combine the four sections in to two or one and thereafter to reduce the prospective Contractors (including present running Contract CW2002-1), working at the same time to three or two.

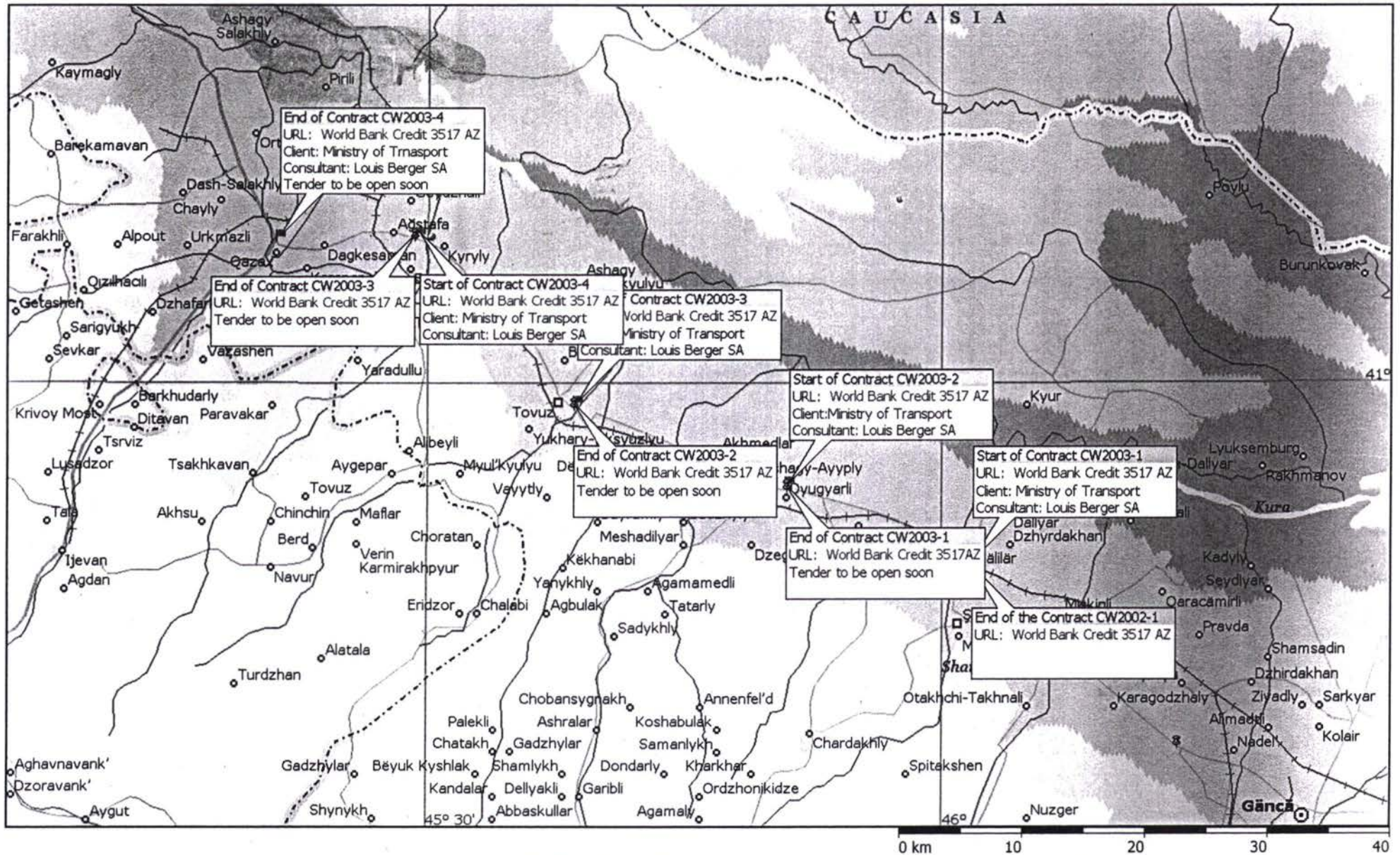
VI. Conclusions

Item	Description	Recommendations
5.7	Review of topographic al survey	In order to avoid time delay and potential Contractor's claim situation, fully equipped and staffed Surveyor team to check up and verify the design coordination system and elevation marks as soon as possible.
5.8.2.2	Overlay and Reconstructi on sections	The reconstruction section km 58+620 to km 61+050 has overlapped the theoretical border line between Contract CW2003-3 and CW2003-4 with in 50 m. The appointed Contractor might have a practical problem to work 50 m length of road section within full rehabilitating profile, thereafter might be advisable to move the border or to shorten the rehabilitated section with 50 m.
5.9.1	Review of culvert structures	<p>Existing 32 culvert structures not included into the tender documents but found in place to be incorporated into the Contracts</p> <p>Those 7 culvert structures built longitudinally with different size culvert units to be replaced with recommended size culvert structure</p> <p>Those 3 culvert structures with badly displaced longitudinally culvert units due to poor foundations to be incorporated into the works as to be replaced.</p> <p>Those 11 culvert structures named into the tender documents as new, but located on site as existing to be incorporated into the works as to be replaced with recommended size culvert structure.</p> <p>Total numbers of culvert structures to work on - to be considered as 212</p>
5.9.2	Review of Bridge structures	<p>Might be advisable to consider standard size span for the new structures instead a spectrum of all different sizes</p> <p>The existing bridge structure at km 5+597 scheduled for repair works by the bidding documents it looks quite worn down (see attached photos) and might be considered for partially or full replacement. The lack of recourses and time</p>

		prevent us from further investigation. Independent expert to be employ and review the structure or as soon as the prospective Contractor start work the required test can be done and proper advise can be provided.
5.12.	Review of design drawings	Tie in detail drawings for transition of one type and thickness pavement structures to the other to be provided Existing cross sections taken at design stage to be provided in order to verify the earthworks volumes of work.
5.13	Technical specification	For the purpose of those Contracts to accept the used of SNIP and AASHTO standards only
5.14	Review of quantity and cost estimates	Independent Qualify Quantity surveyor to verify the tender estimate volumes of Works prior Contracts goes to tender
5.18.1.1	Section I, invitation to Bids	Para 2/3/6 – consider change the name of Azeravtoyol State Concern with the appropriate one.
5.18.1.2	Section II, instruction to bidders	Part G, Bidding data, clause 2.1 and clause 19.2/23.1 - Since Azeravtoyol State Concern none exists then the Employer must be define and the name must be change to appropriate.
5.18.1.3	Section V, Contract data	Part G, Bidding data, clause 2.1 and clause 19.2/23.1 - Since Azeravtoyol State Concern none exists then the Employer must be define and the name must be change to appropriate.
5.18.1.4.1	Facilities to the PM	Each Contract must include and provide basic facilities for the Project Manager's staff in order to facilitate a proper supervision
5.18.1.4.2	Accommodations	Additional 4 houses must be included in order to facilitate the Project Manager's staff
5.18.1.4.3	Field equipment	Each Contract must provide for total station and required basic equipment and staff
5.18.2.1	Competitive bidding	Tender to encourage the association between foreign and local entities.
5.18.2.2	Consultant's	In order to provide quality supervision with

	view	international standards it is advisable, the tender to combine the four sections in to two or one and thereafter to reduce the prospective Contractors (including present running Contract CW2002-1), working at the same time to three or two.
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VII. Attachments



**Contracts CW2003-1 to CW2003-4, Rehabilitation and Upgrading Road Section
 Shemkir - Gazakh, Azerbaijan**

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

addendum1

Item	Chainage	Description of the Existing Structure	Flow Direction	Existing Length	Action	New Length according to the project (m)	Size According to the project	Demolishing Required (m)	Extension Required		New Unit Required (m)	New In/out Structure		Cleaning	Length C/L to HW		REMARKS
									J RHS (m)	K LHS (m)		M RHS	N LHS		P RHS	Q LHS	
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1n	0+370	Φ1000 P	L-R	23.00	Replace	25.77	Φ1250 P	Yes				1	1	Yes			
2e	0+789	Φ1000 P	L-R	16.00	Rehabilitate	16.29	Φ1000 P	No				1	1	Yes			
3e	1+429	Φ1000 P	L-R	17.00	Rehabilitate	17.40	Φ1000 P	No				1	1	Yes			
4e	3+117	Φ1000 P	L-R	19.00	Rehabilitate	19.11	Φ1000 P	No				1	1	Yes			
5e	3+451	Φ1000 P	L-R	16.00	Rehabilitate	16.16	Φ1000 P	No				1	1	Yes			
6e	3+799	Φ1000 P	L-R	17.00	Rehabilitate	17.22	Φ1000 P	No				1	1	Yes			
7n	4+070		L-R		New	27.79	3*1250P	N/A						Yes			
8e	4+410	Φ1000 P	L-R	16.00	Rehabilitate	16.67	Φ1000 P	No				1	1	Yes			
9n	4+908		L-R		New	27.79	2*1250P	N/A						Yes			
10e	5+103	Φ1000 P	L-R	19.00	Rehabilitate	18.76	Φ1000 P	No				1	1	Yes			
11e	5+875	Φ1000 P	L-R	19.00	Rehabilitate	26.43	2500*2000 B	No				1	1	Yes			
12n	5+889		L-R		New	17.46	Φ1250 P	N/A						Yes			
13e	6+348	Φ1000 P	L-R	15.00	Rehabilitate	26.24	Φ1000 P	No				1	1	Yes			
14e	6+650	Φ1000 P	L-R	18.00	Rehabilitate	18.66	Φ1000 P	No				1	1	Yes			
15e	7+247	Φ1000 P	L-R	15.00	Rehabilitate	15.45	Φ1000 P	No				1	1	Yes			
16n	7+405		L-R		New	26.78	3*1250P	N/A						Yes			
1	7+690	Φ1000 P	L-R	14.00	Rehabilitate			No				1	1	Yes			Not found into design
17n	7+780		L-R		New	30.84	3*1250P	N/A						Yes			
18e	7+964	Φ1000 P	L-R	14.00	Rehabilitate	13.35	Φ1000 P	No				1	1	Yes			
19e	8+182	Φ1000 P	L-R	15.00	Rehabilitate	15.29	Φ1000 P	No				1	1	Yes			
20n	8+415		L-R		New	25.79	Φ1250 P	N/A						Yes			
2	8+582	Φ1000 P	L-R	19.00	Rehabilitate			No				1	1	Yes			Not found into design
21e	8+948	Φ1200 P	L-R	16.00	Rehabilitate	16.57	Φ1000 P	No				1	1	Yes			
22e	9+721	Φ1000 P	L-R	15.00	Rehabilitate	15.23	Φ1000 P	No				1	1	Yes			
23n	9+928	Φ1000 P	L-R	16.00	Replace	26.51	2*1250P	Yes				1	1	Yes			
24e	11+070	Φ800 P-Φ1000 P	L-R	44.00	Replace	47.56	Φ1000 P	Yes				1	1	Yes			
25e	11+106	2000*1700 B	L-R	17.00	Replace	16.80	2000*2000 B	Yes				1	1	Yes			
														Yes			
3	11+326	Φ1400 P	L-R	18.00	Rehabilitate			No				1	1	Yes			Not found into design
27n	11+563		L-R		New	30.84	3*1250P	N/A						Yes			
4	12+063	Φ1000 P	L-R	15.00	Rehabilitate			No				1	1	Yes			Not found into design
28e	12+738	Φ1000 P	L-R	14.00	Rehabilitate	15.20	Φ1000 P	No				1	1	Yes			
29e	13+169	Φ1000 P	L-R	15.00	Rehabilitate	16.27	Φ1000 P	No				1	1	Yes			
30n	13+230		L-R		New	26.78	Φ1250 P	N/A						Yes			
														Yes			
32e	13+947	Φ1500P	L-R	27.00	Rehabilitate	27.87	Φ1500 P	No				1	1	Yes			
36																	

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

addendum1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	Yes	P	Q	R
33n	14+015		L-R		New	36.88	3*1250 P	N/A						Yes			
34e	14+737	Φ700P	L-R	15.00	Replace	14.99	Φ1000 P	Yes				1	1	Yes			
5	14+837	Φ1000 P	L-R	28.00	Rehabilitate			No				1	1	Yes			Not found into design
35e	15+151	Φ1000 P	L-R	17.00	Rehabilitate	17.21	Φ1000 P	No				1	1	Yes			
36n	15+421		L-R		New	41.03	4000*2500 B	N/A						Yes			
37e	15+883	Φ1000 P	L-R	17.00	Rehabilitate	21.51	Φ1000 P	No				1	1	Yes			
38e	15+965	Φ1000 P	L-R	21.00	Rehabilitate	19.38	Φ1000 P	No				1	1	Yes			
6	16+365	Φ1000 P	L-R	18.00	Rehabilitate			No				1	1	Yes			Not found into design
39n	16+788		L-R		New	29.48	3000*2500 B	N/A						Yes			
40n	17+318	Φ1000 P	L-R	17.00	Replace	19.67	Φ1250 P	Yes				1	1	Yes			
41n	17+347	2000*2000 B	L-R	21.00	Replace	18.00	2000*2000 B	Yes				1	1	Yes			
42n	17+429	Φ1500P	L-R	15.00	Replace	23.73	Φ1250 P	Yes				1	1	Yes			
43e	17+731	2000*2000 B	L-R	22.00	Rehabilitate	26.37	2000*2000 B	No				1	1	Yes			
44e	18+141	Φ800 P-Φ1000 P	L-R	15.00	Replace	15.21	Φ1000 P	Yes				1	1	Yes			
45e	18+409	Φ1000 P	L-R	21.00	Rehabilitate	20.43	Φ1000 P	No				1	1	Yes			
46n	18+460		L-R		New	35.52	3000*2500 B	N/A						Yes			
47e	18+609	Φ800 P	L-R	19.00	Replace	19.59	Φ1000 P	Yes				1	1	Yes			
48e	18+797	Φ1000 P	L-R	15.00	Rehabilitate	17.62	Φ1000 P	No				1	1	Yes			
7	19+797	Φ800 P	L-R	21.00	Rehabilitate			No				1	1	Yes			Not found into design
49e	20+988	2000*1300 B	L-R	15.00	Replace	13.86	Φ1000 P	Yes				1	1	Yes			
50e	21+074	Φ1000 P	L-R	15.00	Rehabilitate	13.93	Φ1000 P	No				1	1	Yes			
														Yes			
														Yes			
53e	21+693	Φ1000 P	L-R	14.00	Rehabilitate	13.99	Φ1000 P	No				1	1	Yes			
8	21+893	2000*1000 B	L-R	23.00	Rehabilitate			No				1	1	Yes			Not found into design
54e	22+136	Φ1000 P	L-R	14.00	Rehabilitate	13.63	Φ1000 P	No				1	1	Yes			
55e	22+148	Φ1000 P	L-R	13.00	Rehabilitate	12.76	Φ1000 P	No				1	1	Yes			
56e	22+379	Φ1000 P	L-R	15.00	Rehabilitate	22.09	Φ1000 P	No				1	1	Yes			
57n	22+726	Φ500 P-Φ800 P	L-R	34.00	Replace	24.74	2*1250 P	Yes				1	1	Yes			
9	22+926	Φ800 P	L-R	13.00	Rehabilitate			No				1	1	Yes			Not found into design
58e	23+359	1700*700 B	L-R	17.00	Replace	25.72	Φ1250 P	Yes				1	1	Yes			
59e	23+948	Φ800 P	L-R	15.00	Replace	14.59	Φ1000 P	Yes				1	1	Yes			
60e	24+024	Φ800 P	L-R	14.00	Replace	14.51	Φ1000 P	Yes				1	1	Yes			
61e	24+521	Φ1500 P	L-R	18.00	Rehabilitate	18.47	Φ1500 P	No				1	1	Yes			
62e	24+687	Φ1000 P	L-R	14.00	Rehabilitate	14.41	Φ1000 P	No				1	1	Yes			
10	24+887	Φ1000 P	L-R	15.00	Rehabilitate			No				1	1	Yes			Not found into design
63e	25+113	Φ1000 P	L-R	14.00	Rehabilitate	14.51	Φ1000 P	No				1	1	Yes			
64n	25+688		L-R		New	33.34	4000*2500 B	N/A						Yes			
65e	25+721	Φ1000 P	L-R	16.00	Rehabilitate	15.50	Φ1000 P	No				1	1	Yes			
66e	26+149	Φ1000 P	L-R	15.00	Replace	15.51	Φ1250 P	Yes				1	1	Yes			
11	26+449	Φ1000 P	L-R	15.00	Rehabilitate			No				1	1	Yes			Not found into design
														Yes			
42																	

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

addendum1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	Yes	P	Q	R
68e	27+018	Φ1000 P	L-R	15.00	Rehabilitate	14.18	Φ1000 P	No				1	1	Yes			
69e	27+123	Φ1500 P	L-R	13.00	Rehabilitate	14.09	Φ1500 P	No				1	1	Yes			
70e	27+543	1800*1000 B	L-R	33.00	Replace	34.83	2000*2000 B	Yes				1	1	Yes			
71e	27+643	2*2000*2000 B	L-R	33.00	Rehabilitate	34.42	2*2000*2000 B	No				1	1	Yes			
12	27+743	Φ1200 P	L-R	17.00	Rehabilitate			No				1	1	Yes			Not found into design
72e	27+944	Φ1000 P	L-R	13.00	Rehabilitate	14.35	Φ1000 P	No				1	1	Yes			
73e	28+050	Φ1000 P	L-R	20.00	Replace	19.86	Φ1250P	Yes				1	1	Yes			
13	28+150	Φ1000 P	L-R	16.00	Rehabilitate			No				1	1	Yes			Not found into design
74e	28+481	Φ800 P	L-R	15.00	Replace	15.83	Φ1000 P	Yes				1	1	Yes			
75n	28+580		L-R		New	24.74	Φ1250P	N/A						Yes			
76e	28+620	Φ800 P	L-R	16.00	Replace	15.87	Φ1000 P	Yes				1	1	Yes			
77e	28+790	Φ800 P	L-R	15.00	Replace	15.54	Φ1000 P	Yes				1	1	Yes			
78e	28+999	Φ1000 P	L-R	15.00	Rehabilitate	18.05	Φ1000 P	No				1	1	Yes			
														Yes			
80e	29+461	Φ1000 P	L-R	15.00	Rehabilitate	15.60	Φ1000 P	No				1	1	Yes			
14	29+561	Φ1000 P	L-R	15.00	Rehabilitate			No				1	1	Yes			Not found into design
81e	29+952	Φ1000 P	L-R	14.00	Rehabilitate	14.20	Φ1000 P	No				1	1	Yes			
82n	30+000		L-R		New	28.24	3*1250 P	N/A						Yes			
15	30+300	Φ700 P-Φ1000 P	L-R	80.00	Replace			Yes				1	1	Yes			Not found into design
83n	30+538		L-R		New	34.84	Φ1250 P	N/A						Yes			
84e	30+892	Φ700 P	L-R	15.00	Replace	13.94	Φ1000 P	Yes				1	1	Yes			
85e	31+154	Φ800 P	L-R	15.00	Replace	17.99	Φ1000 P	Yes				1	1	Yes			
86e	31+515	Φ1500 P	L-R	16.00	Rehabilitate	15.80	Φ1500 P	No				1	1	Yes			
16	31+615	Φ1000 P	L-R	15.00	Rehabilitate			No				1	1	Yes			Not found into design
87e	31+962	Φ1000 P	L-R	15.00	Rehabilitate	14.57	Φ1000 P	No				1	1	Yes			
88e	32+096	2400*1000 B	L-R	15.00	Replace	15.55	2000*2000B	Yes				1	1	Yes			
89e	32+611	Φ1000 P	L-R	15.00	Rehabilitate	15.01	Φ1000 P	No				1	1	Yes			
90e	32+876	Φ1000 P	L-R	16.00	Rehabilitate	16.68	Φ1000 P	No				1	1	Yes			
91e	33+096	Φ1000 P	L-R	16.00	Rehabilitate	16.03	Φ1000 P	No				1	1	Yes			
92e	33+351	Φ1000 P	L-R	16.00	Rehabilitate	14.22	Φ1000 P	No				1	1	Yes			
93e	33+643	2000*1000 B	L-R	15.00	Replace	15.22	2000*2000B	Yes				1	1	Yes			
94e	33+832	Φ1000 P	L-R	15.00	Rehabilitate	14.10	Φ1000 P	No				1	1	Yes			
95e	34+073	Φ1000 P	L-R	15.00	Rehabilitate	15.24	Φ1000 P	No				1	1	Yes			
96e	34+379	2*(2000*2000)+1,6*2,0	L-R	20.00	Replace	20.16	2000*2000B	Yes				1	1	Yes			
97n	34+400		L-R		New	37.08	2*1250 P	N/A						Yes			
98e	35+076	400*400 B	L-R	13.00	Replace	11.68	Φ1250 P	Yes				1	1	Yes			
99e	35+533	Φ1000 P	L-R	17.00	Rehabilitate	19.99	Φ1000 P	No				1	1	Yes			
100n	35+770		L-R		New	26.73	2*1250 P	N/A						Yes			
101n	36+100		L-R		New	27.10	2*1250 P	N/A						Yes			
102e	36+211	Φ1000 P	L-R	19.00	Rehabilitate	19.17	Φ1000 P	No				1	1	Yes			
17	36+361	Φ1000 P	L-R	17.00	Rehabilitate			No				1	1	Yes			Not found into design
														Yes			

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

addendum1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
104n	38+575	Φ1000 P	L-R	11.00	Replace	13.24	Φ1250 P	Yes				1	1	Yes			
105e	38+591	2000*2000 B	L-R	14.00	Rehabilitate	13.32	2000*2000 B	No				1	1	Yes			
18	38+796	Φ800 P	L-R	12.00	Rehabilitate			No				1	1	Yes			Not found into design
106e	39+377	Φ700 P	L-R	19.00	Replace	19.85	Φ1250 P	Yes				1	1	Yes			
107e	40+778	1700*300 B	L-R	10.00	Replace	9.29	2000*2000 B	Yes				1	1	Yes			
108e	41+896	2*(2500*2500) B	L-R	42.00	Replace	51.68	3000*3500 B	Yes				1	1	Yes			
109e	42+241	Φ800 P	L-R	15.00	Replace	16.38	Φ1000 P	Yes				1	1	Yes			
110e	42+518	Φ700 P	L-R	16.00	Replace	16.13	Φ1250 P	Yes				1	1	Yes			
														Yes			
111e	42+872	Φ700 P	L-R	15.00	Replace	14.63	Φ1250 P	Yes				1	1	Yes			
														Yes			
112e	43+188	Φ800 P	L-R	16.00	Replace	16.40	Φ1250 P	Yes				1	1	Yes			
113e	43+454	Φ800 P	L-R	15.00	Replace	16.13	Φ1250 P	Yes				1	1	Yes			
114e	43+772	Φ1000 P	L-R	16.00	Replace	16.57	Φ1250 P	Yes				1	1	Yes			
115e	44+040	Φ1000 P-Φ700 P	L-R	21.00	Replace	19.00	Φ1250 P	Yes				1	1	Yes			
														Yes			
117n	44+450		L-R		New	33.29	4000*2500 B	N/A						Yes			
118n	45+075		L-R		New	17.90	2*1250 P	N/A						Yes			
119e	45+099	Φ700 P	L-R	17.00	Replace	13.41	Φ1250 P	Yes				1	1	Yes			
120e	45+515	Φ1200 P	L-R	17.00	Replace	16.59	Φ1250 P	Yes				1	1	Yes			
121e	45+804	Φ700 P	L-R	16.00	Replace	13.85	Φ1250 P	Yes				1	1	Yes			
122e	46+242	1900*3500 B	L-R	15.00	Replace	13.81	2000*2000 B	Yes				1	1	Yes			
123e	46+504	2Φ800 P	L-R	20.00	Rehabilitate	15.33	Φ1250 P	No				1	1	Yes			
21	46+704	2000*2000B+Φ1000P	L-R	30.00	Replace			Yes				1	1	Yes			Not found into design
22	47+204	Φ800 P	L-R	16.00	Replace			Yes				1	1	Yes			Not found into design
124e	47+730	2000*2000B	L-R	13.00	Rehabilitate	13.54	2000*2000 B	No				1	1	Yes			
125e	48+108	Φ800 P	L-R	14.00	Replace	13.27	Φ1250 P	Yes				1	1	Yes			
126e	48+396	2000*2000B	L-R	12.00	Rehabilitate	15.64	2000*2000 B	No				1	1	Yes			
127e	48+608	Φ800 P	L-R	17.00	Replace	15.97	Φ1250 P	Yes				1	1	Yes			
128e	49+066	Φ1200 P	L-R	16.00	Replace	15.39	Φ1250 P	Yes				1	1	Yes			
														Yes			
														Yes			
23	49+675	culvert blocked	L-R	15.00	To confirm			?						Yes			Not found into design
131e	50+155	4000*4000B	L-R	31.00	Replace	21.27	4000*5000 B	Yes				1	1	Yes			
132e	50+845	Φ800 P	L-R	13.00	Replace	14.18	Φ1250 P	Yes				1	1	Yes			
133e	50+964	Φ700 P	L-R	18.00	Replace	18.57	Φ1250 P	Yes				1	1	Yes			
24	51+064	culvert blocked	L-R	18.00	To confirm			?				1	1	Yes			Not found into design
134n	51+410	Φ700 P	L-R	13.00	Replace	23.18	2*1250 P	Yes				1	1	Yes			
														Yes			
136e	51+648	Φ700 P	L-R	14.00	Replace	14.33	Φ1000 P	Yes				1	1	Yes			
25	51+800	culvert blocked	L-R	14.00	To confirm			?				1	1	Yes			Not found into design
														Yes			
138e	52+360	Φ700 P	L-R	16.00	Replace	19.17	Φ1250 P	Yes				1	1	Yes			
26	52+960	culvert blocked	L-R	15.00	To confirm			?				1	1	Yes			Not found into design

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

addendum1

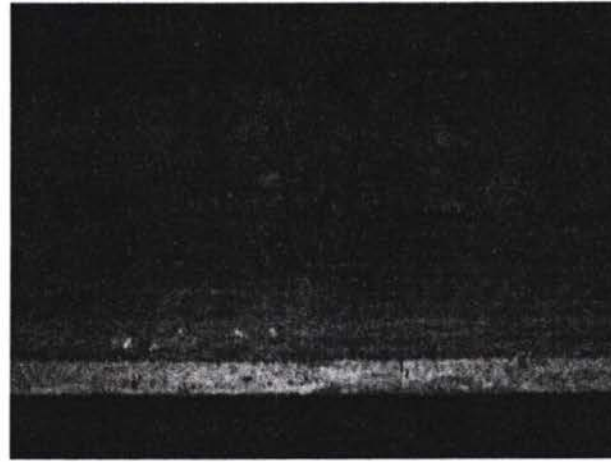
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139e	53+435	Φ1000 P	L-R	15.00	Replace	18.33	Φ1250 P	Yes				1	1	Yes			
140e	53+456	Φ700 P	L-R	15.00	Replace	15.18	Φ1250 P	Yes				1	1	Yes			
141e	53+697	Φ700 P	L-R	14.00	Replace	14.86	Φ1000 P	Yes				1	1	Yes			
														Yes			
143e	53+981	Φ700 P	L-R	12.00	Replace	38.52	Φ1000 P	Yes				1	1	Yes			
144e	54+121	Φ700 P	L-R	13.00	Replace	11.98	Φ1000 P	Yes				1	1	Yes			
145e	54+323	Φ700 P	L-R	13.00	Replace	14.07	Φ1250 P	Yes				1	1	Yes			
146e	54+505	Φ1200 P	L-R	15.00	Replace	13.91	Φ1250 P	Yes				1	1	Yes			
147e	54+588	Φ1200 P	L-R	20.00	Replace	16.86	Φ1250 P	Yes				1	1	Yes			
148e	54+924	Φ1000 P	L-R	13.00	Replace	19.42	Φ1250 P	Yes				1	1	Yes			
149e	55+405	Φ700 P	L-R	14.00	Replace	15.65	Φ1250 P	Yes				1	1	Yes			
														Yes			
151e	57+002	Φ1000 P	L-R	15.00	Replace	13.13	Φ1250 P	Yes				1	1	Yes			
152e	57+091	Φ700 P	L-R	15.00	Replace	15.37	Φ1250 P	Yes				1	1	Yes			
153n	57+380	Φ700 P	L-R	13.00	Replace	25.23	Φ1250 P	Yes				1	1	Yes			
154e	58+123	700*500 B	L-R	12.00	Replace	14.11	Φ1250 P	Yes				1	1	Yes			
27	58+223	Φ800 P	L-R	13.00	Replace			Yes				1	1	Yes			Not found into design
155e	58+519	Φ1000 P	L-R	13.00	Replace	14.53	Φ1250 P	Yes				1	1	Yes			
156e	58+545	3000*1000 B	L-R	15.00	Replace	16.27	2*1000 P	Yes				1	1	Yes			
157n	58+756	Φ700 P	L-R	17.00	Replace	20.25	Φ1250 P	Yes				1	1	Yes			
28	59+156	Φ700 P	L-R	13.00	Replace			Yes				1	1	Yes			Not found into design
158e	59+593	750*500 B	L-R	16.00	Replace	16.96	Φ1250 P	Yes				1	1	Yes			
159n	59+850		L-R		New	35.79	4000*2500 B	N/A						Yes			
160e	60+986	800*700 B	L-R	14.00	Replace	14.01	Φ1250 P	Yes				1	1	Yes			
161n	62+050		L-R		New	38.34	3000*2500 B	N/A						Yes			
162e	62+449	Φ800 P	L-R	24.00	Replace	23.67	Φ1000 P	Yes				1	1	Yes			
163e	62+627	Φ500-Φ800 P	L-R	27.00	Replace	20.85	Φ1250 P	Yes				1	1	Yes			
164e	63+233	Φ1000 P	L-R	22.00	Rehabilitate	23.28	Φ1000 P	No				1	1	Yes			
165e	63+744	Φ800 P	L-R	23.00	Replace	23.52	Φ1000 P	Yes				1	1	Yes			
166e	64+039	Φ1200 P	L-R	23.00	Replace	23.25	Φ1250	Yes				1	1	Yes			
167e	64+456	Φ1000 P	L-R	25.00	Rehabilitate	24.92	Φ1000 P	No				1	1	Yes			
168e	65+004	4000*1500 B	L-R	14.00	Replace	29.30	4000*2000 B	Yes				1	1	Yes			
169e	65+725	1500*2000 B	L-R	16.00	Replace	18.36	2000*1500 B	Yes				1	1	Yes			
170e	67+033	Φ800 P	L-R	24.00	Replace	46.36	Φ1250 P	Yes				1	1	Yes			
171e	66+320	Φ1000 P	L-R	36.00	Replace	35.81	Φ1250 P	Yes				1	1	Yes			
172e	67+612	Φ1000 P	L-R	35.00	Rehabilitate	33.70	Φ1000 P	No				1	1	Yes			
173e	67+880	Φ1000 P	L-R	32.00	Rehabilitate	30.64	Φ1000 P	No				1	1	Yes			
174e	68+095	Φ1200 P	L-R	34.00	Rehabilitate	32.93	Φ1000 P	No				1	1	Yes			
175e	98+654	4000*4000 B	L-R	25.00	Replace	25.13	4500*3500 B	Yes				1	1	Yes			
29	68+954	Φ1000 P	L-R	41.00	Rehabilitate			No				1	1	Yes			Not found into design
176e	69+427	3*(3000*4000) B	L-R	59.00	Rehabilitate	71.15	3*(3000*4000)	No				1	1	Yes			
30	69+600	Φ800 P	L-R	22.00	Replace			Yes				1	1	Yes			Not found into design
177e	70+250	2000*1000 B	L-R	17.00	Replace	23.00	2000*2000 B	Yes				1	1	Yes			
178e	70+361	2500*2500 B	L-R	43.00	Replace	33.42	3500*3500	Yes				1	1	Yes			

Comprehensive study on the existing culvert structures Contracts CW2003-1 to Cw2003-2 done by the Louis Berger site office

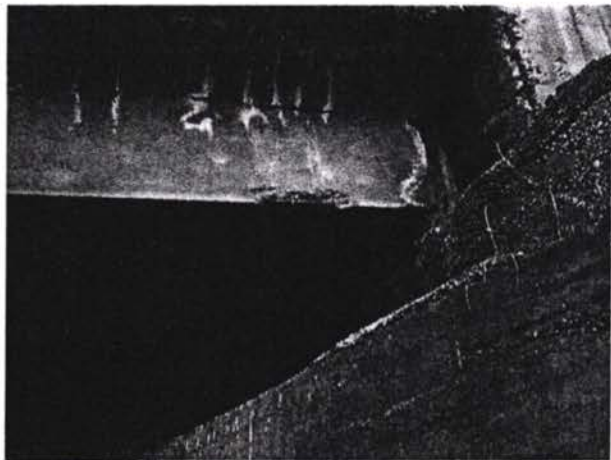
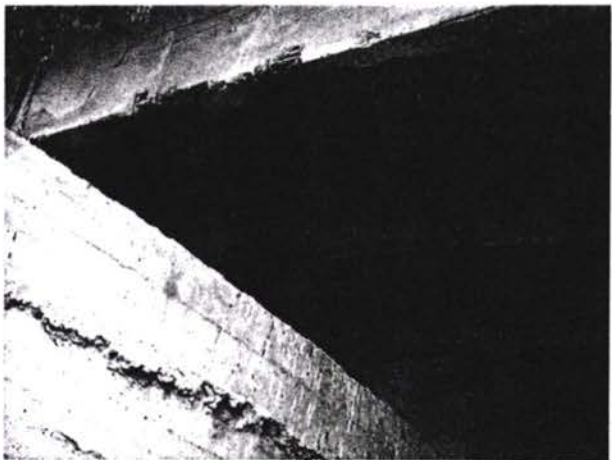
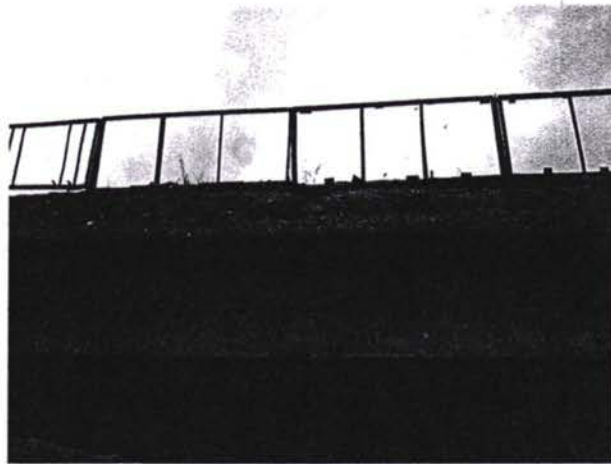
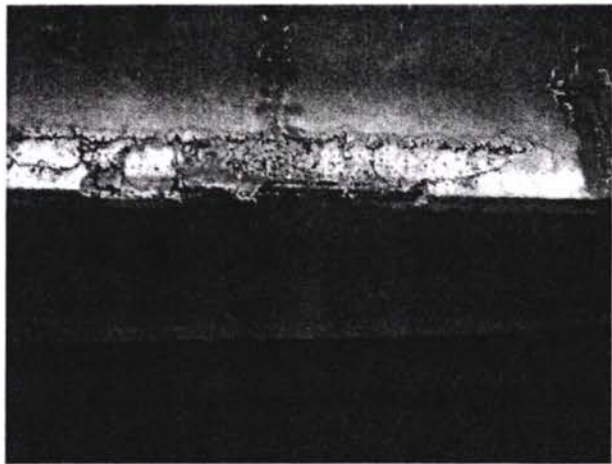
addendum1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
179e	71+562	Φ800 P	L-R	15.00	Replace	15.75	Φ1000 P	Yes				1	1	Yes				
180n	71+641	2000*2000 B	L-R	16.00	Replace	17.66	2000*2000 B	Yes				1	1	Yes				
181e	71+851	2000*2000 B	L-R	15.00	Rehabilitate	16.26	2000*2000 B	No				1	1	Yes				
														Yes				
Notes										Definitions:								
	Action																	
1		Tender design documents calls for work to be done on							182	Replace: When new structure is to replace the existing culvert structure								
2		Our study discovered additional existing culverts							30									
3		Total culverts to work on those Projects							212	Rehabilitation: When the repair works are done on existing culvert structure								
4		Total existing culverts including those discovered by our study							150									
5	new/rep	Design calls for building originally 35 new culverts, but 11 are on site existing							24	New: When there is no existing culvert structure								
6	confirm																	
7	replace	In tender 5 and new found 2 culverts are build with different size units							7	To confirm: When the structure is blocked and require labour to open up								
8	new																	
9	replace	Displaced units for 2 (tender) and 1 new found culverts due to poor foundations							3									
Recommendations																		
										1	2	3	4	5	6	Total	Page	
1		Existing culverts discovered during the study to be included							32	4	12	12	26	33	2	89		Replace
2		Those culverts build with different size units to be replaced							7	22	23	22	5	7	1	80		Rehabilitation
3		Those locations where the units are badly displaced to be replace							3	8	5	6	3	2	0	24		New
4		To include the new culverts missing from the schedule							2	2	2	2	10	2	1	19		To confirm
										36	42	42	44	44	4	212		Each page
Comprehensive study done by:																		
		Assistant Resident Engineer - Bridges								Kerim Mamedov								
		Structural Engineer								Allahveren Hajiyev								
Checked up																		
Approved by:																		
		Project Manager' Representative Resident Engineer								Svetlozar Dotchev								

Item	Number of bridges	Chainage	Description of the existing structure	Existing length (meter)	Carriage way	Action	New length according to the project (meter)	Size according to the project	Carriage way	Remarks
1.	36	2+310	3*14.0	48	7.0	Replace/New	12+21+12	54.3	11.5	CW-2003-1
2.	37	3+076	1*22.16	28	7.0	Replace/New	1*22.16	36.21	11.5	CW-2003-1
3.	38	5+597	1*13.50	14.60	7.0	Repair	1*18.0	18.90	11.5	CW-2003-1
4.	39	20+168	3*22.16	82.48	7.0	Replace/New	3*22.16	82.48	11.5	CW-2003-2
5.	40	27+997	4.4*5.0 B	9.40	7.0	Box culvert #57n instead of the bridge #40 on km27+842	5.0*2.5 B	23.50	9.0	CW-2003-2
6.	41	34+870	1*22.16	23.06	7.0	Repair	1*22.16	23.06	11.5	CW-2003-2
7.	42	37+539	6*22.16	138.96	8.90	Repair	6*22.16	138.96	10.0	CW-2003-2
8.	43	44+808	4.4*5.0 B	9.1	8.70	Box culvert #95n instead of the bridge #43 on km44+808	5.0*2.5 B	23.50	9.0	CW-2003-3
9.	45	60+101	10.2+16.1+10.2	46.0	7.0	Replace/New	12+15+12	48.50	11.50	CW-2003-3
10.	46	66+144	1*13.70	19.7	7.0	Replace/New	1*15	27.0	11.50	CW-2003-4
11.	47	70+940	(3*22.0)+(3*21.0)	145.0	7.0	Replace/New	(3*22)+(3*21.0)	14.5	11.50	CW-2003-4



**Pictures taken at existing
bridge km 5+597**



Review of tender (bidding) documents - basic items from the Bill of Quantity

Item form the tender bidding documents	Description	Contract CW2003-1				Contract CW2003-2				Contract CW2003-3				Contract CW2003-4			
		Tender m3	Review m3	Diference m3	%	Tender m3	Review m3	Diference m3	%	Tender m3	Review m3	Diference m3	%	Tender m3	Review m3	Diference m3	%
212	Provide place and compact fill to embankment	310550				500				52150				0			
301/326/338	Provide material for caping layer	49700	138901	-89201	-64	72600	83709	-11109	-13.3	29215	34517	-5302	-15.4	13550	6677	6873	103
303/328/340	Provide granular subbase material	27400	88027	-60627	-69	33550	46843	-13293	-28.4	30900	44393	-13493	-30.4	47800	35822	11978	33.4
306/331/343	Provide and place bituminous base course	108710	38702	70008	181	126200	20281	105919	522	108550	16353	92197	564	98300	13196	85104	645
310/335/347	Provide and place bituminous surface course	106750	10335	96415	933	124200	5416	118784	2193	106550	5132	101418	1976	95150	4141	91009	2198
312/337/349	Provide subbase material to shoulders	13200	47145	-33945	-72	14400	24706	-10306	-41.7	14800	20812	-6012	-28.9	11900	16794	-4894	-29
301-311	Overlay 40 mm	0	0	0	0	4755	1217	3538	291	500	145	355	245	1185	418	767	183
301-324	Overlay 80 mm	4650	3654	996	27.3	6130	3664	2466	67.3	3020	3275	-255	-7.79	1210	1011	199	19.7
314-337	Overlay 120 mm	3800	3604	196	5.44	760	887	-127	-14.3	3580	5433	-1853	-34.1	370	451	-81	-18
Notes: 1. Red color is used whenever the estimated volumes of Works by the review are bigger that the provided into the Bill of Quantities																	
2. Green color is used when ever the estimated volumes of Works by the review are smolar or equal than the provided into the Bill of Quantities																	

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