

## ANNEX E

### COMPREHENSIVE DISASTER PREVENTION

## ANNEX – E

### COMPREHENSIVE DISASTER PREVENTION

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**Table E-1-1 Disaster Damage in Chaharmahal va Bakhteyari Province - 1998**

Town Ship	District	Village	Cause	Damage							Bridge		Road	Others	
				Intake dam	Intake dam (Agri.)	Farm (ha)	Gar. (ha)	Canal (km)	Canal	Water pipe	Spring	No.			Degree (%)
Borgen	Gand- man	-	F	4	1		20	8							
		Hosein-abad	F						1						
		Maamureh	F						1						
		Shams-abad	F					2							
		Lahdaraze/ Cheshmeh Ali	F			-									
		Emamoeys	F			-									
		Kanark-olia	F			-									
		Moorchegan	F			20									
		Nasir-abad	F			-									
		Vastegan	F			80						10			10 wells
		Chermineh	F			-									
	Borgen	Dehno	F			-									
		Sefiddasht	F			-									
		Faradonbeh	F			-									
		Naghaneh	F			-									
	Chogha- khor	-	F			12									
		-	F				17								
Ardal	Ardal	Behesht-abad	F, L												Fishpond
		Central	F, L									15	30-80		
		Sheikh- mahmood/ Liraby	L											between two village	
		Davazdah- emam	F									1			
		Kory	L									1			
	Dinaran	Nou-tarakee	I									1			
		Aziz-abad	L												Fishpond
		Heidar-abad/ Chahartaq	F, L											between two village	
	Mashay- ekh	Kavand- darvishan	F, L												1
		Gel-sefid	F												Pumping tools
		Sar-rok/ Colcole	F									1		between two village	
	Mian- kooh	Sarkhun	F								1				
		Sarkhun/ (Center)	I									1	5		
		Dgh-kohne	F, L												Fishpond
		Melek-shir	F									1			
		Kaheedan	I									1			
Landi/ Chandeh		F											between two village		
Shelil														Fishpond	

Note: Agri. = Agriculture, Gar. = Garden, F = Flood, L = Landslide

Source: Chaharmahal Province

Table E-1-2 (1/2) Flood Damage Record in Chaharmahal va Bakhteyar Province												
Date	T/ Ship	District	Village	No. of Houses			Human			Road		
				70% ~	30-70	0-30	Killed	Lost	Injured	Vil.	Gra.	Pav.
1987/7/27	Farsan			0			0		0		15	
1987/3/10	Farsan			0			0		0		20	
1991/12/11	Farsan			0			0		0		20	
1991/12/15	Farsan			0			0		0		20	
1992/2/3	Farsan											
1991/2/22	Farsan			30								
1994/11/6	Farsan		Kohrang									
1995/5/31	Farsan		Shoorab									
1995/8/20	Farsan		Bazooft									
1995/9/18	Farsan		Bazooft									
1995/9/20	Farsan		Bazooft									
1996/3/23	Farsan		Bazooft									
1998/5/13	Farsan	Bazooft	Dorak sofla- Alaki oia	2		10	5	3				
1986/5/22	Ardel											
1986/5/22	Ardel											
1986/5/28	Ardel											
1986/5/28	Ardel											
1995/4/24	Ardel		Kaj									
1995/2/24	Ardel		Rozmitan									
1995/2/24	Ardel		Solgan									
1996/4/24	Ardel		Kaj									
1997/5/31	Ardel	Markazi	Kaj							0		
1998/3/29	Ardel	Dinaran	Notaki- Gardpineh		4	1						
1998/3/29	Ardel	Miankooch	Chooledan-Sarqaleh			25						
1998/3/29	Ardel	Markazi	Karim abad			10						
1998/3/29	Ardel	Mashaiekh	Darreh yas-Darreh bir	5								
1998/3/30	Ardel	Mashaiekh	Dorak anari									
1998/5/13	Ardel	Dinaran	Aziz abad									
1958/6/1	Borujen			3,800			0		46		30	
1973/7/22	Borujen			3,875			0		48		0	
1974/8/21	Borujen											
1974/8/21	Borujen											
1976/5/22	Borujen			100			13		0		30	
1984/4/5	Borujen											
1974/4/5	Borujen											
1989/11/30	Borujen											
1989/11/30	Borujen											
1995/9/19	Shoorab		Bazoft				9					
1954/7/25	Shahr-e-kord			600			17		0		30	
1956/6/9	Shahr-e-kord			50			4		0		40	
1976/4/23	Shahr-e-kord			15			0		0		0	
1980/3/30	Shahr-e-kord			0			0		0		30	
1986/4/22	Shahr-e-kord			10			5		0		10	
1986/5/3	Shahr-e-kord											
1986/4/2	Shahr-e-kord											
1987/10/26	Shahr-e-kord			0			0		0		5	
1987/11/3	Shahr-e-kord			0			0		0		10	
1987/3/10	Shahr-e-kord			0			0		0		10	
1991/3/26	Shahr-e-kord			50			0		0		5	
1991/12/13	Shahr-e-kord			0			0		0		10	
1992/1/9	Shahr-e-kord			10								
1992/2/21	Shahr-e-kord			1			2					
1992/2/23	Shahr-e-kord			40								
1995/3/28	Shahr-e-kord		Savad jan									
1996/8/30	Shahr-e-kord		Jahan bin	1								
1996/8/31	Shahr-e-kord		Shanis abad-Taqanak									
1992/2/20	Lordegan						1					
1992/2/24	Lordegan											
1994/11/25	Lordegan											
1995/5/17	Lordegan											
1995/11/23	Lordegan		Boogar									
1995/3/5	Lordegan		Rdarreh chenar-Piran									
1995/3/5	Lordegan		Boogar									
1998/5/13	Lordegan	Malard	Sefidar-Gandab	9	10	7						
1994/4/1	Lordegan		Nomad area									
			Sum (1954-1996)	8,591	10	7	51	0	94	0	285	0
			Sum (1997-1998)	7	4	46	5	3	0	0	0	0
			Total	8,598	14	53	56	3	94	0	285	0
Note: Vil. = Village, Gra. = Gravel, Pav. = Pavement, Gar. = Garden										(Source : SED, MOI)		

**Table E-1-2 (2/2) Flood Damage Record in Chaharmahal va Bakhteyar Province**

[illegible]

Table E-1-3 (1/2) Flood Damage Record in Esfahan Province													
Date	T/ Ship	District	Village	No. of Houses			Human			Road			Agri.
				70% ~	30-70	0-30	Killed	Lost	Injured	Vil.	Gra.	Pav.	Gar. Farm
1998/3/29	Samirom	Padena sfla	Tangch khoshk- Rood abad			3							12 21
1998/3/29	Samirom	Padena olia	Padena olia										10 20
1998/3/29	Samirom	Hana	Rahimi river										6
1976/6/4	Samirom						4						120
1986/5/5	Samirom						6		150				
1956/5/23	Samirom			0			7				0		0
1994/11/19	Samirom			70									
1995/5/30	Samirom												
1996/7/9	Samirom						2						
Sum (1976-1996)				70	0	0	19	0	150	0	0	0	120
Sum (1997-1998)				0	0	3	0	0	0	0	0	0	22 47
Total				70	0	3	19	0	150	0	0	0	22 167
Note: Vil. = Village, Gra. = Gravel, Pav. = Pavement, Gar. = Garden (Source ; SED, MOI)													
Table E-1-4 (1/2) Flood Damage Record in Kohgiluyeh va Boyerahmad Province													
Date	T/ Ship	District	Village	No. of Houses			Human			Road			Agri.
				70% ~	30-70	0-30	Killed	Lost	Injured	Vil.	Gra.	Pav.	Gar. Farm
1997/4/24	Yasuj									0			0
1984/5/11	Yasuj												
1986/11/11	Yasuj						3				0		
1957/4/27	Yasuj												
1986/12/6	Yasuj			142			7				207		20
1986/11/30	Yasuj			551			1				1		20
1981/11/14	Yasuj												
1989/12/13	Yasuj												
1971/8/28	Yasuj						1						100
1990/3/15	Yasuj												
1990/2/25	Yasuj												
1991/12/13	Yasuj												
1988/11/13	Yasuj												
1992/5/7	Yasuj						1						
1992/5/18	Yasuj												
1992/12/22	Yasuj												
1992/12/30	Yasuj			2									
1992/1/9	Yasuj												
1992/2/7	Yasuj						4						
1992/3/10	Yasuj						5		4				
1993/4/4	Yasuj												7,000
1994/11/7	Yasuj			7			2						
1994/11/19	Yasuj												
1995/3/3	Yasuj												
Sum (1984-1996)				702	0	0	24	0	4	0	208	0	7,140
Sum (1997-1998)				0	0	0	0	0	0	0	0	0	0
Total				702	0	0	24	0	4	0	208	0	7,140
Note: Vil. = Village, Gra. = Gravel, Pav. = Pavement, Gar. = Garden (Source ; SED, MOI)													



Table E -1-5 (1/4) Flood Damage Record in Khuzestan Province														
Date	T/ Ship	District	Village	No. of Houses			Human			Road (km)			Agri.(ha)	
				70% ~	30-70	0-30	Kill	Lost	Injured	Vil.	Gr.	Pav.	Gar.	Farm
1968/1/24	Abadan			10			7							10
1975/2/9	Abadan													
1977/1/8	Abadan			50										
1992/5/8	Abadan													
1992/2/3	Abadan													
1994/11/7	Abadan			16										
1996/5/11	Abadan						2							
1976/12/11	Aghajari										5			
1984/12/28	Aghajari			45			4							
1957/11/8	Izeh													
1964/11/12	Izeh			42										50
1964/12/14	Izeh													
1964/1/23	Izeh			108										
1965/11/12	Izeh													
1977/11/22	Izeh			40			16							
1986/6/18	Izeh						16							
1986/11/8	Izeh			60			14		6					
1986/12/20	Izeh			302			23				12			
1989/12/5	Izeh			100										
1992/2/23	Izeh													
1992/3/2	Izeh													
1998/4/28	Izeh	Dehdez	Soosan				1					20		
1956/11/8	Ahvaz													
1957/1/29	Ahvaz													
1958/5/31	Ahvaz													
1960/1/23	Ahvaz			5,000							0			100
1963/5/10	Ahvaz			30										100
1968/1/21	Ahvaz			65										
1968/1/25	Ahvaz			400										
1968/1/27	Ahvaz			1,693			2							
1972/4/24	Ahvaz													
1974/3/23	Ahvaz			2,000							8			12,000
1974/3/26	Ahvaz													1,000
1974/12/21	Ahvaz			25							5			
1975/4/22	Ahvaz													
1975/6/7	Ahvaz													
1975/12/24	Ahvaz										5			
1975/1/24	Ahvaz			360							10			
1975/1/28	Ahvaz			50			2							
1975/2/11	Ahvaz													
1975/2/14	Ahvaz			135										
1976/4/4	Ahvaz										5			
1976/4/7	Ahvaz													
1976/4/21	Ahvaz			0										
1977/3/22	Ahvaz			700			6							
1977/11/15	Ahvaz													
1977/12/23	Ahvaz													
1977/3/13	Ahvaz													
1979/1/16	Ahvaz													
1979/2/10	Ahvaz			80			22							5,000
1982/11/10	Ahvaz													
1983/3/15	Ahvaz													
1984/3/24	Ahvaz						7							
1984/1/4	Ahvaz													
1985/12/10	Ahvaz			4,852			30							
1985/5/9	Ahvaz			220			14							
1986/3/4	Ahvaz						7							
1987/10/28	Ahvaz													
1987/3/12	Ahvaz													
1988/11/12	Ahvaz													
1988/3/18	Ahvaz													
1992/10/4	Ahvaz													
1991/12/11	Ahvaz													
1991/3/2	Ahvaz													
1993/4/12	Ahvaz			4										331
1993/2/4	Ahvaz													5,600
1993/3/13	Ahvaz													
1994/11/19	Ahvaz			560										34,100
1997/11/10	Ahvaz									0				0
Sum (1976-1996)				16,174	0	0	91	0	0	0	33	20	0	58,231
Sum (1997-1998)				0	0	0	0	0	0	0	0	0	0	0
Total				16,174	0	0	90	0	0	0	33	0	0	58,231



Table E -1-5 (2/4) Flood Damage Record in Khuzestan Province														
Date	T/Ship	District	Village	No. of Houses			Human			Road (km)			Agri(ha)	
				70% ~	30-70	0-30	Kill	Lost	Injured	Vil.	Gra.	Pav.	Gar.	Farm
1963/4/9	Khoramshahr			450										100
1963/4/11	Khoramshahr			50										100
1964/12/20	Khoramshahr						4							
1968/1/27	Khoramshahr			62			4							
1972/3/28	Khoramshahr													200
1973/3/18	Khoramshahr													
1976/12/30	Khoramshahr			80										
1979/1/12	Khoramshahr													
1992/3/10	Khoramshahr			10			5		16					2000
1996/5/9	Khoramshahr			16										105
1964/1/23	Shooshtar			200										
1968/1/24	Shooshtar			200			4		40					
1983/3/20	Shooshtar						9							
1986/5/6	Shooshtar													
1992/12/29	Shooshtar			40										
1992/1/9	Shooshtar			10										
1992/2/23	Shooshtar													
1992/12/29	Gotvand			40										
1992/12/18	Gachsaran													
1992/12/30	Gachsaran			10										
1968/1/21	Masjad soleiman			50										
1974/2/3	Masjad soleiman			15										
1977/5/23	Masjad soleiman													
1979/12/14	Masjad soleiman													
1982/3/15	Masjad soleiman			1			4							
1986/6/18	Masjad soleiman						16							
1986/11/8	Masjad soleiman			150			1							
1989/12/4	Masjad soleiman						13				10			
1992/4/26	Masjad soleiman													
1992/1/13	Masjad soleiman			310										
1992/3/6	Masjad soleiman													
1994/11/7	Masjad soleiman													
1996/4/22	Masjad soleiman						3							
Note: Downstream of the Study area is included .														
														(Source : SED, MOJ)

**Table E -1-5 (3/4) Flood Damage Record in Khuzestan Province**

Table E -1-5 (3/4) Flood Damage Record in Khuzestan Province													
Livestock					Infrastructure			T/ Dam.	Longitude		Latitude		
Chicken	Horse	Camel	Sheep	Cow	Canal	Bridge	Well	Guat	MilR	From	To	From	To
			160										
						1		10					
						1							
			100										
						18							
						1			500				
			400	20		3			4152	50-00	50-15	31-32	32-00
			280										
						1							
						1							
								0					
			15,000										
			180										
			10,000			32		265	60,000				
										48-38	48-43	31-18	31-22
0	0	0	25,860	20	0	37	0	265	64,652				
0	0	0	0	0	0	0	0	0	28,000				
0	0	0	25,460	0	0	34	0	265	88,000				

[illegible]

Table E-2-1 Sediment Volume Estimation for Main Check Dam - (Vastegan)

No. of water course	No. of checkdam	Dam Type	Length (L) (m)	Width (B) (m)	Depth (height) (D) (m)	Empty height (d) (m)	Sediment section (A) (m <sup>2</sup> )	Slope (I) (%)	Length of sediment (l) (m)	Sediments volume (V) (m <sup>3</sup> )
TM	101	C	48.0	10.0	4.0	3.5	64.4	21.0	33.3	715.6
	102	C	54.0	10.0	3.5	3.0	68.3	4.9	122.4	2,787.8
	103	C	34.5	11.0	5.5	5.0	60.4	5.5	181.8	3,660.6
	104	A	51.0	15.0	8.0	6.0	123.8	9.7	123.7	5,105.2
	105	A	60.0	16.0	10.0	7.5	222.8	4.0	375.0	27,850.0
	106	A	59.0	18.0	8.0	6.5	160.1	4.4	295.5	15,767.4
	991	C	22.0	9.0	5.5	5.0	64.6	15.5	64.5	1,389.2
T1	111	C	16.0	9.0	3.0	2.5	28.9	13.4	37.3	359.5
	112	C	86.0	24.0	3.7	3.0	81.5	15.2	39.5	1,072.4
	121	C	31.0	7.0	3.0	2.2	46.5	17.7	24.9	385.3
	141	C	28.0	7.0	3.5	3.0	29.2	14.8	40.5	394.6
	161	C	33.5	13.0	4.0	3.5	62.1	14.6	47.9	992.5
	181	C	29.0	7.5	3.0	3.7	25.9	24.0	30.8	266.2
T2	201	C	20.0	12.0	4.3	3.7	48.6	8.2	90.2	1,462.0
	202	C	45.0	23.0	3.5	3.2	73.3	5.8	110.3	2,696.1
	221	C	21.5	8.0	4.0	3.5	36.2	4.2	166.7	2,011.1
	211	C	42.0	12.0	4.5	4.5	99.5	7.2	125.0	4,145.8
	212	C	43.0	20.0	7.5	7.0	223.3	2.9	482.8	35,933.3
T3	301	C	41.0	8.0	6.0	5.5	112.9	33.3	33.0	1,243.1
	302	C	35.0	7.0	6.5	6.0	91.6	14.3	83.9	2,562.2
	303	C	23.0	7.5	3.0	2.5	21.2	11.4	43.9	309.9
	304	C	30.0	8.0	3.5	3.0	40.1	8.2	73.2	978.0
	Total									112,087.8

Table E-2-2 Sediment Volume Estimation for Main Check Dam - (Chaman-Goli Bazoft)

No. of water course	No. of checkdam	Dam Type	Length (L) (m)	Width (B) (m)	Depth (height) (D) (m)	Empty height (d) (m)	Sediment section (A) (m <sup>2</sup> )	Slope (I) (%)	Length of sediment (l) (m)	Sediments volume (V) (m <sup>3</sup> )
T1	101	C	27.0	7.0	3.8	3.2	28.6	10.6	60.4	575.6
	102	C	29.0	6.0	4.5	4.0	49.3	14.4	55.6	913.0
	103	C	30.0	13.0	4.5	4.0	55.6	5.7	140.4	2,601.2
T2	201	C	36.0	26.0	3.5	2.5	26.6	5.6	89.3	791.7
	202	C	36.0	26.0	3.4	2.5	26.6	8.0	62.5	554.2
	203	C	29.0	16.0	4.0	3.2	39.0	0.8	800.0	10,400.0
	204	B	62.0	22.0	8.0	6.0	139.4	3.3	363.6	16,897.0
	205	E	46.0	32.0	5.0	2.5	71.7	5.1	98.0	2,343.1
	206	B	54.0	32.0	5.0	2.5	55.1	3.6	138.9	2,550.9
	211	C	27.0	8.0	4.0	3.2	28.6	13.9	46.0	438.9
	221	C	27.0	12.0	4.0	2.5	28.6	18.6	26.9	256.3
	231	C	30.0	18.0	3.5	2.5	45.6	20.9	23.9	363.6
	241	C	43.0	24.0	4.5	3.5	81.9	12.1	57.9	1,579.3
	242	C	43.0	25.0	4.5	3.5	81.9	21.9	32.0	872.6
	243	C	43.0	25.0	4.5	3.5	81.9	6.9	101.4	2,769.6
	244	C	43.0	26.0	4.5	3.5	81.9	11.0	63.6	1,737.3
	251	A	26.0	10.5	10.0	8.5	138.1	18.5	91.9	4,230.1
	261	C	27.0	7.0	4.0	3.2	28.6	24.0	26.7	254.2
	271	C	14.0	7.0	5.0	3.7	22.1	29.7	24.9	183.5
	281	C	14.0	7.0	5.0	3.7	22.1	29.4	25.2	185.4
	291	C	14.0	7.0	5.0	3.7	22.1	23.6	31.4	231.0
T3	311	C	32.0	12.0	4.0	3.5	60.5	8.7	80.5	1,622.6
	321	C	34.0	11.0	4.0	3.5	61.2	37.2	18.8	383.9
	341	C	34.0	11.0	4.0	3.5	61.2	32.9	21.3	434.0
T4	401	C	27.0	7.0	4.0	3.2	28.6	20.6	31.1	296.2
T5	501	C	27.0	7.0	4.0	3.2	28.6	17.4	36.8	350.7
	Total									53,815.8

Table E-2-3 Sediment Volume Estimation for Main Check Dam - (Sarbaz)

No. of water course	No. of checkdam	Dam Type	Length (L) (m)	Width (B) (m)	Depth (height) (D) (m)	Empty height (d) (m)	Sediment section (A) (m <sup>2</sup> )	Slope (I) (%)	Length of sediment (l) (m)	Sediments volume (V) (m <sup>3</sup> )
TM	1001	C	52.0	18.0	6.0	3.7	45.6	4.0	185.0	2,812.0
	1002	B	62.0	22.0	8.0	6.0	139.4	4.5	266.7	12,391.1
	1201	C	50.0	14.0	3.5	3.0	72.0	2.3	260.9	6,260.9
	1211	C	28.0	13.0	3.0	2.5	24.3	2.6	192.3	1,557.7
	1221	C	46.0	9.0	3.5	3.0	55.6	33.3	18.0	333.9
	1241	C	38.0	8.0	3.2	2.7	41.3	4.9	110.2	1,517.1
	1301	C	42.0	14.0	5.5	4.7	100.3	3.4	276.5	9,243.3
	1302	C	66.0	32.0	7.0	6.2	283.7	3.6	344.4	32,573.0
	1401	C	28.0	13.0	4.5	4.0	45.8	6.7	119.4	1,822.9
	1402	C	51.0	17.0	2.5	2.0	26.4	4.9	81.6	718.4
	1511	C	34.0	12.0	3.0	2.3	19.1	3.4	135.3	861.4
	1601	C	26.0	10.0	5.5	4.7	51.4	11.9	79.0	1,353.4
	1701	C	38.0	16.0	4.0	3.5	55.1	6.9	101.4	1,863.3
	1801	C	45.0	11.0	4.5	4.0	77.4	11.5	69.6	1,794.8
T1	101	C	30.0	13.0	5.0	4.5	52.4	33.4	26.9	470.7
	102	C	29.0	10.0	5.5	5.0	54.7	12.0	83.3	1,519.4
	103	C	32.0	13.0	4.0	3.5	44.6	9.1	76.9	1,143.6
	104	C	26.0	15.0	5.5	4.7	53.9	9.1	103.3	1,855.9
	105	C	30.0	13.0	5.0	4.0	57.0	5.7	140.4	2,666.7
	106	C	33.0	13.0	5.0	4.5	66.0	4.7	191.5	4,212.8
	107	C	65.0	35.0	3.5	3.0	121.9	3.8	157.9	6,415.8
	111	C	27.0	10.0	3.0	2.2	25.5	20.4	21.6	183.3
	121	C	30.0	11.0	5.0	4.5	69.5	17.3	52.0	1,205.2
	141	C	32.0	10.0	6.0	5.5	76.7	15.0	73.3	1,874.9
	201	C	28.0	7.0	5.5	5.0	64.3	13.8	72.5	1,553.1
	202	C	31.0	6.0	6.5	6.0	71.9	9.8	122.4	2,934.7
T2	203	C	27.0	9.0	6.5	6.0	82.6	5.2	230.8	6,353.8
	204	C	45.0	10.0	6.5	5.7	88.6	3.1	367.7	10,860.6
	211	C	27.0	7.0	7.5	7.0	80.7	9.6	145.8	3,922.9
	221	C	33.0	6.0	5.0	4.5	38.3	12.1	74.4	949.6
	301	C	38.0	13.0	5.0	4.5	86.8	10.4	86.5	2,503.8
T3	302	C	48.0	14.0	5.5	4.5	104.4	6.0	150.0	5,220.0
	303	C	26.0	8.0	5.0	4.0	47.0	6.9	115.9	1,816.4
	311	C	44.0	13.0	5.0	4.5	91.9	7.4	121.6	3,725.7
	Total									136,492.1

Table E-2-4 Sediment Volume Estimation for Main Check Dam - (Tangsorkh)

No. of water course	No. of checkdam	Dam Type	Length (L) (m)	Width (B) (m)	Depth (height) (D) (m)	Empty height (d) (m)	Sediment section (A) (m <sup>2</sup> )	Slope (I) (%)	Length of sediment (l) (m)	Sediments volume (V) (m <sup>3</sup> )
TM	1001	B	47.0	15.0	9.5	7.0	172.8	4.4	318.2	18,327.3
	1101	C	22.5	11.0	5.0	4.5	56.0	17.7	50.8	949.2
	1102	C	40.0	8.0	6.0	5.3	99.1	9.4	112.8	3,725.0
	1103	C	29.5	12.0	3.0	2.5	33.5	6.9	72.5	809.2
	1111	C	25.0	6.0	4.5	4.0	49.5	21.9	36.5	602.7
	1121	C	36.0	14.0	5.0	4.2	82.1	7.4	113.5	3,106.5
	1301	C	36.5	10.0	5.0	4.5	87.2	5.8	155.2	4,510.3
	1401	C	37.5	10.0	4.5	4.0	65.7	12.8	62.5	1,368.8
	1201	C	21.0	6.0	5.5	5.0	58.5	5.8	172.4	3,362.1
T1	101	C	18.0	7.0	2.0	1.8	14.0	7.2	50.0	233.3
T2	201	C	42.0	9.0	2.5	2.0	38.6	7.7	51.9	668.4
T3	301	C	36.0	6.0	4.0	4.0	61.2	3.5	228.6	4,662.9
T4	401	C	16.0	6.0	2.5	2.0	13.7	18.9	21.2	96.6
T5	501	C	32.0	5.0	4.0	3.5	45.0	6.6	106.1	1,590.9
	502	C	29.0	10.0	3.5	3.0	42.0	6.1	98.4	1,377.0
	50	C	27.5	8.0	4.5	4.0	39.1	6.0	133.3	1,737.8
	511	C	26.5	7.0	4.0	3.5	42.4	9.5	73.7	1,041.4
	701	C	48.0	12.0	4.0	3.5	69.1	20.3	34.5	794.3
T6	601	C	26.5	5.0	5.0	4.7	59.5	8.7	108.0	2,142.9
	602	C	34.0	4.0	4.0	3.5	100.8	5.1	137.3	4,611.8
	Total									55,718.3

Table E-2-5 Sediment Volume Estimation for Main Check Dam - (Zeras)



Table E-2-6 River Improvement (Channel Work at Vastegan) 1/3

No.	Structure			Spillway				Elevation		River-bed Gradient		Section	Remarks
	Type	G. Height	T. Height	H	h	Width	S.Slope	Planned	Existing	Planned	Existing	Distance	
26	-							2296.029	2296.029	1/50	1/14	46.63	End of Check Dam
25	Cosoli. Dam	-2.35	2.35	2.0	1.4	20.0	1:1	2295.096	2292.747				
								2293.525		1/50	1/583	42.54	
24	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2292.674	2292.674	1/50	1/50	37.06	
24-1	Ground Sill	-0.74	0.00	2.0	1.4	20.0	1:1	2291.933	2292.674	1/50	1/50	37.06	
24-2	Ground Sill	-0.74	0.00	2.0	1.4	20.0	1:1	2291.192	2291.933	1/50	1/50	37.06	
24-3	Ground Sill	-0.74	0.00	2.0	1.4	20.0	1:1	2290.451	2291.192	1/50	1/50	37.06	
24-4	Ground Sill	-0.74	0.00	2.0	1.4	20.0	1:1	2289.709	2290.451	1/50	1/50	37.06	
23	Cosoli. Dam	-1.77	1.77	2.0	1.4	20.0	1:1	2288.998	2288.998				
								2287.229		1/50	1/23	36.93	
23-1	Ground Sill	-0.90	0.00	2.0	1.4	20.0	1:1	2286.491	2287.392	1/50	1/23	36.93	
22	Drop Chute	-0.79	0.79	2.0	1.4	20.0	1:1	2285.752	2285.752				
								2284.967		1/50	1/32	34.64	
22-1	Ground Sill	-0.40	0.00	2.0	1.4	20.0	1:1	2284.274	2284.670	1/50	1/32	34.64	
21	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2283.581	2283.581	1/52	1/52	37.76	
21-1	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2282.855	2282.855	1/52	1/52	37.76	
21-2	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2282.129	2282.129	1/52	1/52	37.76	
20	Drop Chute	-0.72	0.72	2.0	1.4	20.0	1:1	2281.410	2281.410				
								2280.688		1/50	1/33	35.94	
20-1	Ground Sill	-0.35	0.00	2.0	1.4	20.0	1:1	2279.9688	2280.321	1/50	1/33	35.94	
19	Drop Chute	-0.50	0.50	2.0	1.4	20.0	1:1	2279.250	2279.250				
								2278.746		1/50	1/30	39.75	
18	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2277.951	2277.951	1/50	1/50	36.03	
18-1	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2277.233	2277.230	1/50	1/50	36.03	
18-2	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2276.513	2276.510	1/50	1/50	36.03	
17	Cosoli. Dam	-2.11	2.11	2.0	1.4	20.0	1:1	2275.792	2275.792				
								2273.684		1/50	1/44	42.08	
16	Ground Sill	0.00	0.00	2.0	1.4	20.0	1:1	2272.842	2272.842	1/51	1/51	35.32	
15	-							2274.148	2274.148	1/51	1/14	23.73	Bridge at Vastegan
14	Cosoli. Dam	+1.25	2.50	2.0	1.4	20.0	1:1	2273.679	2272.429				
		-1.25						2271.179		1/62	1/42	54.01	
14-1	Ground Sill	-0.82	0.00	2.0	1.4	23.3		2270.320	2271.143				

Table E-2-6 River Improvement (Channel Work at Vastegan) 2/3

No.	Structure			Spillway				Elevation		River-bed Gradient		Section Distance	Remarks
	Type	G. Height	T. Height	H	h	Width	S.Slope	Planned	Existing	Planned	Existing		
										1/62	1/42	54.01	
14-2	Ground Sill	-0.41	0.00	2.0	1.4	26.6		2269.4491	2269.857				
										1/62	1/42	54.01	
13	Cosoli. Dam	0.00	0.00	2.0	1.4	30.0	1:1.5	2268.578	2268.578				
										1/110	1/471	57.55	
13-1	Ground Sill	-0.40	0.00	2.0	1.4	30.0	1:1.5	2268.055	2268.456				
										1/110	1/471	57.55	
13-2	Ground Sill	-0.80	0.00	2.0	1.4	30.0	1:1.5	2267.532	2268.334				
										1/110	1/471	57.55	
13-3	Ground Sill	-1.20	0.00	2.0	1.4	30.0	1:1.5	2267.0085	2268.211				
										1/110	1/471	57.55	
13-4	Ground Sill	-1.60	0.00	2.0	1.4	30.0	1:1.5	2266.4853	2268.0893				
										1/110	1/471	57.55	
12	Ground Sill	-2.00	0.00	2.0	1.4	30.0	1:1.5	2265.962	2267.967				
										1/110	1/74	57.64	
12-1	Ground Sill	-1.75	0.00	2.0	1.4	30.0	1:1.5	2265.4381	2267.1881				
										1/110	1/74	57.64	
12-2	Ground Sill	-1.50	0.00	2.0	1.4	30.0	1:1.5	2264.9141	2266.4091				
										1/110	1/74	57.64	
12-3	Ground Sill	-1.24	0.00	2.0	1.4	30.0	1:1.5	2264.3901	2265.6302				
										1/110	1/74	57.64	
12-4	Ground Sill	-0.99	0.00	2.0	1.4	30.0	1:1.5	2263.866	2264.8513				
										1/110	1/74	57.64	
12-5	Ground Sill	-0.73	0.00	2.0	1.4	30.0	1:1.5	2263.342	2264.0723				
										1/110	1/74	57.64	
12-6	Ground Sill	-0.48	0.00	2.0	1.4	30.0	1:1.5	2262.818	2263.2934				
										1/110	1/74	57.64	
12-7	Ground Sill	-0.22	0.00	2.0	1.4	30.0	1:1.5	2262.294	2262.5144				
										1/110	1/74	57.64	
11	Cosoli. Dam	0.05	2.55	2.0	1.4	30.0	1:1.5	2261.770	2261.723				
		-2.50						2261.714		1/110	1/44	60.39	
								2259.214					
11-1	Ground Sill	-1.69	0.00	2.0	1.4	30.0	1:1.5	2258.665	2260.351				
										1/110	1/44	60.39	
11-2	Ground Sill	-0.86	0.00	2.0	1.4	30.0	1:1.5	2258.116	2258.978				
										1/110	1/44	60.39	
11-3	Cosoli. Dam	-0.04	2.50	2.0	1.4	30.0	1:1.5	2257.567	2257.606				
		-2.50						2255.067		1/110	1/44	60.39	
11-4	Ground Sill	-1.72	0.00	2.0	1.4	30.0	1:1.5	2254.518	2256.233				
										1/110	1/44	60.39	
11-5	Ground Sill	-0.89	0.00	2.0	1.4	30.0	1:1.5	2253.969	2254.861				
										1/110	1/44	60.39	
10	Drop Chute	-0.50	0.50	2.0	1.4	30.0	1:1.5	2253.420	2253.420				
								2252.920					
										1/105	1/86	59.23	
10-1	Ground Sill	-0.38	0.00	2.0	1.4	30.0	1:1.5	2252.3559	2252.731				
										1/105	1/86	59.23	
10-2	Ground Sill	-0.25	0.00	2.0	1.4	30.0	1:1.5	2251.7917	2252.042				
										1/105	1/86	59.23	
10-3	Ground Sill	-0.13	0.00	2.0	1.4	30.0	1:1.5	2251.2276	2251.354				
										1/105	1/86	59.23	
9	-							2251.228	2250.961				
										1/105	1/102	59.23	
10-4	Ground Sill	-0.04	0.00	2.0	1.4	30.0	1:1.5	2250.6635	2250.699				
										1/105	1/102	59.23	
10-5	Ground Sill	-0.02	0.00	2.0	1.4	30.0	1:1.5	2250.0994	2250.119				
										1/105	1/102	59.23	

Table E-2-6 River Improvement (Channel Work at Vastegan) 3/3

No.	Structure			Spillway				Elevation		River-bed Gradient		Section	Remarks
	Type	G. Height	T. Height	H	h	Width	S.Slope	Planned	Existing	Planned	Existing	Distance	
8	Drop Chute	0.00	0.50	2.0	1.4	30.0	1:1.5	2249.538	2249.538				
		-0.50						2249.038		1/105	1/76	51.12	
8-1	Ground Sill	-0.32	0.00	2.0	1.4	30.0	1:1.5	2248.551	2248.871				
										1/105	1/76	51.12	
7	Cosoli. Dam	-0.13	0.13	2.0	1.4	30.0	1:1.5	2248.064	2248.198				
										1/115	1/102	49.01	
7-1	Ground Sill	-0.08	0.00	2.0	1.4	30.0	1:1.5	2247.6381	2247.713				
										1/115	1/102	49.01	
6	Cosoli. Dam	-0.02	0.02	2.0	1.4	30.0	1:1.5	2247.212	2247.233				
										1/110	1/166	70.87	
6-1	Ground Sill	-0.24	0.00	2.0	1.4	30.0	1:1.5	2246.568	2246.8079				
										1/110	1/166	70.87	
5	Cosoli. Dam	-0.45	0.45	2.0	1.4	30.0	1:1.5	2245.934	2246.381				
										1/100	1/88	55.59	
5-1	Ground Sill	-0.38	0.00	2.0	1.4	30.0	1:1.5	2245.378	2245.754				
										1/100	1/88	55.59	
4	Drop Chute	-0.55	0.55	2.0	1.4	30.0	1:1.5	2244.822	2245.122				
								2244.571					
										1/100	1/59	75.19	
3	Cosoli. Dam	-0.03	0.03	2.0	1.4	30.0	1:1.5	2243.820	2243.852				
										1/95	1/205	72.74	
2	Ground Sill	-0.44	0.00	2.0	1.4	30.0	1:1.5	2243.054	2243.498				
										1/95	1/46	39.70	
1	Drop Chute	-0.17	0.17	2.0	1.4	30.0	1:1.5	2242.636	2242.636				
								2242.465					
										1/95	1/91	54.09	
1-1	Ground Sill	-0.15	0.00	2.0	1.4	30.0	1:1.5	2241.895	2242.046				
										1/95	1/91	54.09	
1-2	Ground Sill	-0.13	0.00	2.0	1.4	30.0	1:1.5	2241.326	2241.451				
										1/95	1/91	54.09	
1-3	Ground Sill	-0.10	0.00	2.0	1.4	30.0	1:1.5	2240.757	2240.857				
										1/95	1/91	54.09	
1-4	Ground Sill	-0.08	0.00	2.0	1.4	30.0	1:1.5	2240.187	2240.262				
										1/95	1/91	54.09	
1-5	Ground Sill	-0.05	0.00	2.0	1.4	30.0	1:1.5	2239.618	2239.668				
										1/95	1/91	54.09	
1-6	Ground Sill	-0.03	0.00	2.0	1.4	30.0	1:1.5	2239.048	2239.073				
										1/95	1/91	54.09	
0				2.0	1.4	30.0	1:1.5	2238.479	2238.479				Irrigation Canal

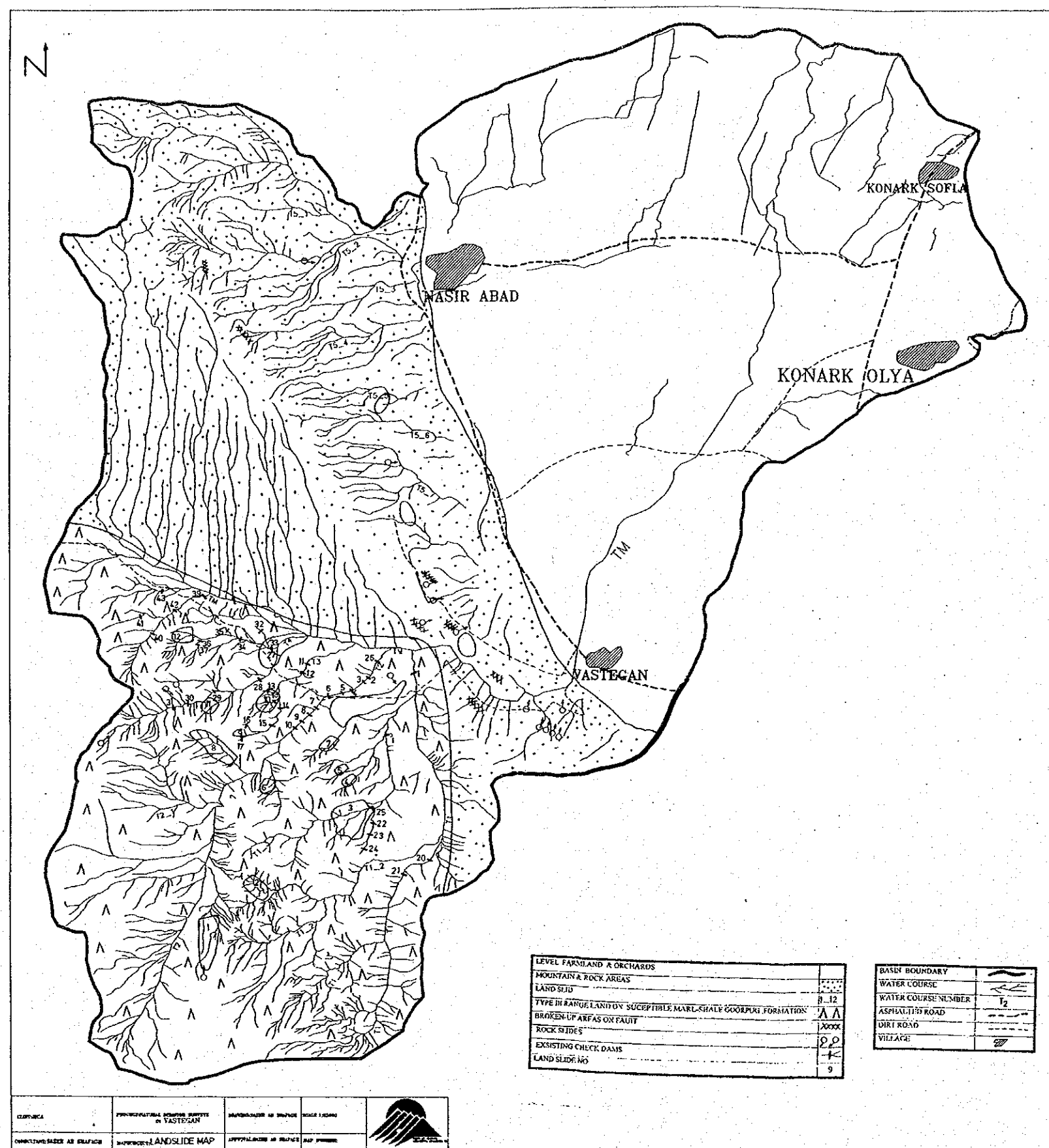
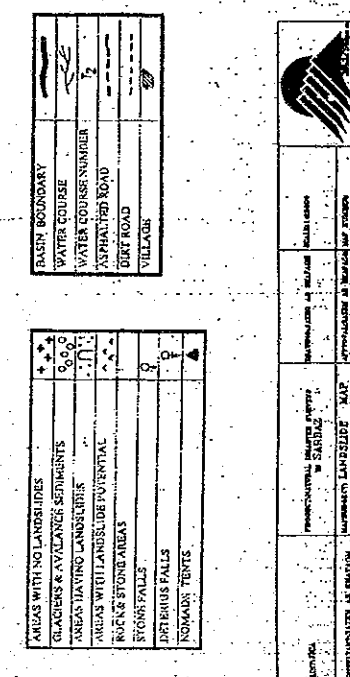


Figure E-2-1 Location Map of Natural Disaster - (Vastegan)





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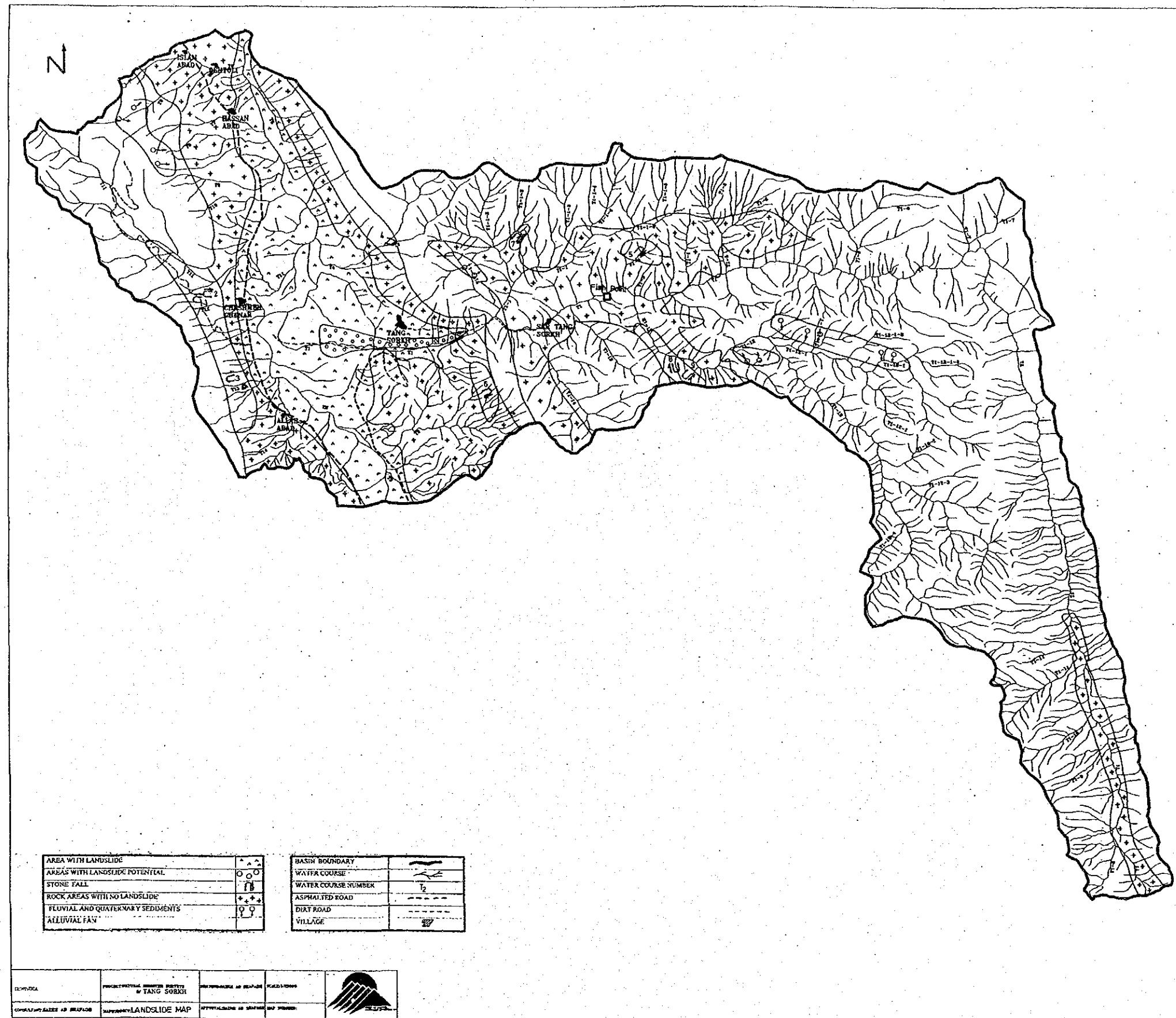


Figure E-2-4 Location Map of Natural Disaster - (Tangsorkh)

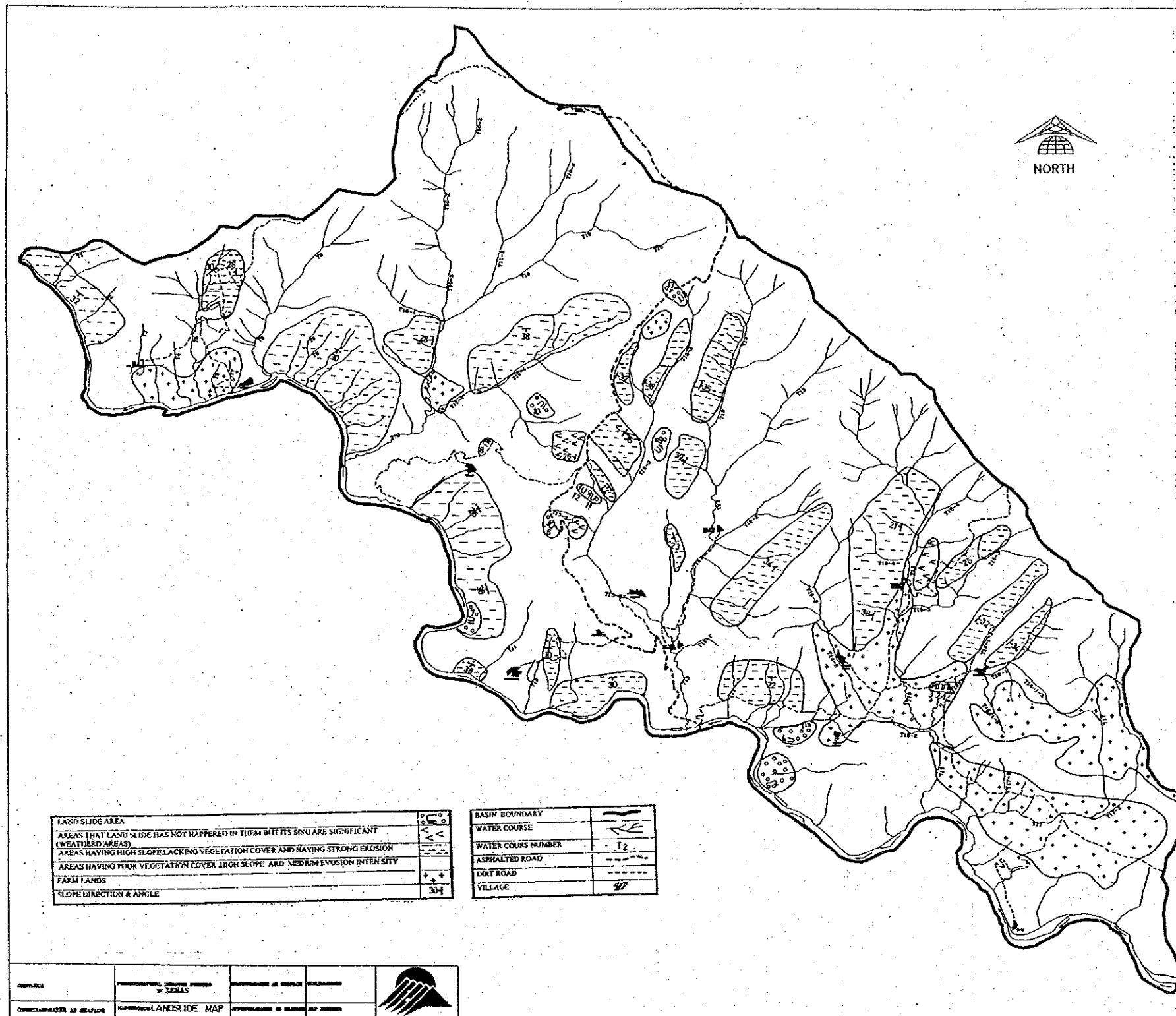


Figure E-2-5 Location Map of Natural Disaster - (Zeras)



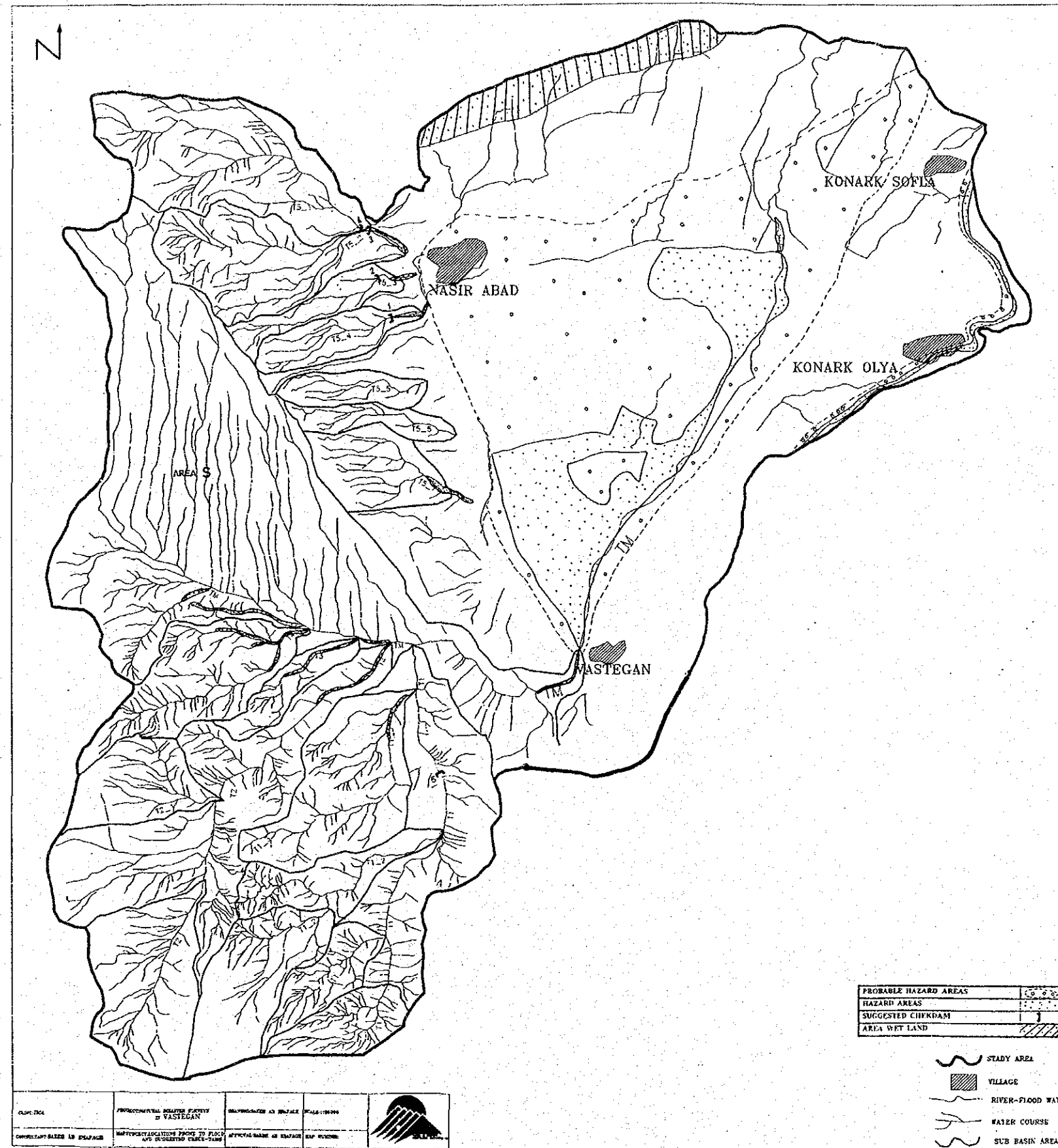


Figure E-2-6 Location Map of Hazard Area - (Vastegan)

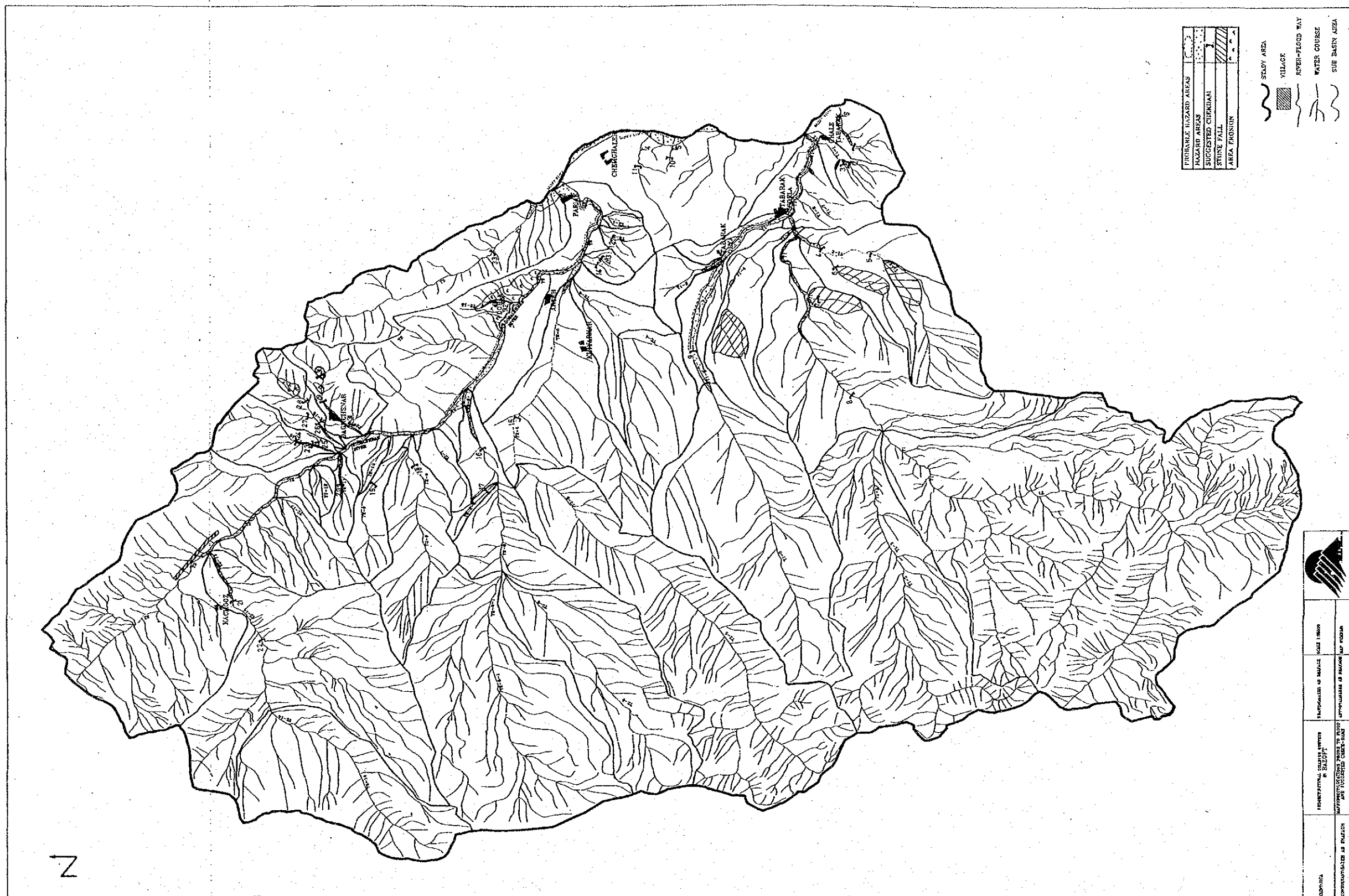


Figure E-2-7 Location Map of Hazard Area - (Chaman-Goli Bazoft)



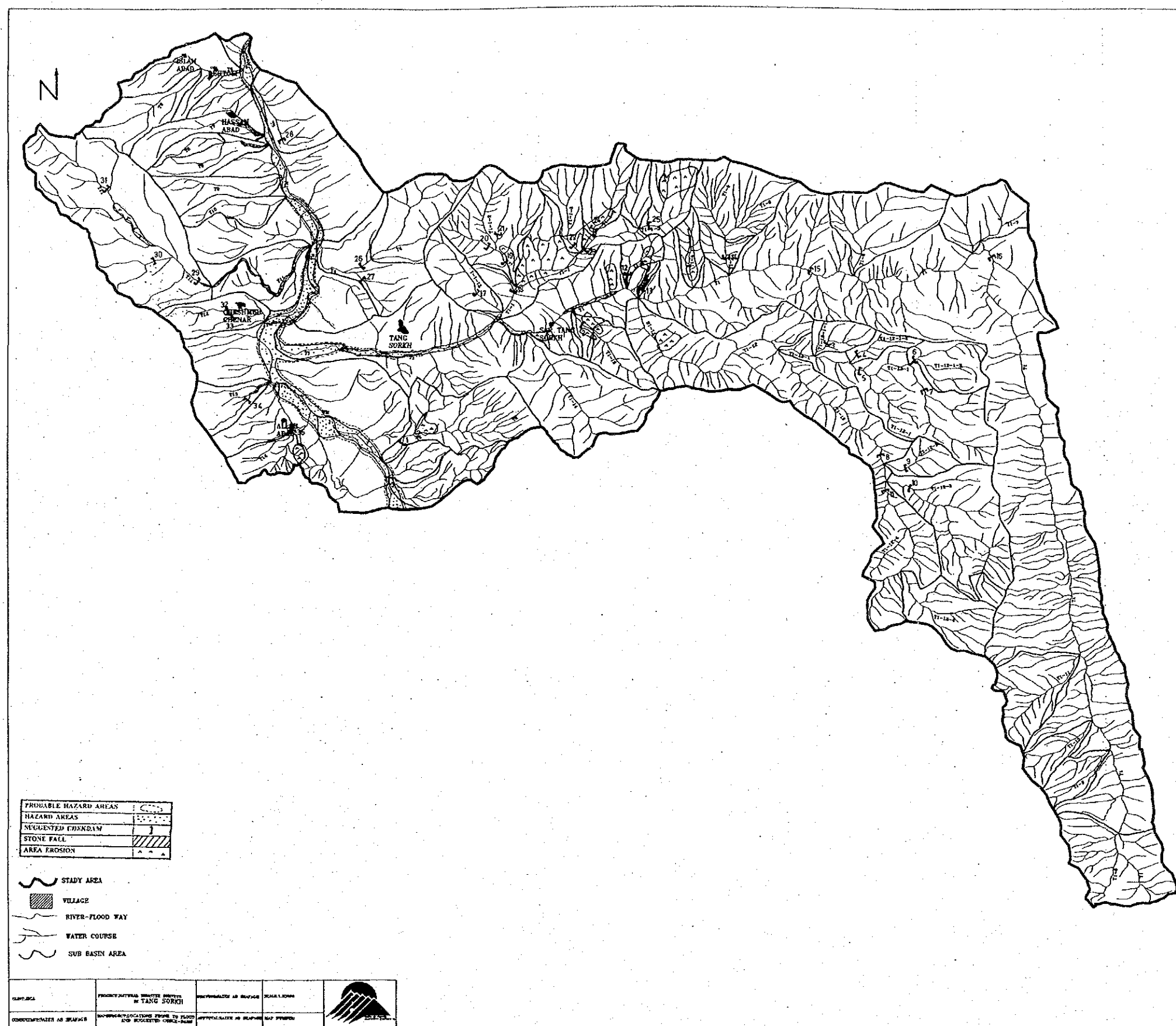


Figure E-2-9 Location Map of Hazard Area - (Tangsorkh)

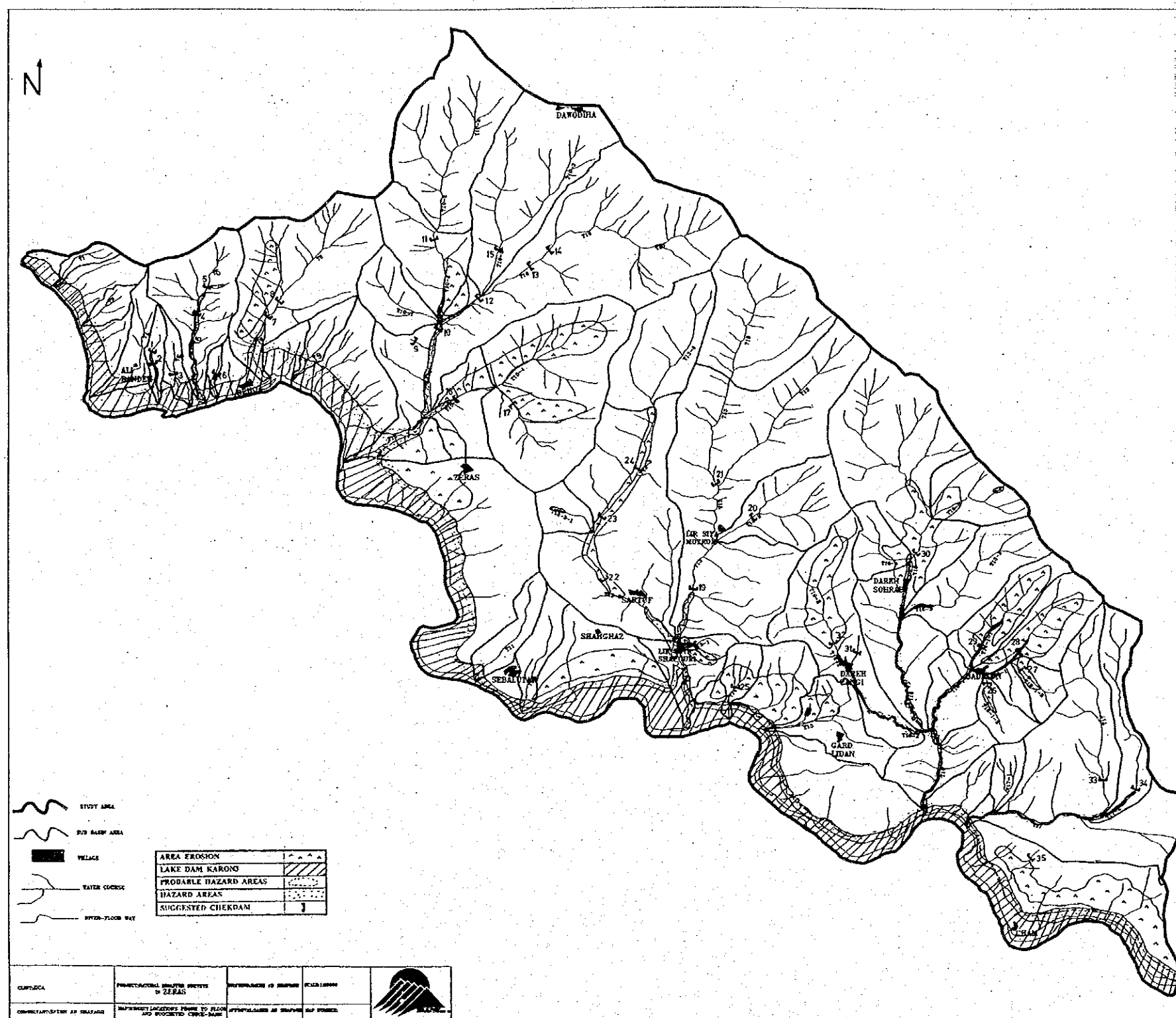
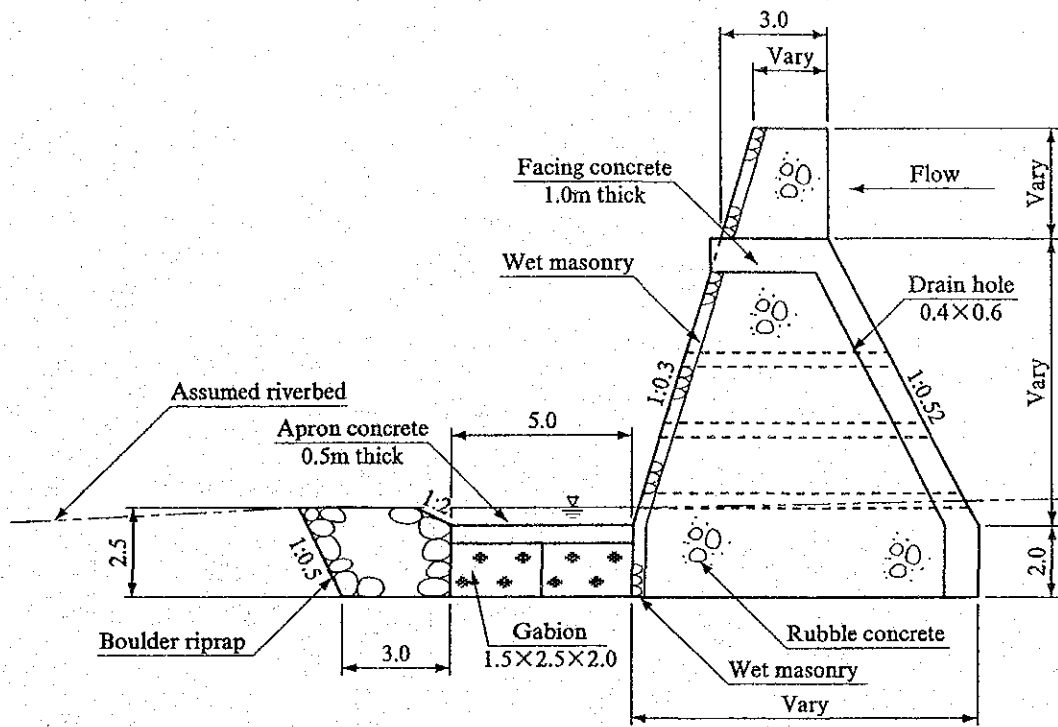


Figure E-2-10 Location Map of Hazard Area - (Zeras)

# CHECK DAM Type A



# Type B

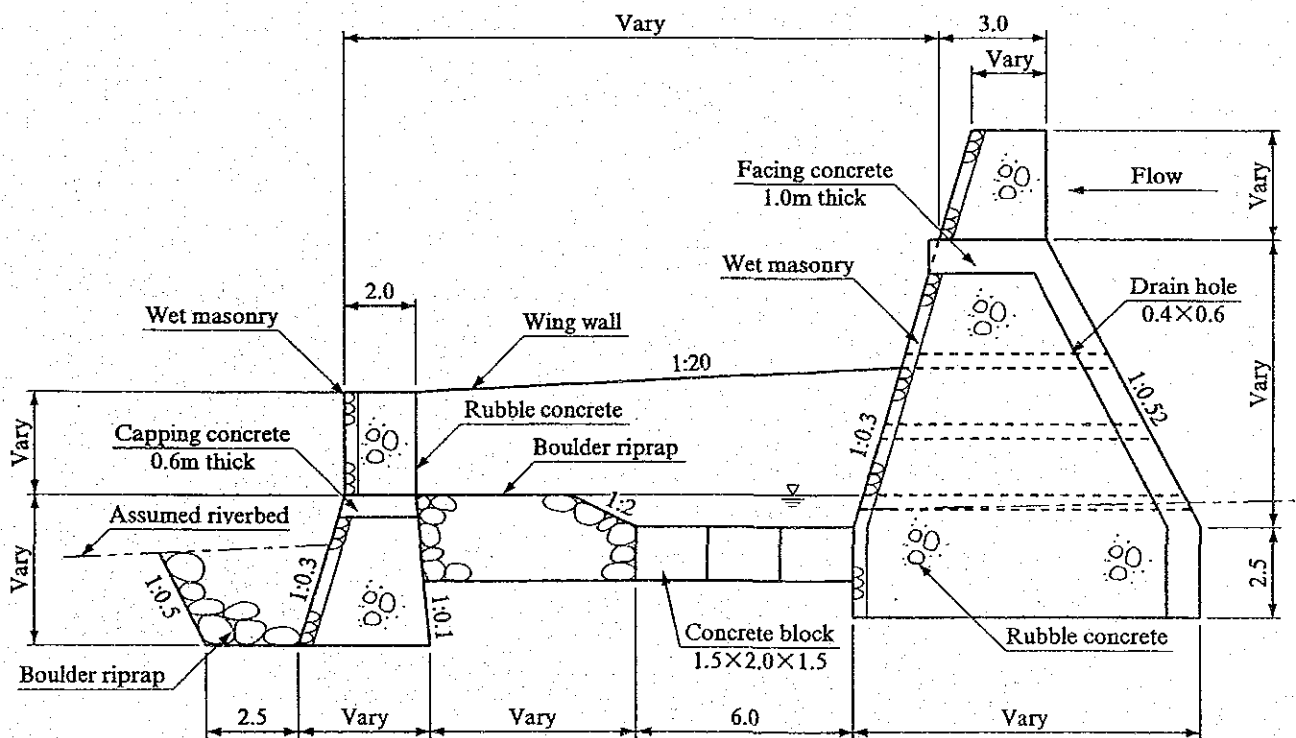
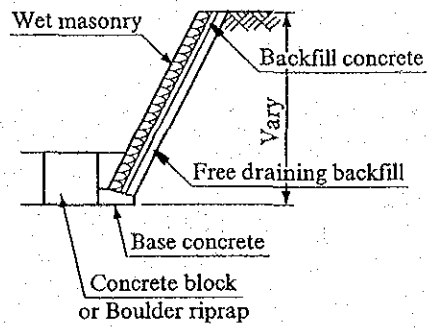
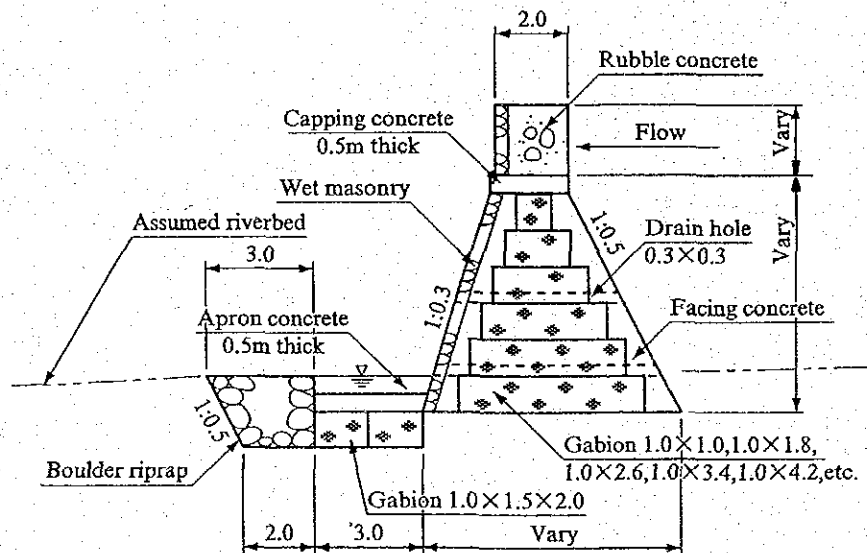


Figure E-2-11 Disaster Prevention Structure - Check Dam (Type A, Type B)

### Wing wall (cross section)



### Type C



### Type D

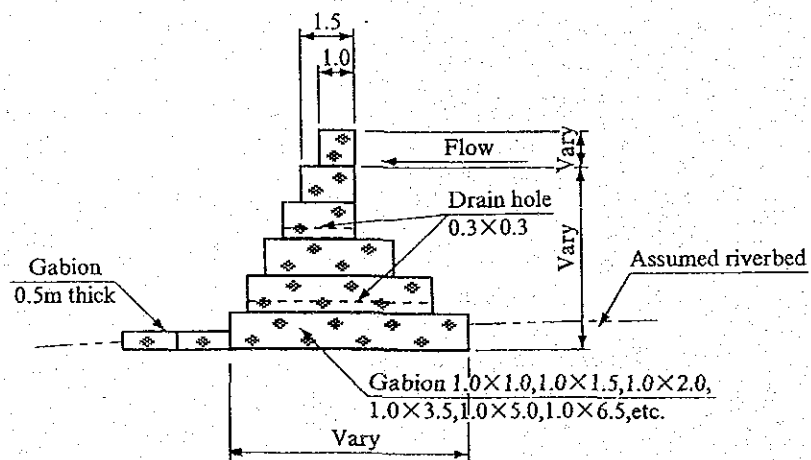
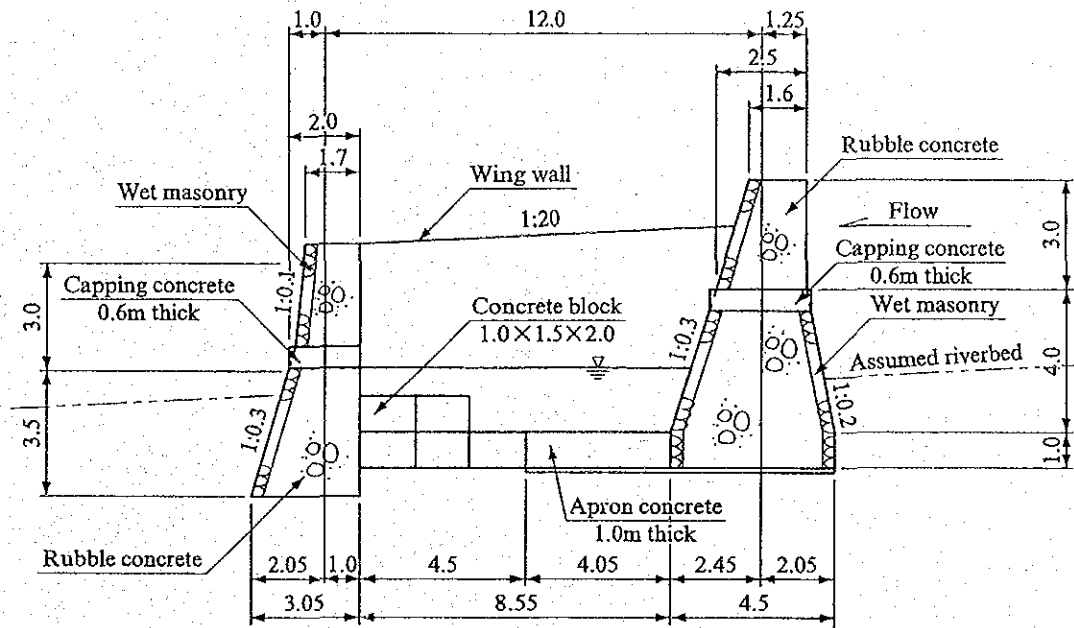


Figure E-2-12 Disaster Prevention Structure – Check Dam (Type C, Type D)

## Type E



## Wing wall

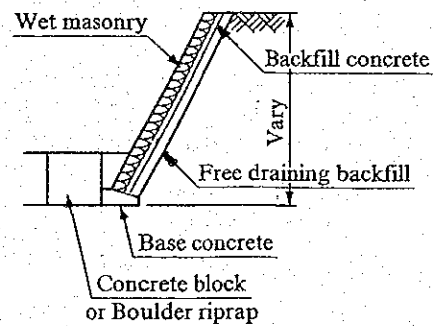
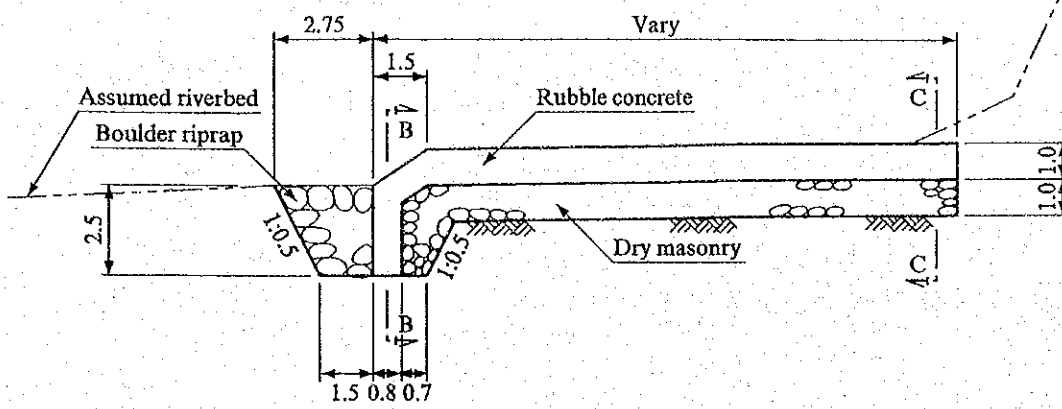


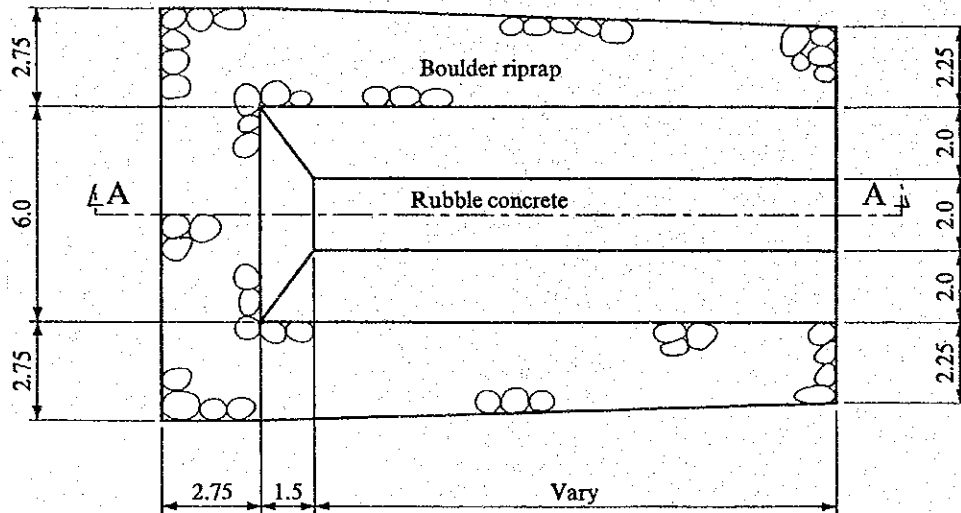
Figure E-2-13 Disaster Prevention Structure – Ground Sill (Type E)



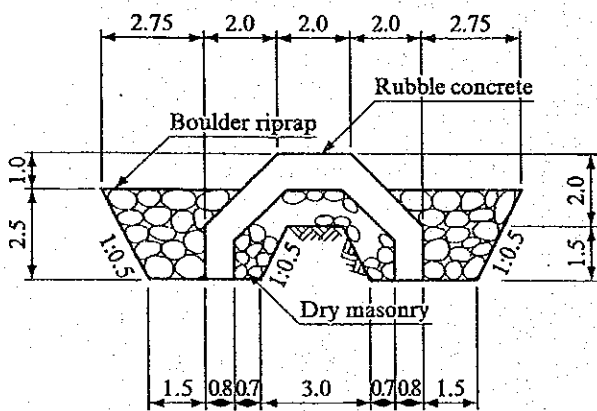
Bazoft  
SPUR DYKE  
SECTION A-A



PLAN



SECTION B-B



SECTION C-C

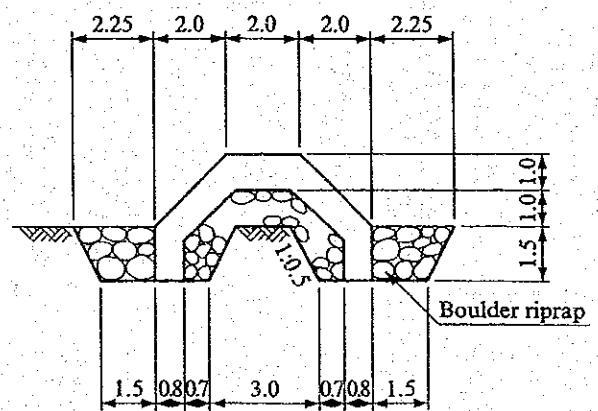
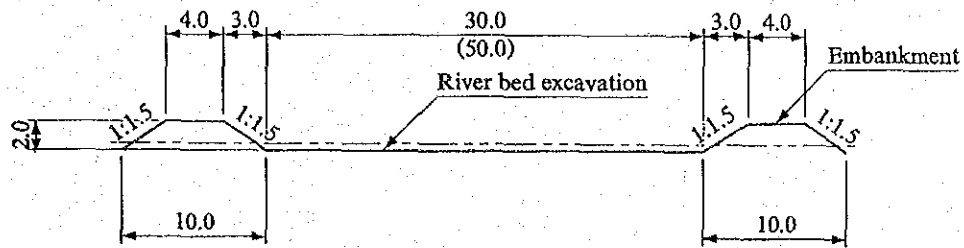


Figure E-2-14 Disaster Prevention Structure - Spur Dike

### River Treatment

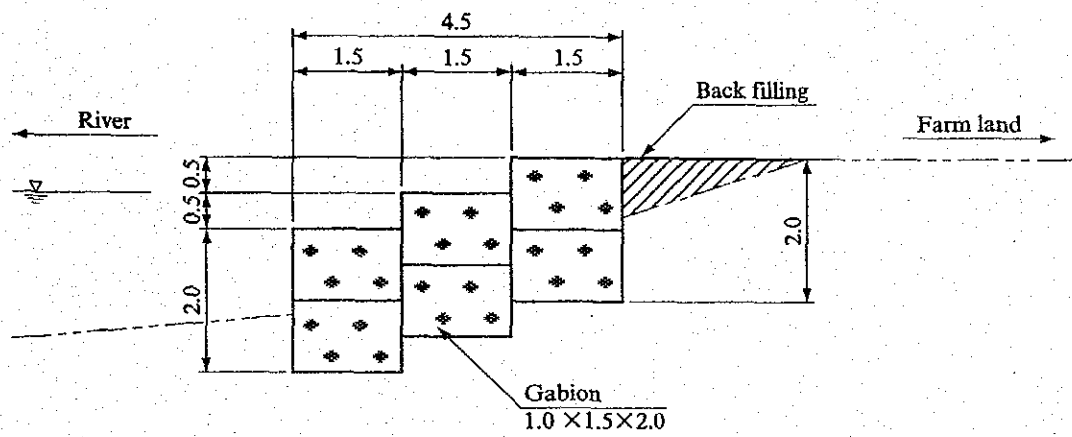
#### Vastegan



Note: Figure in ( ) denotes the river width in downstream section

### River Bank Protection

#### Bazoft



### River Bank Protection

#### Sarbaz

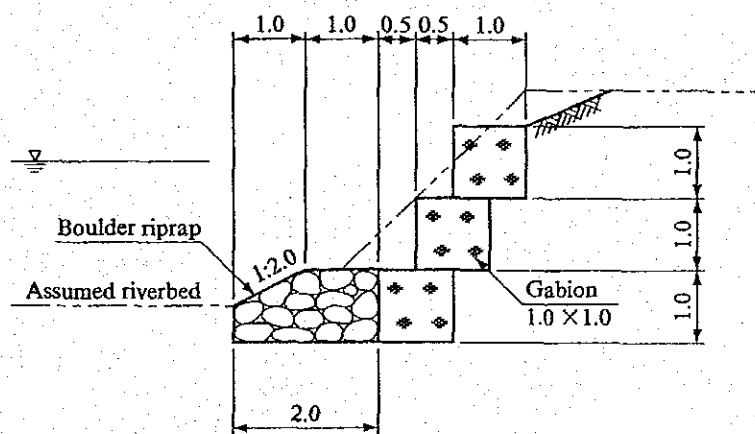
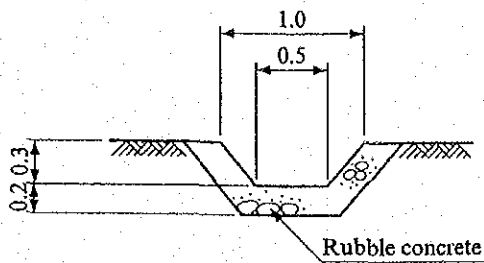


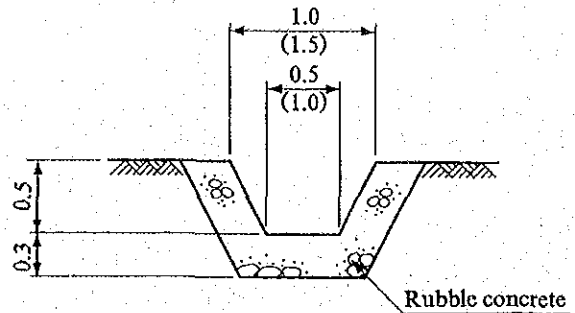
Figure E-2-15 Disaster Prevention Structure-River Treatment / Bank Protection

## LANDSLIDE PROTECTION

Horizontal drain



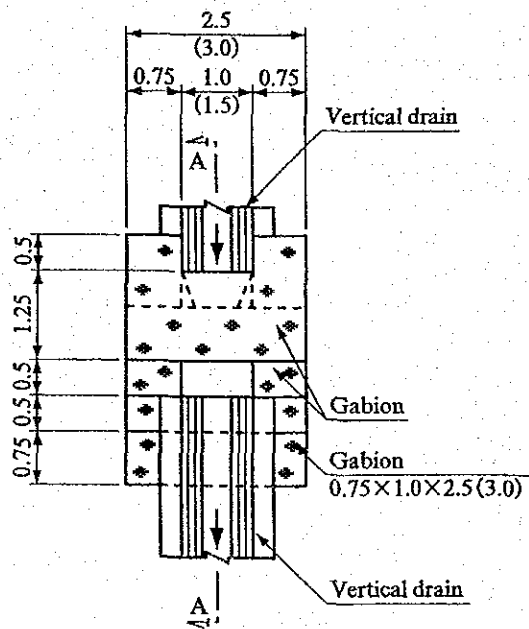
Vertical drain



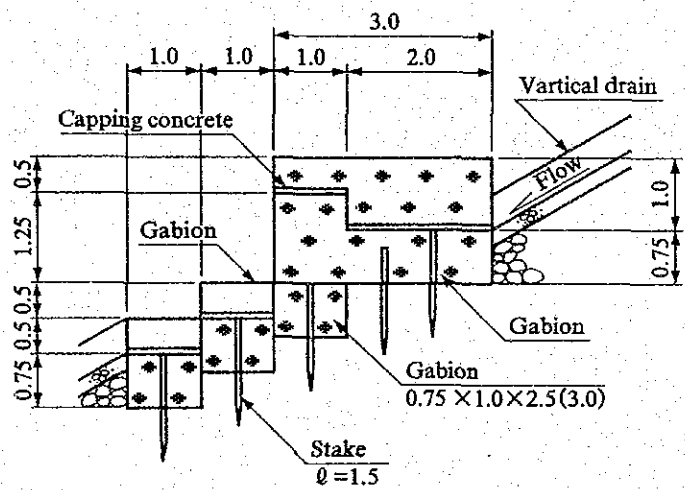
Note: Figure in ( ) denotes the large size drain

Drop check chute

Front view

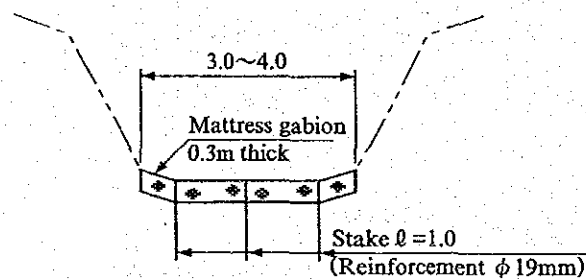


SECTION A-A



Note: Figure in ( ) denotes the large size chute

## GULLY PROTECTION (Cross section)



Note: Drop check chute is to be installed every 20m on the gully

Figure E-2-16 Disaster Prevention Structure-Landslide Protection

## ROCKFALL PROTECTION

Cross section

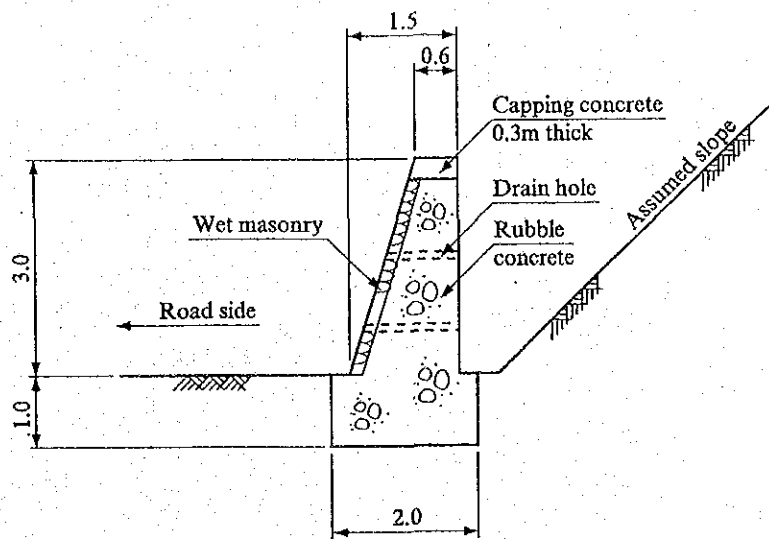
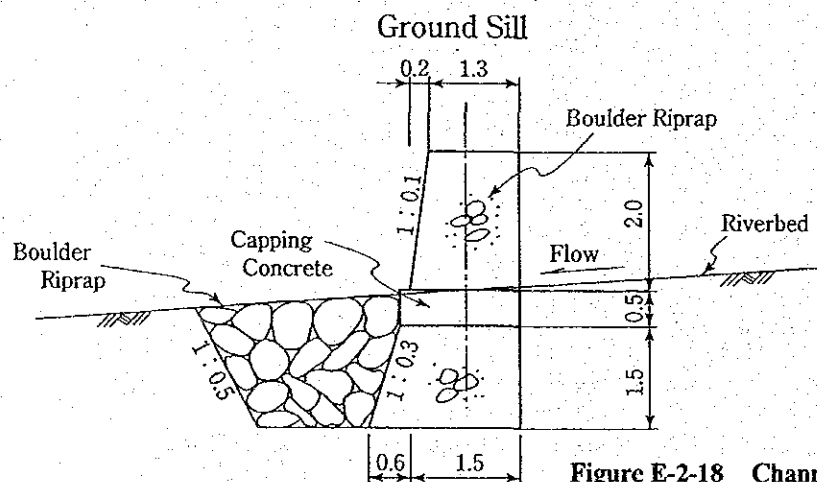
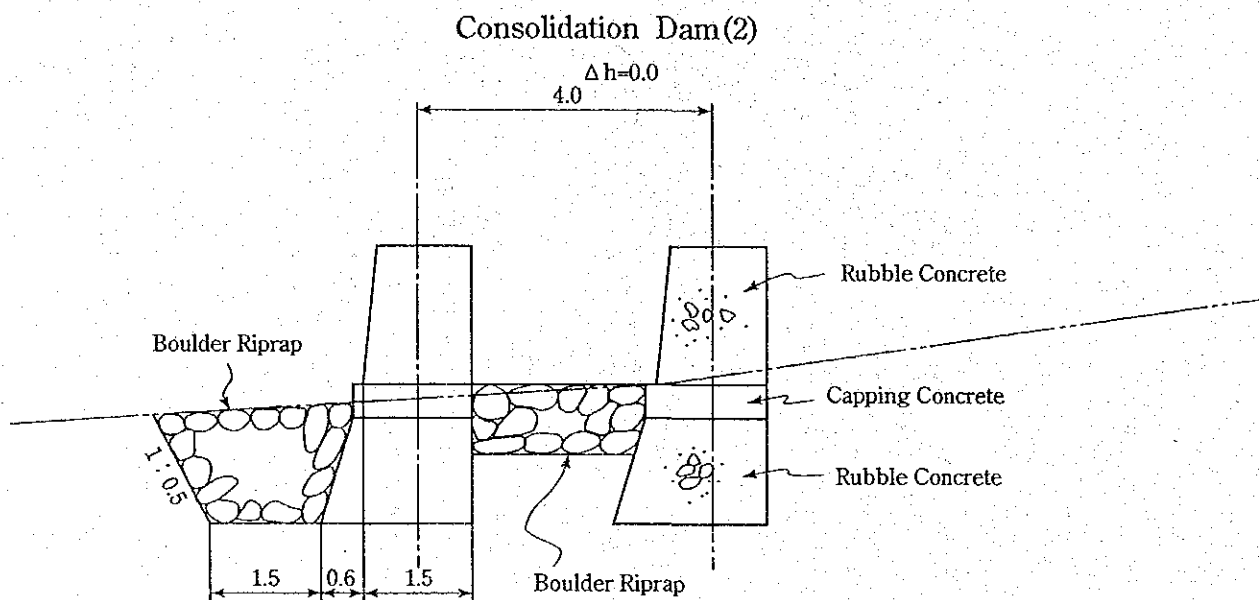
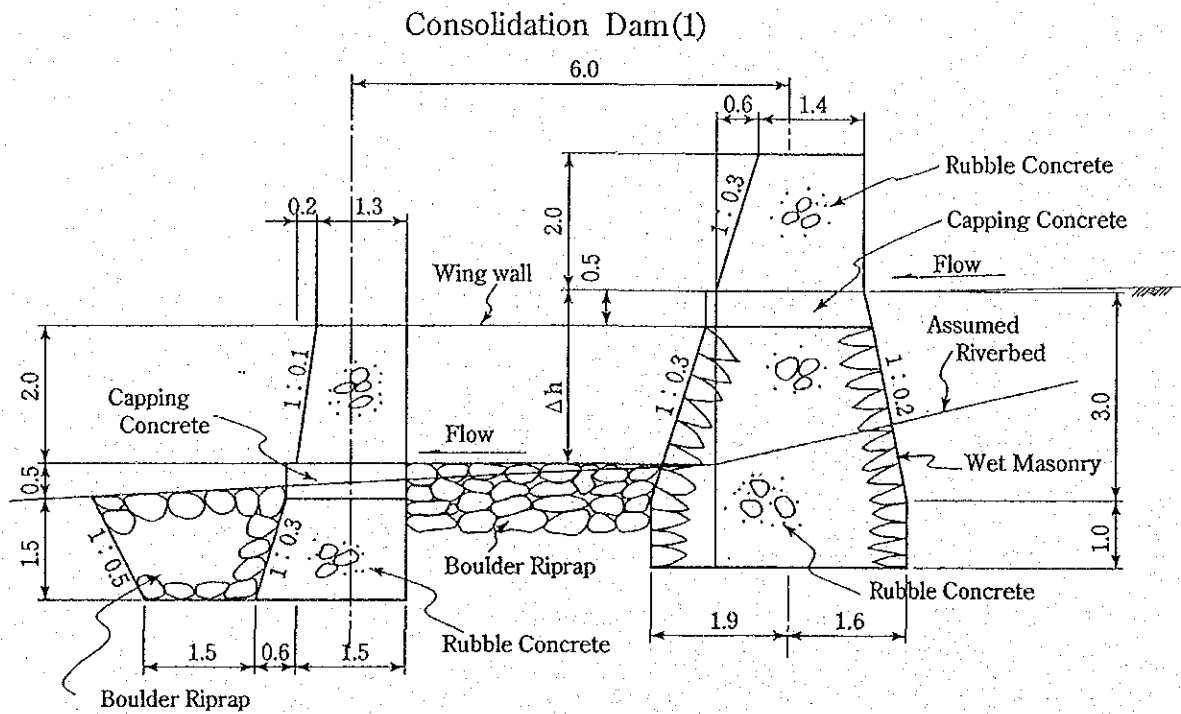
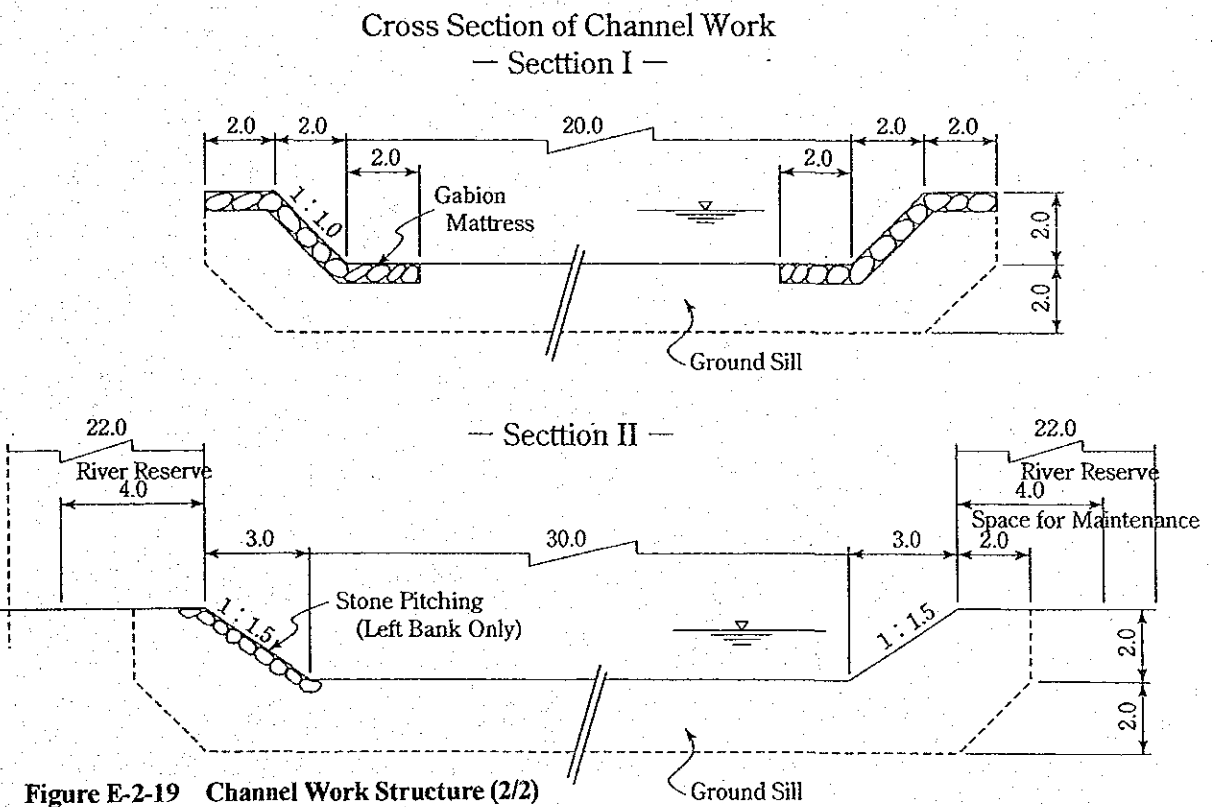
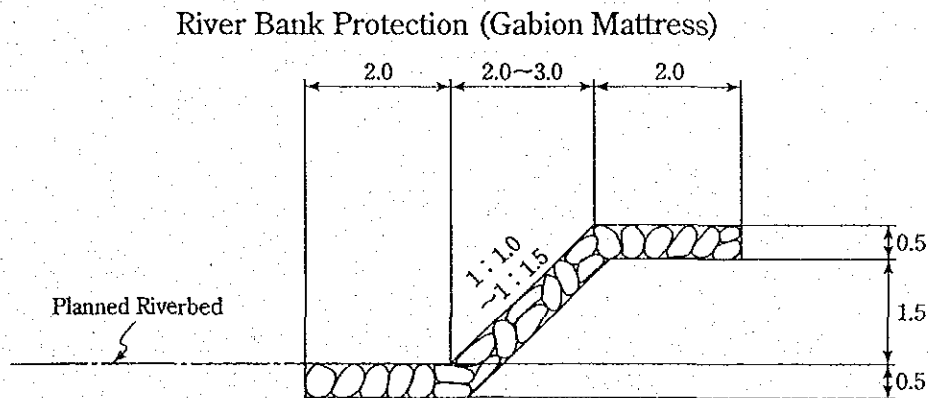
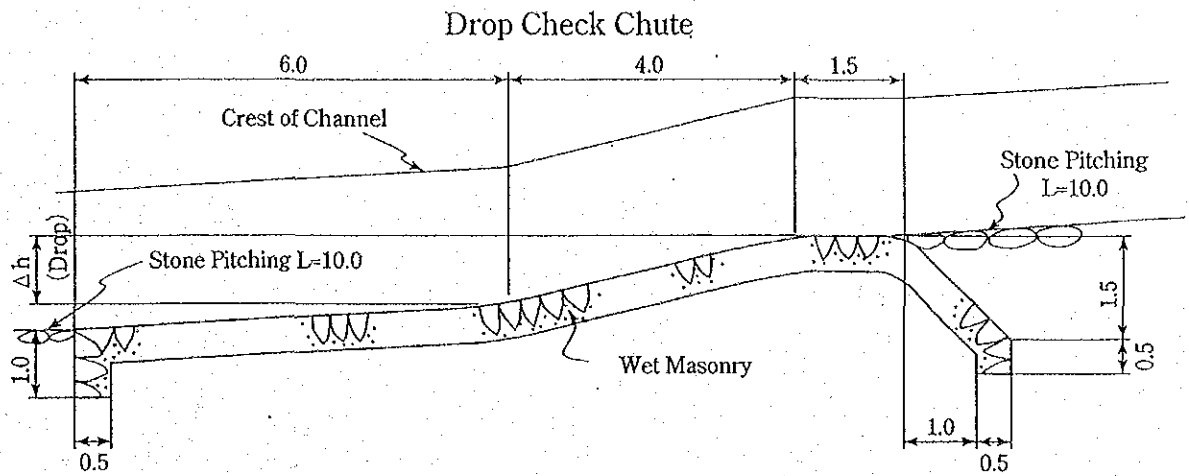


Figure E-2-17 Disaster Prevention Structure- Rockfall Protection



**Figure E-2-18 Channel Work Structure (1/2)**



**Figure E-2-19 Channel Work Structure (2/2)**

Legend

- CD (1) = Consolidation Dam (1)
- CD (2) = Consolidation Dam (2)
- DC = Drop Check Chute
- SL = Ground Sill

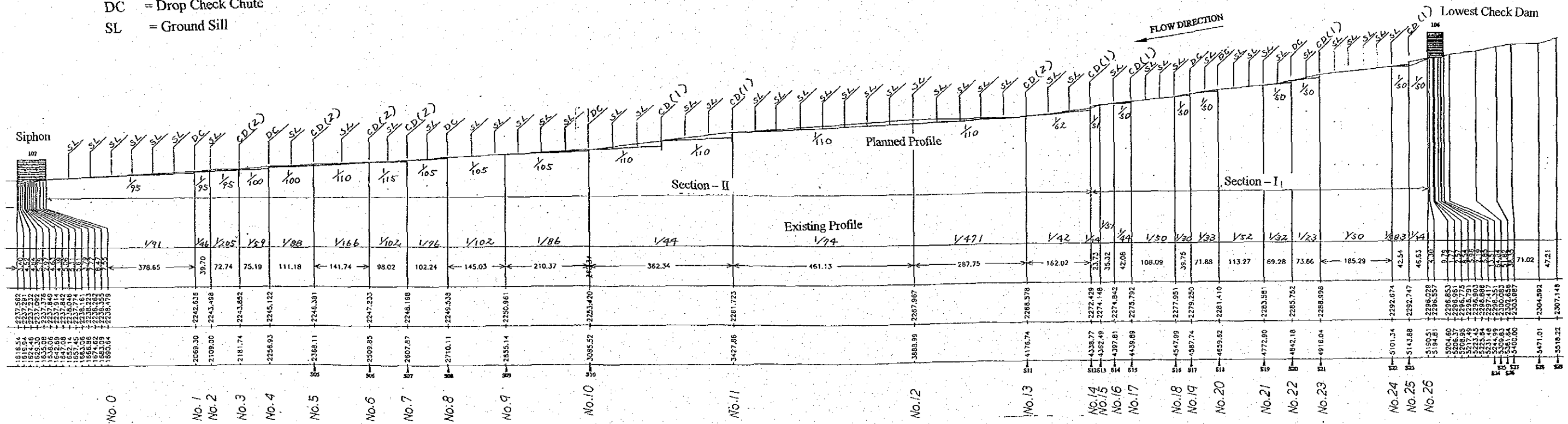


Figure E-20 Profile of Channel Work