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MINISTRY OF COMMUNICATIONS

REPORT
ON
RAIN / FLOOD DAMAGES TO
MEKRAN COASTAL HIGHWAY

February, 2005

4. **FINDINGS**

As a result of meetings with NHA Consultants/ Contractors/ Meteorological Department and the field visit to the Mekran Coastal Highway on 23rd and 24th February 2005, the Committee findings are as under:-

- (1) Heavy water flows were encountered on the night between 10th and 11th February 2005. The Highway remained closed and was opened to light traffic on 17th February 2005.
- (2) The Coastal Highway has been constructed mostly on the old alignment (except for about 20 kms near the Aghore Bridge). There were 11 bridges on the old alignment. The embankment has been raised and 63 additional bridges and 1,453 additional culverts have been provided in the new alignment.
- (3) The Meteorological Department does keep record of maximum and average and daily rainfall. However, this data needs to be interpreted by the consultants in terms of floods which also require a detailed study of the catchment area, water absorption capacity of soil etc. The ground conditions, however, fully establish very heavy flows of water in the area.
- [4] It seems that in-depth hydrological studies required for the design of the Sections were not carried out. Under such circumstances, designing of cross drainage structures should have been done on the safer side. The discharge used for Aghore river seems to be inadequate and that it has been designed on the data provided/crosschecked with WAPDA does not seem to be the correct design approach. The assessment of discharge by the Consultant should have been based on detailed hydrological study taking into consideration the catchment area, rainfall intensity and actual ground conditions.
- [5] The Sections of Coastal Highway that run parallel to the direction of flow received minimum damages. Most of the

Coastal Highway that runs across the direction of flow suffered major damages due to floodwater.

- [6] Rainfall seemed to have played the dominant role near the Aghore Bridge (Liari – Ormara Section) and in the first 15 kms of Ormara – Pasni Section. The Shadikor dam water has severely affected about 2 kms of road length and approaches to Bridges 8 and 9 on Ormara – Pasni Section.
- [7] The construction of this new highway along the Coastal belt has changed the path of the flow of rainwater and has obstructed the flow of water to the sea. Before construction, there was wide area available for sheet flow to fall into the sea. However, due to road, water has to pass through the drainage structures, which have not been adequately provided, resulting in an increase in water levels on the upstream side. Thus Rain/Flood water has over-topped the highway and structures in stretches ranging between 500m to 5km at many places. Some new streams have developed where culverts now need to be provided.
- [8] Some culverts have been under-designed in terms of discharge capacity.
- [9] Among the drainage structures, the causeways have performed very well in terms of least/no damages.
- [10] Leaving out loose material near the shoulders/berms invariably result in their erosion and therefore these are the worst affected portions.
- [11] Identical type of failure on the bridge approach roads, culverts, shoulders, etc. point towards a 'common weakness' in these structures. The backfilling at approaches and structures, especially of the bridges seems to have been constructed with inadequate quality control.

(12) Erosion of bridge approaches proved to be a 'blessing in disguise' and lowered the thrust on the road and Bridge structure from severe damage.

[13] During the construction phase of the first section, water flows which were not anticipated at the design stage, resulted in design changes and after the rains of July 2003, the following additions were made in terms of additional culverts, dykes, gabions, etc:-

(a) 37 cells in 10 culverts, one new Bridge besides increasing number of spans on an existing bridge on a stretch of 40 kms from 0 + 00 to 40 + 00 kms.

(b) Several spurs were constructed to properly guide the incoming water and gabions were provided to protect the bridge approaches at a cost of about Rs 249 million.

These sections have performed well during the recent rains with no noticeable damage.

(14) The loose stone rip-rap work done on the bulbs of the culverts and bridges does not seem to be adequate to take the pressure and scouring effect of water at these locations. It would have been more appropriate to use grouted rip-rap or cement concrete slabs on the bulbs of all the culverts as was done subsequently in Section-I, after the rains of July 2003, and in view of typical flash-floods/hill torrents in Balochistan.

[15] A few more culverts were added a few days before the rains of 10th and 11th February 2005 in the Pasni – Gwadar Section.

(16) Addition in drainage structures and a new bridge during the construction of Ist Section mean that these could not be anticipated earlier and the lessons learnt could not be replicated on all the susceptible sections of the Highway.

- (17) The first sub-section of Ormara – Pasni appears to be the poorly designed and constructed section. The embankment height is lower than the highest flood level along most of its length and drainage structures provided are quite inadequate. Attribution of damages to flood water from Shadikor dam is also not plausible in this section.
- (18) The last Section of Pasni – Gwadar has performed well during the recent flood and appeared to be appropriately designed by the Consultant and carefully executed by the contractor. The arguments that the flow at this section was along the alignment carries some weight but its embankments have been kept high and the drainage structure provided are sufficient to take the maximum possible discharge and thus prevent damage to embankment and structures of the road.
- [19] Asphaltic layer has performed well and the 6 cm thick layer seems to be appropriate for another period of five years before another layer is added for rehabilitation.
- [20] The tendency to take over the project in haste when certain items of work that are still incomplete is not considered as desirable e.g. wing walls of culverts etc. are still under construction and stone rip-rap work is still in progress. Besides, adequate compaction of slopes of embankment and material on the approach roads to bridges is considered very necessary.
- [21] In terms of damages, the summarized position is as under: -

Table : 3 Flood Damages

Sl.#	Description	Damaged	Total	As % of Total
01	Breach on Bridge Approaches (No:)	15	128	11.7 %
02	Brach on Culverts (No:)	12	1,453	0.8 %
03	Embankment Damages (kms)	2.3	530	0.5 %
04	Pavement Damages (kms)	3.4	530	0.6 %
05	Shoulder Damages (kms)	19.8	1,060	1.9 %

Pavement and shoulder lengths for actual repairs may vary quite considerably to include weak sections and also to provide for adequate workability of the machinery during the actual rehabilitation phase.

- (22) NHA has evaluated the flood damages based on visual assessment at Rs 109 million as per the following breakdown.

Table : 4 Cost Estimate of Flood Damages

(Rs. Million)			
Sl.#	Section	Total	Per Km
01	Liari – Ormara Section, M/s FWO (242.4 kms)	24.794	0.102
02	Ormara – Pasni :		
	➤ Sub Section-I, M/s Al Khan (150.3 Km)	12.677	0.252
	➤ Sub Section-II, M/s Nazir (50.8 Km)	3.017	0.059
	➤ Sub Section-III, M/s D Baluch (50.0 Km)	29.650	0.593
03	Pasni-Gwadar Section, M/s FWO (135.5 Km)	14.524	0.107
	Sub – Total (529 kms)	84.662	0.160
04	Construction of Temporary Diversion	5.00	
05	Contingency	5.00	
	Sub Total	94.662	
06	Escalation (15 %)	14.199	
	Total	108.86	
		1	
	Say	109.00	
(As per cent of total construction cost = 1 per cent)			

This amount does not include the expenditure required for additional structures to cater for water flows as encountered in February 2005. It would be necessary to provide for additional structures based on proper design calculation for rain water discharge. The actual rehabilitation cost may be of the order of at least 4 – 5 times the above assessment.

- [23] Attributing damages entirely to the ‘force majeure’ need to be evaluated further in view of the position stated in the above paras in terms of better anticipation at the design and execution stages, better workmanship and use of specified materials as these could have reduced the flood water damages.

- [24] The Defect Liability Period is applicable for normal repairs after completion and has been kept at six months against the normal practice of one year. All the Contractors, except for M/s Al-Khan have completed this period
- (25) The highway is open to traffic and the change in travel time due to diversion in the 'after rain/flood condition' is to the tune of about half an hour in fair-weather condition. The operating speed remains almost as before except in the damaged portions mentioned above.
- (26) The damages to the road structure on Mekran Coastal Highway as a whole are much less as compared to what has been reported in the news/print media. The total material damages have not been more than 1% of the actual physical work done on the project. The bridge structures with stood the flood water and though inadequate in terms of discharge capacity have not been damaged. From visual inspection, it appears that they are safe. It would be appropriate to add spans to these bridges where the Highest Flood level (HFL) have damaged the approaches and flowed over the bridge structures so as to increase their discharge capacity.

5. **RECOMMENDATIONS**

The recommendations are as under:

- (1) Major Highway Projects need to have realistic time frame for planning and execution and undue haste should be avoided in taking over such projects unless all the items of work have been satisfactorily completed.
- (2) Assigning the entire episode/event to the force majeure needs further examination by an independent consultant of international repute who should also carry out a proper design and quality assessment of the entire highway for appropriate remedial measures.

- [3] The rehabilitation works need to be started as soon as possible after fully incorporating the lessons learnt from the un-pleasant experience of recent heavy water flows.
- [4] The discharge capacity of damaged structures need to be maximized (probably while living mostly within the existing vertical alignment) but making the maximum use of the horizontal opening now made available after carefully estimating the discharge requirements taking into account the damming effect of the pavement itself.
- [5] Drainage structures should be provided where recent heavy water flows have developed new streams.
- [6] Cleaning of all culverts, expansion joint of bridges, repairing the adverse scouring effects of bridges, removal of silt from pavement etc, proper workmanship and use of appropriate materials need to be assigned due priority.
- (7) In the operational phase (post-flood conditions), due to ponding of water on either side of some sections, despite low traffic volumes, it is important that low axle load restrictions (even below the legal limits) should be seriously considered to minimize chances of any adverse effects on the existing pavement or pre-mature failure till such time it is fully rehabilitated.
- [8] NHA should issue instructions to all the consultants/contractors that backfilling be done with specified material and its compaction should not be compromised under any circumstances.
- (9) Adequate road furniture to ensure safety need to be provided.
- (10) The building of 'check dams' of mud by the local population to store rain water close to the highway (even at places with the highway embankment used as a dam wall) needs to be

discouraged so that these do not add to discharges in such circumstances, if these dams are broken.

- (11) The National Highway and Motorway Police (NH & MP) need to be deputed immediately on the Mekran Coastal Highway. This could be with the minimum strength, to start with, and keeping in view that the traffic is very low and there are only very few entry and exit points, the load restrictions mentioned above need to be implemented on the entire stretch of the Highway.

NATIONAL HIGHWAY AUTHORITY
CONSTRUCTION WING

No. 5(53)/GM(C)/NHA/2004- 62

Islamabad, the 16th Feb 2005

To


Ministry of Communications
'D' Block, Pak Sectt'
Islamabad

Attn: Mr Firdaus Alam, JS-II
Mr Tahir Sharif Director(Roads)

Subject: **RAIN/FLOOD DAMAGES ON MAKRAN COASTAL HIGHWAY**

1. Makran Division and Coastal Belt of Balochistan received unprecedented heavy rains during the 2nd week of Feb 2005, resulting into Flash Floods & Torrents in all the streams & waterways flowing down from the Hills towards the coast line. Besides, the Shadi Kore Dam upstream of Pasni and a few other irrigation dams bursted adding devastation to already worsening situation. Makran Coastal Highway was hit by the Flood/Torrents nearly throughout its length of 532 KM from Liari (near Uthal) to Gawadar on Night 10/11 Feb 2005.

2. Chairman, NHA and General Manager, Makran Coastal Highway flew over the Coastal Highway on 11th Feb 2005 in an Army Helicopter. The estimation of Flood Damages and 1st report covering the incident as submitted by GM(MCHP) is enclosed for your information and necessary action please.


(MUHAMMAD TAH SIN-UL-HAQ)
GM(Construction)

cc.

1. Member(Ops)
2. Member(MW)
3. GM(MCHP)
4. Director(HW/MW)
5. PS to Secretary Communications
6. PS to Chairman, NHA

NATIONAL HIGHWAY AUTHORITY
MAKRAN COASTAL HIGHWAY PROJECT

SECTION WISE DETAIL OF DAMAGES DUE TO FLOODS (FEB 2005)

A. LIARI ORMARA SECTION

A-1: Liari to Aghore (121 Km):-

All structures including bridges remained stable and in sound condition through out the flood and the over all condition of the road upto Aghore (121 Km) is satisfactory and trafficable with the exception of slight rain cuts in shoulder, side slopes of embankment. The major damage has been observed in the form of breach (approx 70-80m) in approach road of Hingol Bridge towards abutment "B" (Gawadar Side). The bridge remained submerged totally from 0100 hrs to 1200 Hrs (on 11th February-05). The adjacent camps of FWO, the Consultants and Coast Guards on down stream side were inundated for more than 24 hrs, whereas considerable portion of a hotel on the upstream side towards abutment "B" got washed away in to the sea.

A-2: Aghore to Rasmalan (33 Km)

All Culverts and bridges withstood the pressure of flood waters. However, small breaches at location (km 134 & Km 141) have been noticed. Treated shoulders and side slopes of embankment have been slightly damaged at isolated locations.

A-3: RASMALAN TO ORMARA (95 KM)

Rasmalan to Buzi top (10 Km) hilly terrain is the most critical and susceptible portion in the entire project. But all of the road structures performed well and exhibited extreme effectiveness. Certain deep rain cuts and minor sliding at isolated stretches have been observed which can be conveniently rectified.

Major portion of road between Buzi top to Ormara (80 Km) traverses through high mountains except for the last 34 Km which is plain area. The torrential rains caused overtopping near "Jikki" Pass at Km 169 and at two bridge locations between Km 214 & 215.

Abutment of a bridge at Km 218 (close to Ormara) has been eroded by heavy flood water.

• **CONCLUSION :-**

Despite all damages caused, the road from Aghore to Ormara is still trafficable. Only obstacle is to resume traffic at Hingol Bridge (km 121) at the earliest. After re-construction of approaches of this bridge, on temporary basis, the road section from Liari (zero point) to Ormara will become trafficable.

B. ORMARA - PASNI SECTION :-

Due to breach of Shadi Kore Dam, which is located in Ormara – Pasni Section and heavy flood in Basol river, severe damages occurred in all 3 sub-sections. Details are as under:-

B-1: Sub Section-I (Km 00 to km 51).

The heavy rains caused flood in Basol river where water overtopped the road at many locations:-

- i- Km 15 to Km 17+500 = 2.5 km stretch
- ii- Km 26 to Km 31+700 = 5.7 km stretch
- iii- Approach on Bridge No: 03 Basol River.
- iv- Approaches of some Culverts were damaged.

B-2: Sub Section-II (km 51 – km 101)

Rain / flood water over topped the road only at one location i.e. between Km 50 to Km 54 the structures are intact but the approaches of certain Bridges & Culverts were washed out.

B-3: Sub Section-III (km 101 – km 152)

Heavy damages occurred due to the breach of Shadi Kore Dam and flood water overtopped at many locations. The road has been completely washed out in 3-4 km length between km 352 – km 384.

At present the road is closed for traffic but with the construction of diversions as the water recedes the traffic shall be resumed.

C. PASNI – GAWADAR (Km 395 – Km 530)

C-1: Breach of Shadi Kore dam and two other small dams in the area constructed by locals, have caused heavy flood in this section. Nearly twenty (20) km of road was submerged under flood water (thirteen km towards Ormara and 7 km towards Pasni town).

C-2: The link road of Pasni experienced heavy damages i.e approach of a bridge at km 5+385 were washed away completely. Approx 1.66 Km of road stretch between km 3+800 to km5+460 was completely washed away.

C-3: The NHA building at Pasni experienced flooding upto door lintel level which resulted in collapse of boundary wall and two rooms of the building along with loss of furniture items and lab equipment.

C-4: The flood water also took away generator, control room of asphalt plant, 4 nos Bitumen Bowzer and shuttering alongwith other T&Ps of one of the contractors i.e. M/s H.C.C.L.

S#	SECTIONS	NATURE OF DAMAGES	REMARKS
B	<u>ORMARA - PASNI</u> (Km 243 To 392) <u>B-1</u> Sub-Section-I (Km 243-294) <u>(M/s AL-Khan Const. Co.)</u>	a. Embankment adjacent to culvert at Km 258+400 (8m length) washed completely. b. Embankment adjacent to culvert at Km 259+400 (12m length) washed away and the culvert settled down. c. Embankment to culvert at Km 259+800 (15 m length) washed away. The structure tilted in one direction. d. Culvert at Km 260+800 tilted after washing way of its embankment. e. Roadway embankment at Km 273+400 near Basol River in 80m length washed, including culverts settlement. f. Both the approaches to bridge at Basol River (Km 273+700) washed away.	
	<u>B-2</u> Sub-Section-II Km 294-345 <u>M/s A.M & Nazir (JV)</u>	a. Back filling of five culverts from Km 296-297 has settled. b. Both approaches of bridge at Km 314 have been breached. c. Backfilling of culvert at Km 317 settled down. d. Approach of Bridge at Km 319 towards Abutment "A" breached. e. Approach to bridge at Km 324 towards abutment "B" breached	
	<u>B-3</u> Sub-Section-III Km 345 to 395 <u>M/s S.M.A.D. Balouch</u>	a. Both the approaches to Bridges No: 1, 8 & 9 washed away. b. The roadway embankment washed away at number of locations between Km 352+900 to Km 388+400 as under: i- Km 352+780 – 353+400 = 500 m ii Km 359+780 – 361+580 = 1800m iii- Km 379+230 – 379+680 = 450 m iv- Km 380+130 – 380+480 = 350 m v- Km 383+480 – 384+680 = 1400m	

S#	SECTIONS	NATURE OF DAMAGES	REMARKS
C	C-1 PASNI – GAWADAR (KM 395 TO 530)	a. No Damage to Road or Shoulders of the Main Highway Except for Rain Cuts and Localized Damage on Side Slopes.	Road is Trafficable
	C-2 PASNI – LINK ROAD	a. The Approaches of a Bridge at Km 4+584 Washed away completely. b. Embankment Adjacent to Culvert at Km 4+000 & 5+385 Washed out completely. c. NHA Building at Pasni badly damaged. Boundary Wall & Two Rooms Collapsed alongwith loss of Lab-equipment and Furniture. d. Generator and Control Room of Asphalt Plant and 4 Nos of Bitumen Bowzers, Shuttering and Scaffolding of M/s H.C.C.L Engaged on Link Road were washed away.	Reconstruction of Link Road Along With Approach is required

Summary of Breaches

Total No: of Breaches at Bridges (Approaches)	=	10 nos.
Total No: of Breaches at Culvert/Approaches	=	20 nos.
Total No: of overtopping / Road Breaches	=	17 nos.

Remedial Measures

1. It will take approximately 7 days i.e upto 22nd February 2005 to open the road for traffic through diversions.*
2. A team of consultants has been assigned to undertake assessment study of damages and suggest permanent remedial measures in view of HFL.
3. Rough estimation of cost of repairs & rehabilitation works is around Rs 500 million.
4. Estimated time for execution of permanent rehabilitation works and improvement of road profile in view of HFL, is between 6 months to an year.

***Note:** Road between Pasni and Ormara has been opened for light traffic on 15 Feb 2005.

RAIN/FLOOD DAMAGES ON MEKRAN COASTAL HIGHWAY

(QUESTIONNAIRE)

NHA

- Project History & approval
- Approved Cost and its time frame
- Project Status (pre-flood)
- Post-flood condition (damages - pavement/structures, pavement condition after water recession – silting, etc).
- Scope of Rehabilitation
 - As per pre-flood condition taking into account the adverse water effects, if any, inside the pavement.

(Remarks: Extreme care in controlling axle loads - may be below the legal limit even)
 - Learning from the flood experience (design changes etc).
- Cost Estimates and time frame in both the above cases.
- Apportionment of liability among
 - NHA
 - Consultant
 - Contractor

Consultant

- Condition of the track/road facility and condition of pavement structures (width, structures, drainage etc) before the project was undertaken.
- Any road realignment wrt the earlier track/road.
- Design Parameters
 - Traffic conditions (volume & composition)

- Axle loads
- Geological condition (soil, vegetation, etc)
- Hydrological Data and data incorporated in the design (Data spread (time series), average rainfall, maximum rainfall, flood-levels, catchment area, HFL (Highest Flood Level), etc.
- Height of embankment and number of structures designed against discharge data.
- Design of Drainage (lateral, longitudinal, culverts, causeways, bridges, etc), Erosion/training works & criteria adopted, soil retaining works, discharge, etc.
- Special design features adopted as road is aligned against the flow.
- Any other relevant design consideration taken into account.
- Whether the affected pavement and structures can be rehabilitated to the status of pre-flood level in terms of its performance and durability? If not, proposed preventive/remedial measures.
- Suggested rehabilitation measures, cost effect and time frame in terms of its rehabilitation to the status of the pre-flood level and after incorporating the "lessons learnt" from this unpleasant experience.
- Any other relevant information.

Contractor

- Discharge of run-off from rain and other sources during the construction phase & any adverse effects noted or brought to the notice of the consultant/client.
- Whether the affected pavement and structures can be rehabilitated to the status of pre-flood level? If not, proposed preventive/remedial measures.
- Suggested rehabilitation measures, cost effect and time frame in terms of its rehabilitation to the status of the pre-flood level and after incorporating the "lessons learnt" from this unpleasant experience.
- Any other relevant information

Meteorological Department

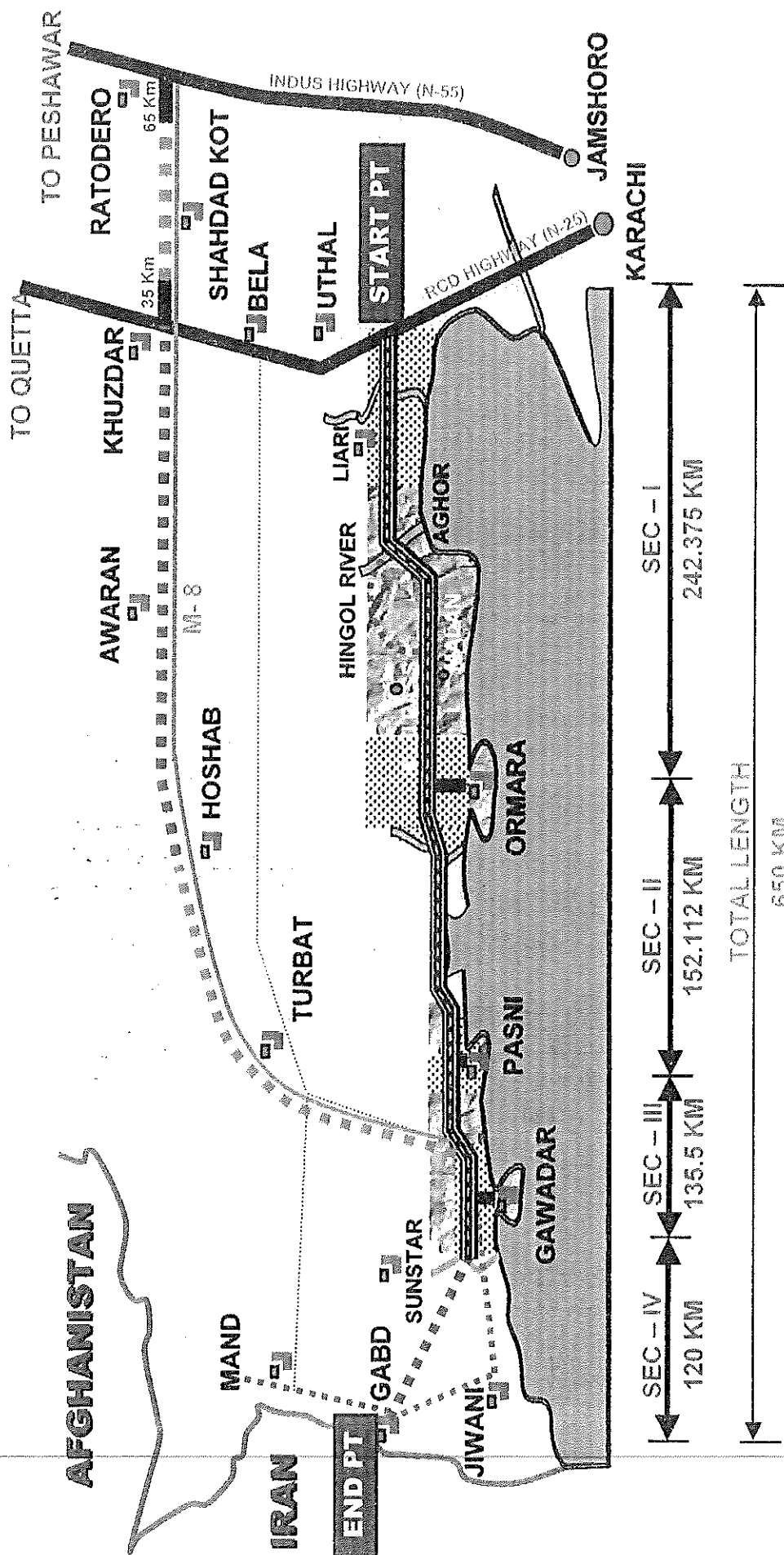
- Historical data (time series, average rainfall, maximum rainfall, flood levels, catchment areas, etc)
- Any other relevant information

Externalities

e.g. Shadi Kore Dam

- Storage capacity, spillway facility if any and discharge capacity
- Was the spillway used for lowering water level in the dam?
- Effects of dam water (length/area of impact on the coastal highway)
- Any other relevant information

MAKRAN COASTAL HIGHWAY PROJECT



CONSULTANT

- LRA GROUP
- SAM PAK
- ACC
- INDUS ASSOCIATED CONSULTANTS
- ENGINEERING CONSULTANT INTERNATIONAL

CONTRACTORS

- FWO
- AL KHAN CONSTRUCTION COMPANY
- (JV) NAZIR & AM CONSTRUCTION COMPANY
- SARDAR MOHAMMAD ASHRAF D BALOCH

CLIENT

NATIONAL HIGHWAY AUTHORITY

DISTRIBUTION OF WORK

SECTION IV (120 Km)	SECTION III (135.5 Km)	SECTION II (152.115 Km)	SECTION I (242.375 Km)
GAWADAR – GABD (NOT YET UNDERTAKEN)	PASNI-GAWADAR	ORMARA-PASNI	LIARI-ORMARA
	GAWADAR TOWARDS PASNI	SUB SEC III	PKG I
	PASNI TOWARDS GAWADAR	SUB SEC II	PKG II
		SUB SEC I	PKG III
	91 Km	50.031 Km	88.60 Km
	44.5 Km	51.121 Km	32.575 Km
		50.96 Km	121.20 Km
DESIGN CONSULTANT	ECIL	M/S IRSHAD NABI ASSOCIATES M/S ACE AND M/S MEINHARDT	M/s REC
SUPERVISORY CONSULTANT	ECIL	IAC	M/s Loya
CONTRACTOR	FWO	SMAD BALOGH	M/s A.A Associates
		ACC	LRA GROUP (LA, REC, AAA)
		SAMPAK	
		NAZIR & AM (JV)	FWO

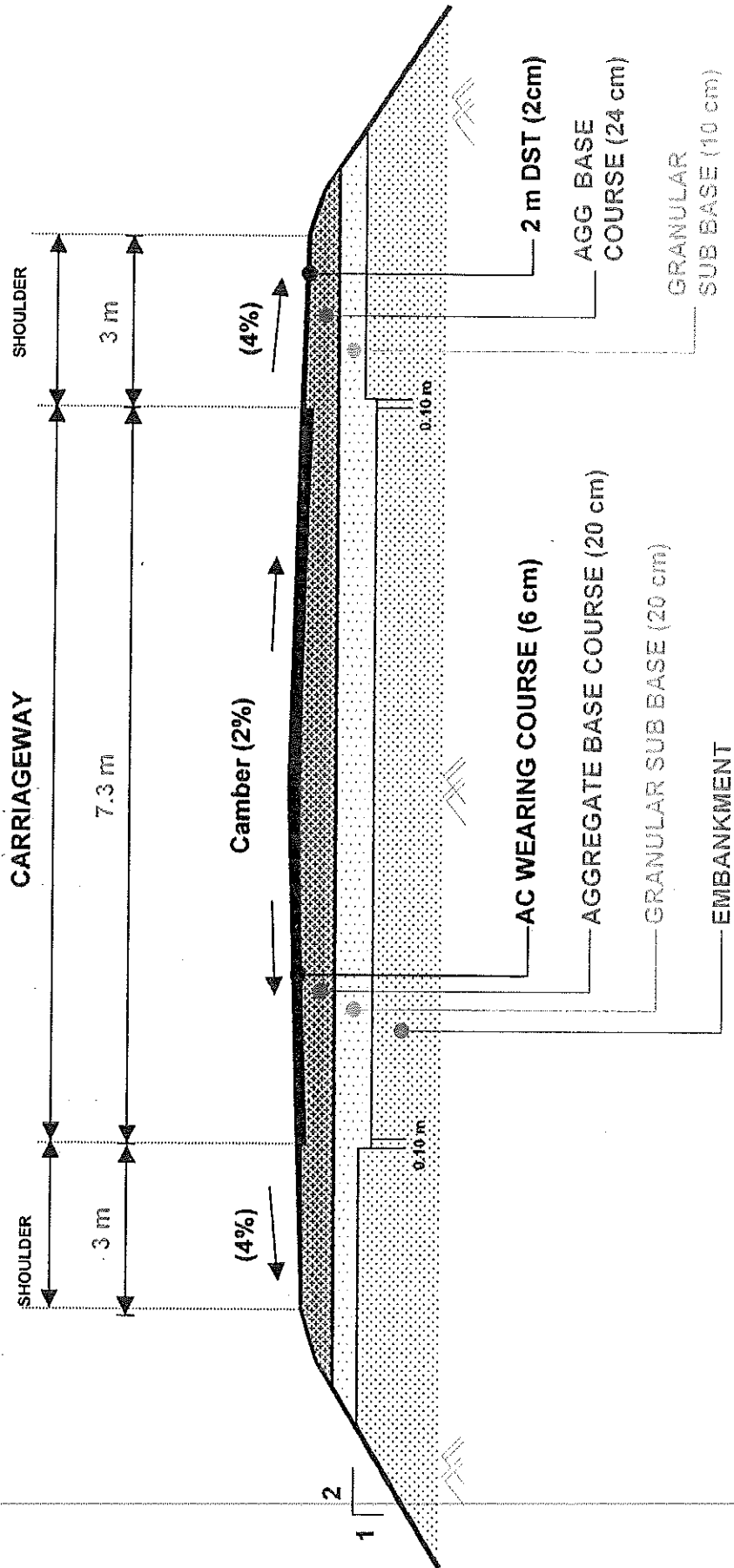


SALIENT FEATURES

MCCHP (LIARI TO GABD)

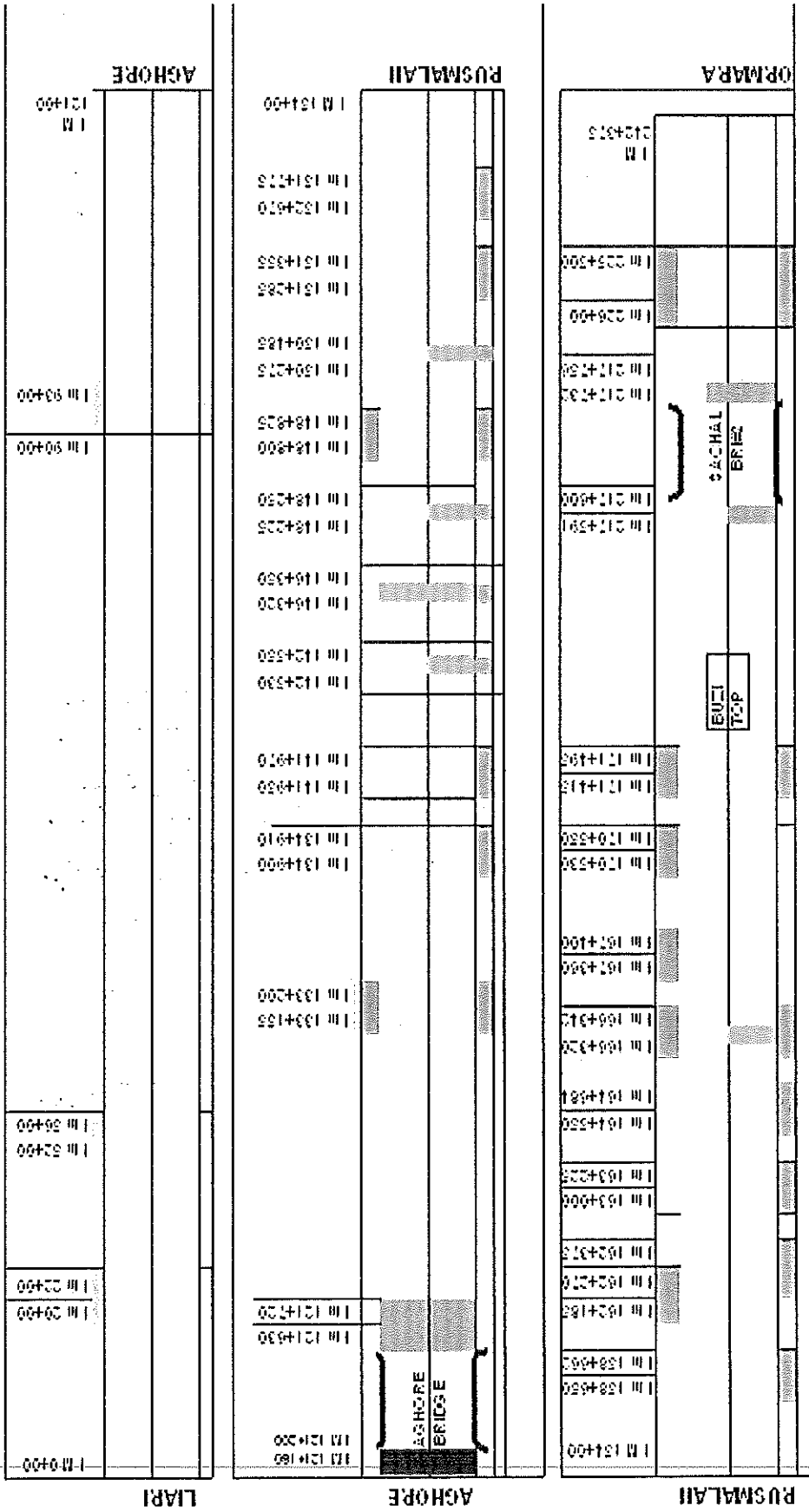
➤ CLIENT	NATIONAL HIGHWAY AUTHORITY	➤ WIDTH OF CARRIAGEWAY	7.30 m
➤ CONSULTANT	LRA GROUP (LOYA, REC, AAA), SAMPAK, ACC, IAC, ECIL	➤ SHOULDER WIDTH	3 / 2.5 m
➤ CONTRACTORS	FWO, AL-KHAN, NAZIR & AM (JV), SMADE	➤ DST ON SHOULDERS	2.0 m
➤ TOTAL LENGTH	653 Km (LIARI-GABD)	➤ ASPHALTIC WEARING COURSE	6 cm
➤ REVISED LENGTH	650 Km (Ormara Link Deleted)	➤ AGGREGATE BASE COURSE	20 cm
➤ LENGTH UNDER CONSTRUCTION	530 Km (LIARI TO GAWADAR)	➤ GRANULAR SUB BASE	20 / 27 cm
➤ LENGTH NOT YET UNDERTAKEN	120 Km (GAWADAR - GABD)	➤ No. OF BRIDGES	63
➤ COST OF ONGOING SECTIONS	10,427.825 MILLION RS.	➤ No. OF SPANS	258
		➤ No. OF CULVERTS	1453
		➤ No. OF CELLS	2169
		➤ DATE OF COMMENCEMENT	1 ST JULY 2000
		➤ DATE OF COMPLETION	15 th Dec 2004

TYPICAL X-SECTION



POST FLOOD STATUS (LIARI-ORMARA SECTION)

Km 0+00 to Km 242+375

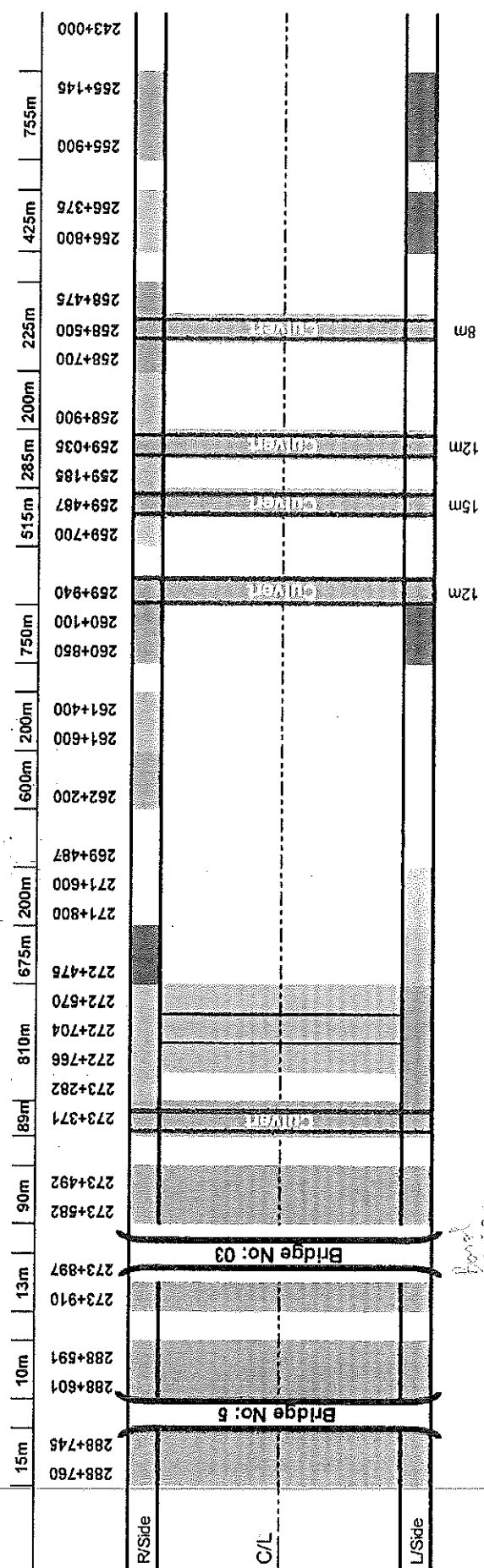


Breach on Bridge Approaches = 01 Nos
 Breach on oververts Nil
 Pavement = 401 M
 Shoulders = 6406 Km
 Embankment = 90 M
 Guard Rails = 483 M
 Side Drain = 4.661 Km
 Water Overtopped = 12 Locations

LEGEND
 Damage up to 50% Level
 Damage up to 50%+ Level
 Crest Damage
 Deck Damage
 Slope Damage

POST FLOOD STATUS(ORMARA -PASNI SUB SECTION - I)

Km 243+000 to 293+960



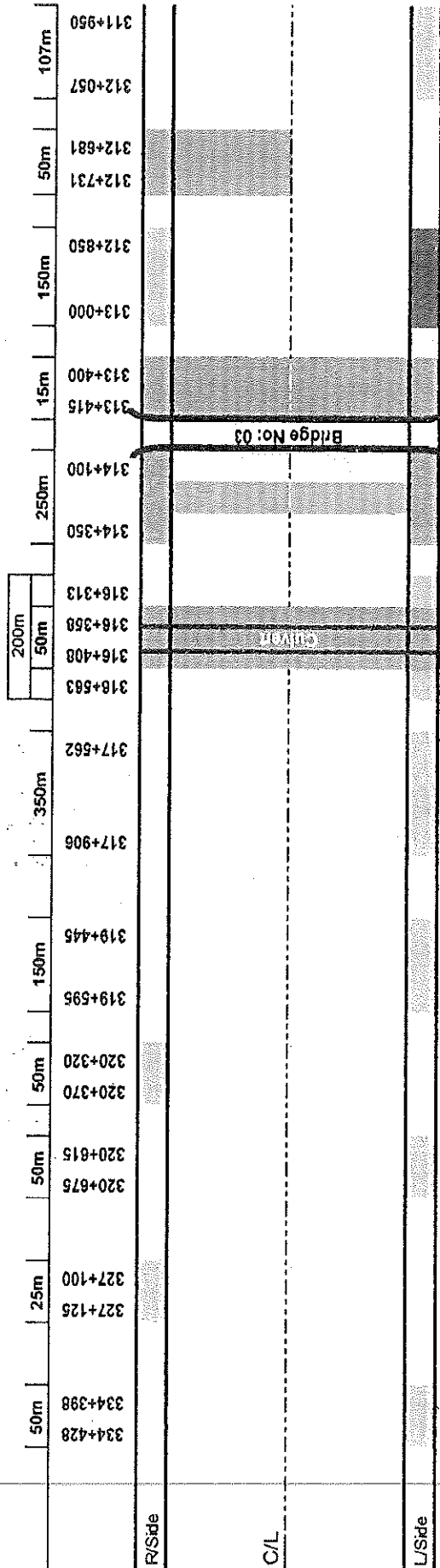
Breach on Bridge Approaches = 04 Nos
 Breach on culverts = 05 Nos
 Pavement = 400 M
 Shoulders (L 2.46 + R 5.06) = 7.5 Km
 Embankment = 260 M

LEGENDS




- Damage upto Ground Level
- Damage upto Sub-Base / Base Course Level
- Shoulder Damage
- DST Damage
- Slope Damage

POST FLOOD STATUS(ORMARA -PASNI SUB SECTION - II)

Km 293+960 to 345+081



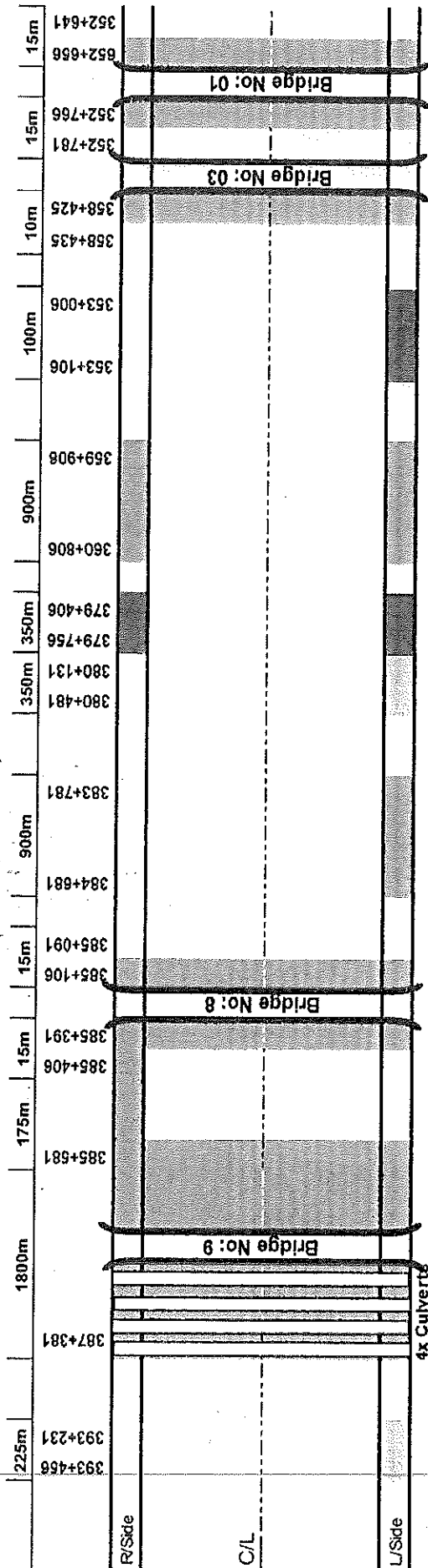
LEGENDS

-  Damage upto Ground Level
-  Damage upto Sub-Base / Base Course Level
-  Shoulder Damage
-  DST Damage
-  Slope Damage

Breach on Bridge Approaches = 01 Nos
 Breach on culverts = 01 Nos
 Pavement = 130 M
 Shoulders (L 0.315 + R 0.365) = 680 M






POST FLOOD STATUS(ORMARA -PASNI SUB SECTION - III)

Km 345+081 to 395+112



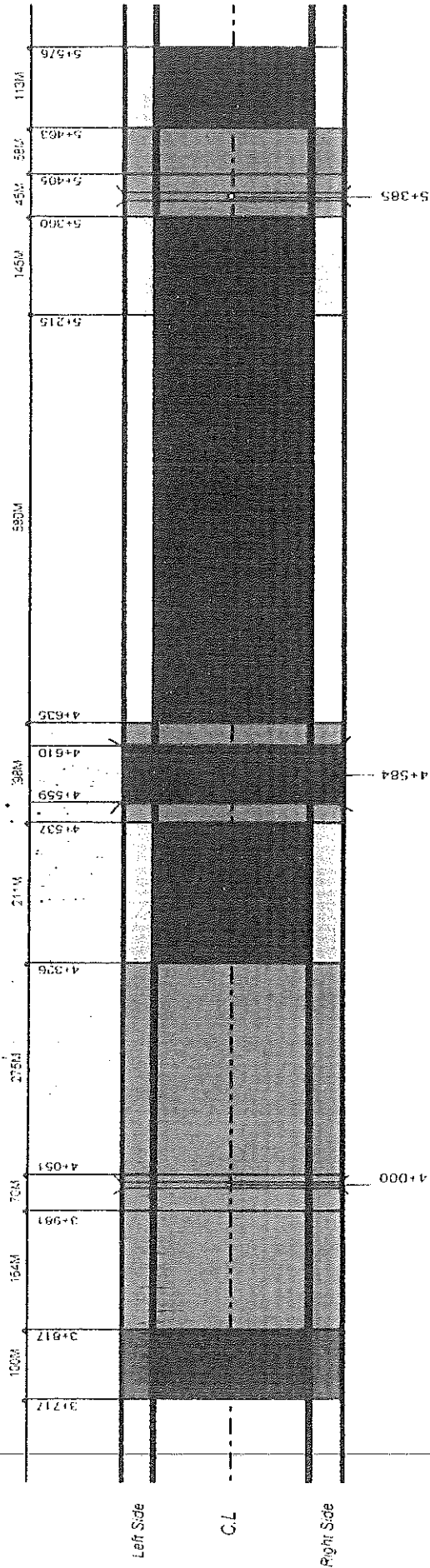
Breach on Bridge Approaches	= 07 Nos
Breach on Culverts	= 04 Nos
Pavement	= 1870 M
Embankment	= 1870 M
Shoulders (L 2600 + R 1425)	= 4025 M
Grouted Riprap	= 200 M

LEGENDS







-  Damage upto Ground Level
-  Damage upto Sub-Base / Base Course Level
-  Shoulder Damage
-  DST Damage
-  Slope Damage

POST FLOOD STATUS (PASNI -GAWADAR SECTION)

KM 395+112 TO KM 530+00



LEGEND:

-  DAMAGE UPTO GORUND LEVEL
-  DAMAGE UPTO SUB-BASE / BASE COURSE LEVEL
-  SHOULDER DAMAGE
-  DST DAMAGE
-  ASPHALTIC CONCRETE OK
-  SHOULDER OK

- Breach on Bridge Approaches = 02 Nos
- Breach on culverts = 02 Nos
- Pavement = 659 M
- Embankment = 162 M
- Shoulders = 469 M
- DST = 1228 M