Evaluation sheet (landslide)

Code no.	N 7 5 7
Region Office	
Maintenance Unit	

Coordinates	Latitude	33° 53' 34.5"
	Longitude	73° 24' 38.0"
Road Name	Km	

Date	12/9/2017
Inspector	Basharat, Yasir, Sajid, Shafi

[Main body of landslide]

Mountain side	
Valley side	
Both	√

[Causes]

Category			Check
Topographical factor	Result of photo interpretation	exist clearly	√
		exist but partial and not clear	
		exist but not clear	
	Surface anomalies	large and new cracks, steps and subsidence	
		small and old cracks, steps and subsidence	
		slight deformation	√
		no anomalies	
Geological conditions	Geological structure	fault, fracture zone	
		dip slope	
		undip slope/ no characteristic feature	√
	Main rock formation of landslide body	metamorphic rock (schist, quartzite, phyllite etc.)	
		sedimentary rock (sandstone, limestone etc.)	√
		igneous rock (granite etc.)	
		quaternary deposit (colluvial deposit etc.)	
	Hydrological feature	much springs / much seepage	
		little springs /little seepage	√
		trace of water	
		no water observed	

[History]

category			Check
Records of Landslide	Existing record (documents or patrimony)	obvious	√
		slight	
		none	
	Damage on road facilities and houses	obvious	
		slight	√
		none	

[Countermeasure]

Category		Check	Type of countermeasure
There is no countermeasure			Retaining walls to protect road
Effectiveness of countermeasure	No effect		
	Some effect	√	
	High effect		

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	(2)	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Expected size of disaster](width, length, depth, etc.)

L= 1020 m, W= 650, D, 10-15 m

[Description]

The N-75-7 passing through a very big old landslide which comprises almost 3 km^2 area . Lithology of the site is characterized by claystone, siltstone and sandstone of Miocene Murree Formation. The scarp of the landslide clearly indicates that it is an old landslide . This landslide has been reactivated many times in the past, consequently, small landslides were also observed within the landslide. The upper part of the slide is stable, however, at the toe the landslide material has been reactivated and there is potential for future landslide. A small landslide on the right

Sketch sheet

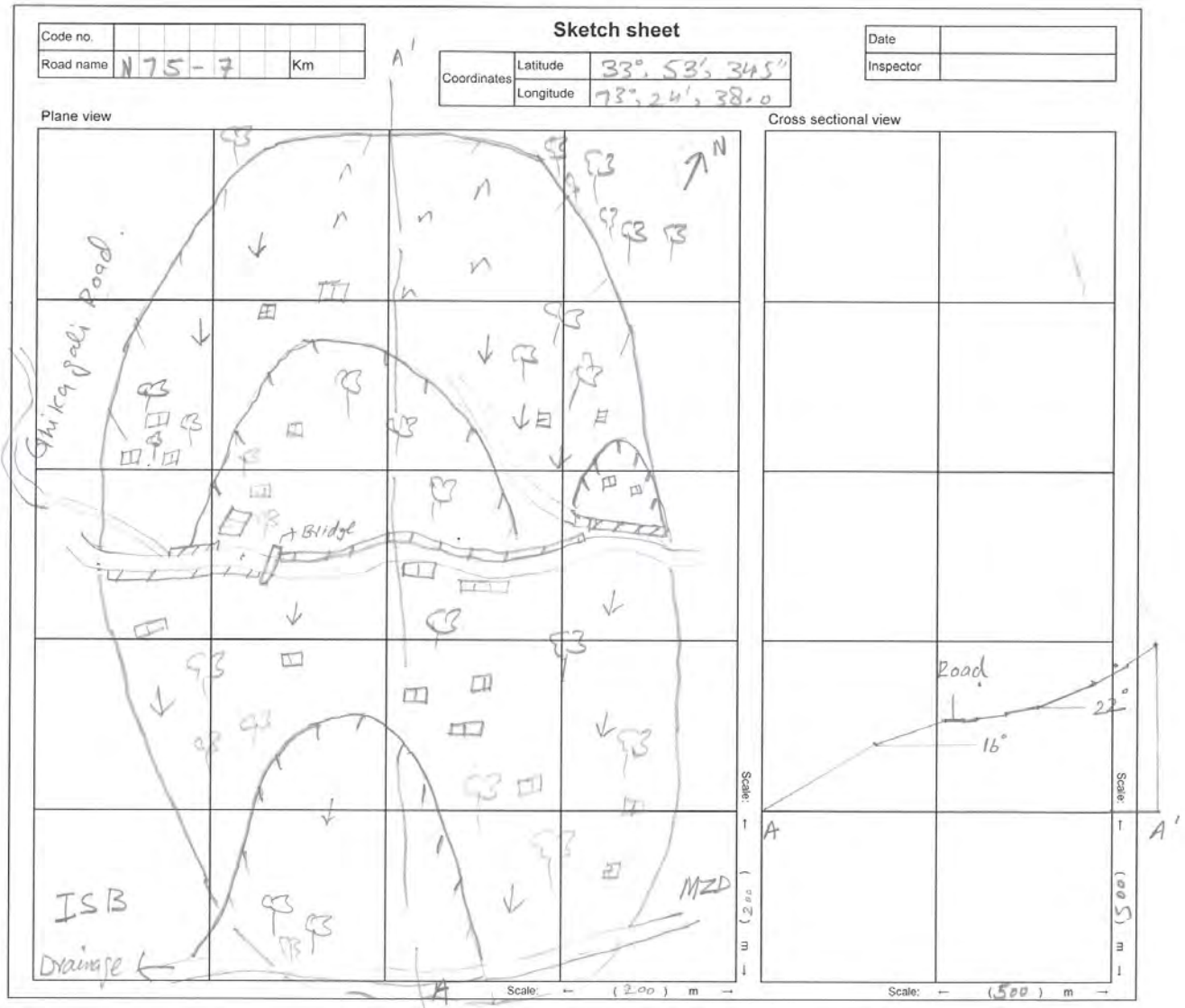
Code no.	N	7	5		7			
Region Office								
Maintenance Unit								

Coordinates	Latitude	33° 53' 34.5"
	Longitude	73° 24' 38.0"
Road Name		Km

Date	12/9/2017
Inspector	Basharat, Yasir, Sajid, Shafi

Plane view

Cross sectional view



Scale: ← ( ) m →

Scale: ← ( ) m →

Code no.	N	7	5		7			
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	33° 53' 34.5"
	Longitude	73° 24' 38.0"
Road Name		Km

Date	12/9/2017
Inspector	Basharat, Yasir, Sajid, Shafiq

Mountain side view of landslide

Valley side view of landslide

Road condition: Road passing through the center of the landslide

Existing countermeasures / anomalies: Retaining and gabion walls has been constructed to protect the road

Existing countermeasures / anomalies: Upto 4 cm cracks were observed in the retaining wall

Existing countermeasures / anomalies: Retaining wall has been constructed

Evaluation sheet (debris flow)

Code no.	N 7 5 9
Region Office	
Maintenance Unit	

Coordinates	Latitude	33° 54'15.9"
	Longitude	73° 24' 51"
Road Name		Km

Date	12/7/2017
Inspector	Basharat, Yasir, Sajid, Shafiq

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	√
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	√
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	√
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	√

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	√
Outflow of embankment	
Debris flooding on the road	

[Expected size of disaster] (width, length, depth, etc.)

L= 1000 m, W=30 m, D= 4 m

[Countermeasure]

Type of countermeasure		Check
d to protect the road. Culvert has also bee		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

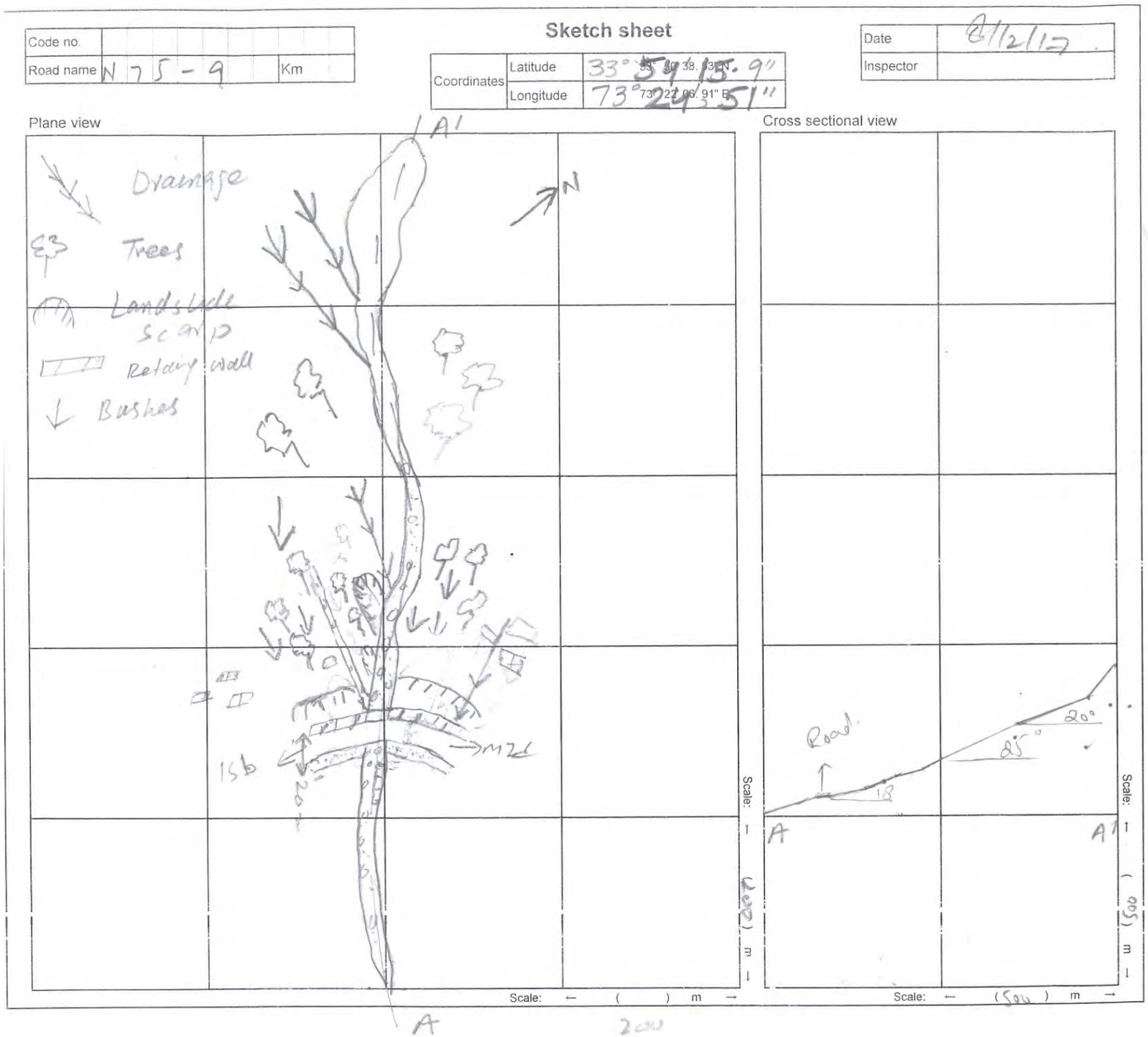
-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

A seasonal stream crosses the highway at this location. Stream brings huge volume of debris every year. During 2007, the debris flow damaged the road completely. Big catachment area with debris fall/rock fall material are present on the upstream. Small landslides were also observed along the stream which contribute in the debris volume and have potential to damage the road in future. Sandsone bed along the left side of the stream is dipping


Sketch sheet
Code no.
Road name N 75 - 9 Km
Coordinates
Latitude 33° 57' 15.9"
Longitude 73° 22' 51"
Date 8/12/17
Inspector
Plane view
Cross sectional view
Drainage
Trees
Landslide scarp
Retaining wall
Bushes
A1
A
N
Road
20°
25°
18
Scale: 1 ( ) m
Scale: ← ( ) m →

Code no.	N	7	5		9				
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	33° 54'15.9"
	Longitude	73° 24' 51"
Road Name		Km

Date	12/7/2017
Inspector	asharat, Yasir, Sajid, Shafi

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

The crack on road has been observed

Road condition

Existing countermeasures / anomalies: Retaining wall has been constructed at the toe of the slope failure

Evaluation sheet (debris flow)

Code no.	N 7 5 2 0
Region Office	
Maintenance Unit	

Coordinates	Latitude	33°55' 28.9"
	Longitude	73° 27' 3.5"
Road Name		Km

Date	24-11-2017
Inspector	Basharat, Yasir, Sajid, Shafiq

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	√
	steepest slope of river bed	40°or more	
		30° - 40°	√
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	
There is a history about debris flow though there is no obstacle to traffic.	√
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 280 m, W=25 m, D=3-4m

[Countermeasure]

Type of countermeasure		Check
as made for the outflow of debris material		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

The site is marked by the presence of landslide and debris flow. Geology of the site is characterized by active fault and highly jointed claystone and sandstone. Due to erosion along two gullies debris material has been found in the stream bed. Beside, debris flow, there is also a potential landslide. Large open crack on the top indicates its future potential failure. The debris flow and landslide are in dangering the stability of the road. Small retaining

Code no.	
Road name	N 75 - 20 Km

Sketch sheet

Coordinates	Latitude	33°55'28.9"
	Longitude	73°27'3.5"

Date	08-12-2017
Inspector	

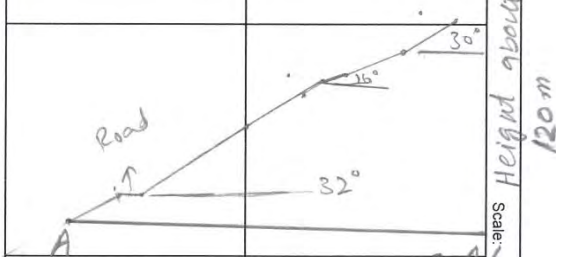
Plane view

Houses
Landslide scarp
Debris flow
Trees
Landslide material
cracks
Drainage
bedding
Profile

Scale: ← (80) m →

Scale: ↑ (80) m ↓

Cross sectional view



Height about 120 m

Scale: ← (150) m →

Scale: ↑ (150) m ↓

Scale: ← ( ) m →

Scale: ↑ ( ) m ↓

Scale: ← ( ) m →

Scale: ↑ ( ) m ↓

Code no.	N	–	75			2	0			
Road name										

Photo sheet

Coordinates	Latitude	33°55' 28.9"
	Longitude	73° 27' 3.2"

Date	24-11-2017
Inspector	Basharat, Yasir, Sajid, Shafi

View of debris flow on the road

View of debris flow towards valley side

Road condition at location

Future potential landslide. Vegetation and trees on the main body of landslide

Water seepages along the stream

Construction of small check dams to control debris flow

Evaluation sheet (debris flow)

Code no.	N 7 5 2 8
Region Office	
Maintenance Unit	

Coordinates	Latitude	33°59'16.6"
	Longitude	73°29'2.7"
Road Name		Km

Date	12/8/2017
Inspector	Basharat, Yasir, Sajid, Shafiq

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	√
	steepest slope of river bed	40°or more	
		30° - 40°	√
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	
		none	√
	traces of large slope failure in stream	certain	
		none	√

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	√

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	√

[Potencial disaster mode]

	Check
Damage of bridge/culvert	√
Outflow of embankment	
Debris flooding on the road	

[Expected size of disaster] (width, length, depth, etc.)

L= 440 m , W=12 m, D= 2-3 m

[Countermeasure]

Type of countermeasure		Check
low of the debris. Retaining walls has bee		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	(4)

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

The site is located on a seasonal stream, where road has very sharp bend. Sides of the upstream are bounded by alternative beds of sandstone and claystone. Some boulders of size greater than 3 m^3. The culvert has been constructed for the debris outflow. Vegetation is also present on both sides of the stream. As a countermeasure benching on upstream side was made which is partially damaged. Downstream side retaining walls are also present.

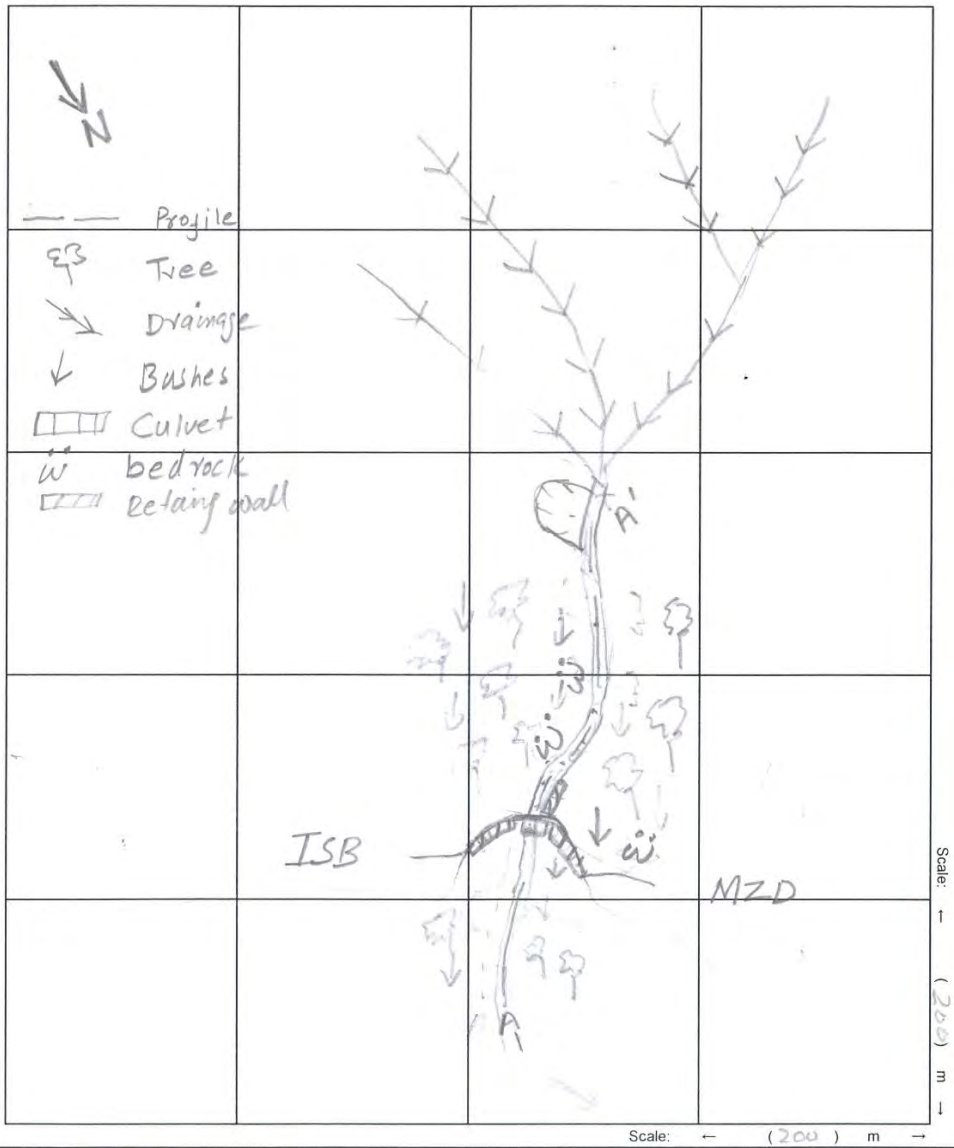
Sketch sheet

Code no.		
Road name	N-75-28	Km

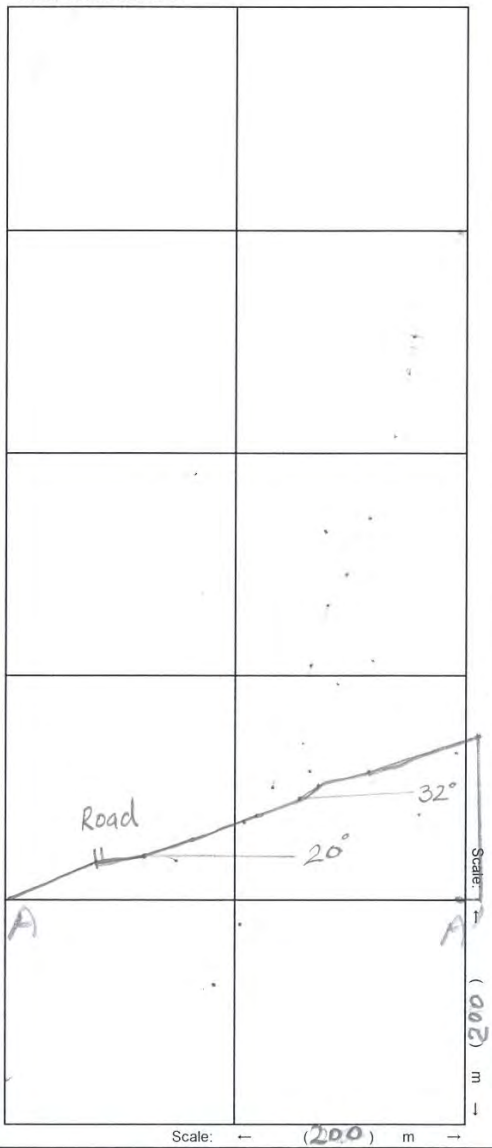
Coordinates	Latitude	33°59' 16.6"
	Longitude	73° 29' 2.7"

Date	08-12-2017
Inspector	

Plane view



Cross sectional view



Scale: ← ( ) m →

Scale: ↑ ( ) m ↓

Scale: ← ( ) m →

Scale: ↑ ( ) m ↓

Code no.	N	7	5		2	8			
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	33°59'16.6"
	Longitude	73°29'2.7"
Road Name		Km

Date	12/8/2017
Inspector	Basharat, Yasir, Sajid, Shafiq

Front view of the debris flow:

Valley side view of the debris flow

Road condition at the site

Rock beds dipping towards the channel

Culvert has been constructed for the outflow of debris flow

Existing countermeasures / anomalies: Benches has been made on the upstream which has been partially destroyed

Code no.	N 7 5	3 3
Region Office		
Maintenance Unit		

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34°7'14.9"
	Longitude	73°29'35.4"
Road name		Km

Date	12/7/2017
Inspector	Basharat, Yasir, Sajid, Shafiq

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		√
			none		
	Surface condition		bare land with minor vagetation		
			intermediate (bare･grass･tree)		√
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m		
			15≦H＜30m		
			H＜15m		
			i≧70°	dip	
			45°≦i＜70°		
			i＜45°		√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences･clarity		√
			certain･unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	
Natural slope	√

[Countermeasure]

Type of countermeasures	

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	√
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 300 m, W= 220 m, D 5-6 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

Landslide was initially triggered during 1992 flood. In March 2012, landslide was reactivated during the heavy rainfall. The landslide completely destroyed 200 meter road. The continuity of traffic along this road was disrupted more than one week during March 2012. This section is cut slope consisting of sandstone and shale . The slide is still active. There are large number of open

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Code no.	
Road name	N - 75 - 33 Km

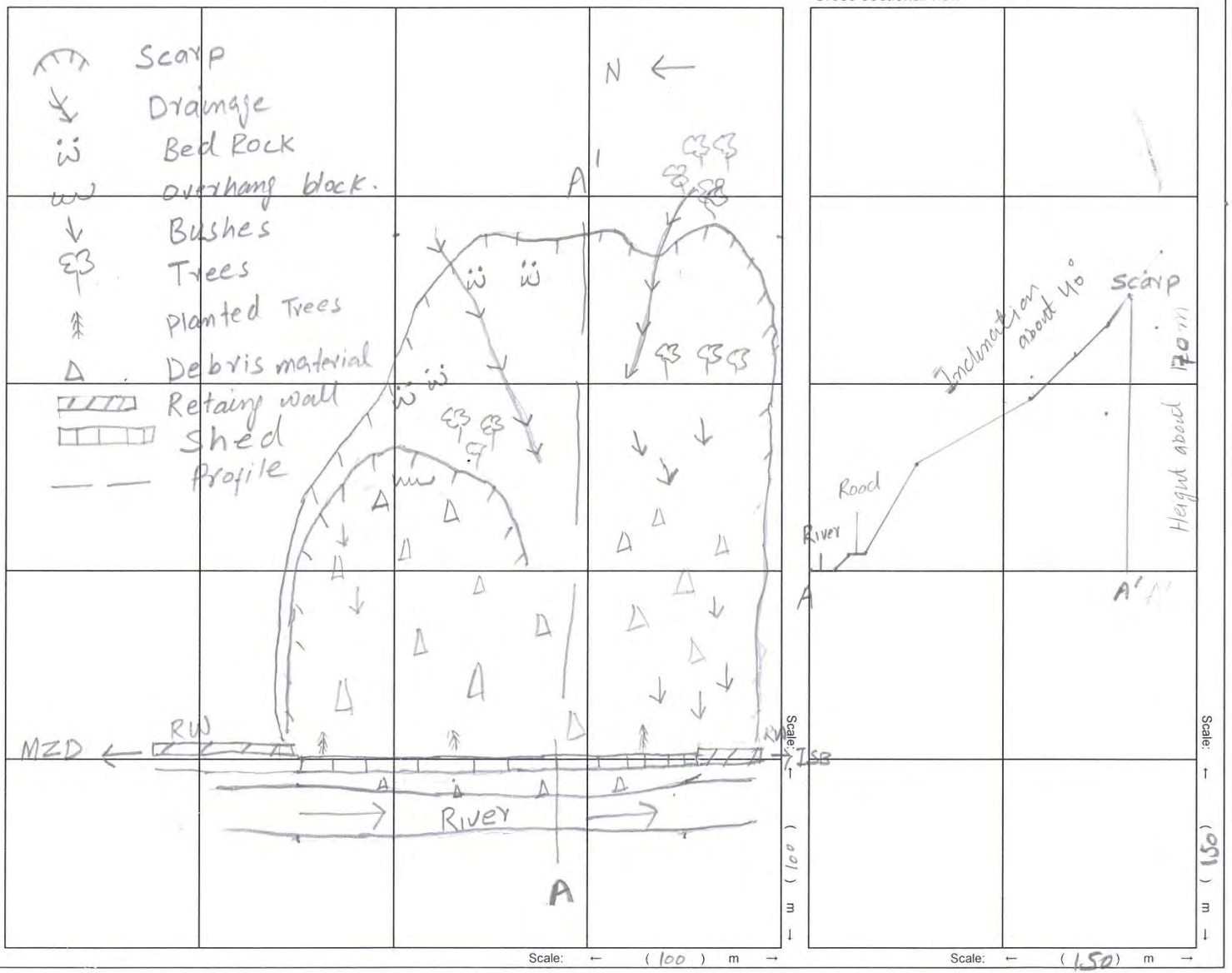
Sketch sheet

Coordinates	Latitude	34° 07' 14.9"
	Longitude	73° 29' 35.4"

Date	25-11-2017
Inspector	

Plane view

Cross sectional view



Code no.	N	7	5		3	3				
Road name								Km		

Photo sheet

Coordinates	Latitude	34°7'14.9"
	Longitude	73°29'35.4"

Date	25-11-2017
Inspector	Basharat, Yasir, Sajid, Shafiq

Full view of the landslide

View of landslide on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of shed as counter measure

View of fallen blocks on Shed

Evaluation sheet (landslide)

Code no.	N 15 _ 4
Region Office	
Maintenance Unit	

Coordinates	Latitude	34° 55' 43.4"
	Longitude	73° 40' 51.4"
Road Name		Km

Date	6/19/2018
Inspector	Basharat, Yasir, Sajid, Shafi

[Main body of landslide]

Mountain side	
Valley side	√
Both	

[Causes]

Category			Check
Topographical factor	Result of photo interpretation	exist clearly	√
		exist but partial and not clear	
		exist but not clear	
	Surface anomalies	large and new cracks, steps and subsidence	
		small and old cracks, steps and subsidence	√
		slight deformation	
		no anomalies	
Geological conditions	Geological structure	fault, fracture zone	
		dip slope	
		undip slope/ no characteristic feature	√
	Main rock formation of landslide body	metamorphic rock (schist, quartzite, phyllite etc.)	√
		sedimentary rock (sandstone, limestone etc.)	
		igneous rock (granite etc.)	√
		quaternary deposit (colluvial deposit etc.)	
	Hydrological feature	much springs / much seepage	√
		little springs /little seepage	
		trace of water	
		no water observed	

[History]

category			Check
Records of Landslide	Existing record (documents or patrimony)	obvious	√
		slight	
		none	
	Damage on road facilities and houses	obvious	√
		slight	
		none	

[Countermeasure]

Category		Check	Type of countermeasure
There is no countermeasure			Retaining Wall has been constructed
Effectiveness of countermeasure	No effect	√	
	Some effect		
	High effect		

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	(1)	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Expected size of disaster](width, length, depth, etc.)

L= 300m , W= 500m , D= 40 m

[Description]

This landslide is located along N-15, about 3 km away from the Naran town. It is an old rotational landslide which has been reactivated due to road construction and rainfall. The upper part of the landslide is stable with vegetation cover, however, the landslide is active at the toe. Thick forest is also present on the left side of the slide. Due to re-activation of this slide about 100 meters road has been affected. Above the road the landslide scarp is clearly visible. Many detached boulders are hanging on the landslide scarp that can damage the road and the continuity of traffic. The boulders comprising of granite and schist ranges between 1-3 m3 size was present. A retaining wall above 2 m height has been constructed to protect the road from the slide material. However, the central part of this retaining wall has been damaged due to the reactivation of the slide material. Presently, there is no high risk to damage the road, however, in the future if the whole mass of the landslide body will move, lead to the damage and block the road for the continuity of traffic. For mitigation purpose, a retaining wall with a height of 5 meters has been suggested with proper drainage control.

Code no.	N	1	5	_	4				
Region Office									
Maintenance Unit									

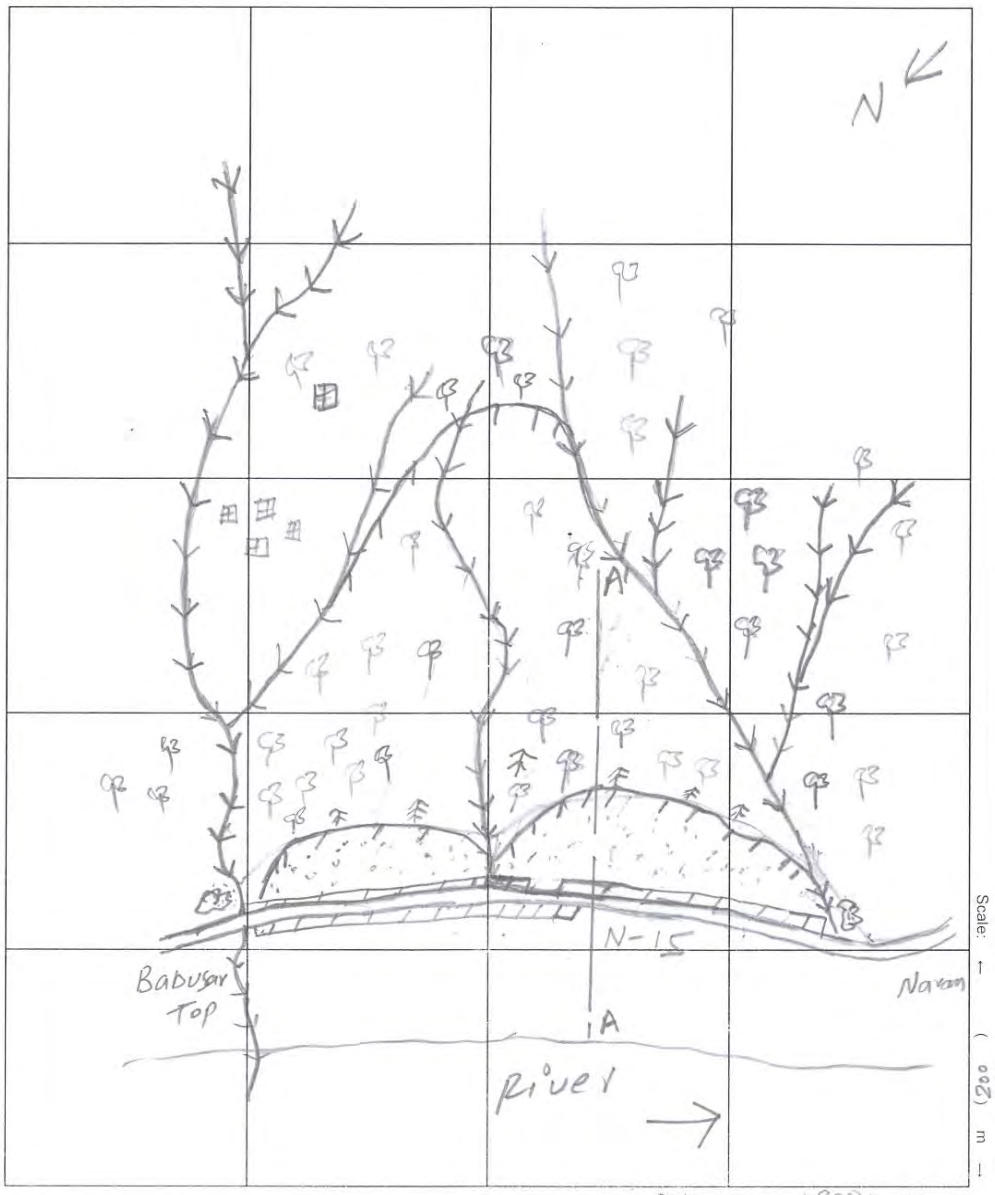
Sketch sheet

Coordinates	Latitude	34° 55' 43.4"
	Longitude	73° 40' 51.4"
Road Name		Km

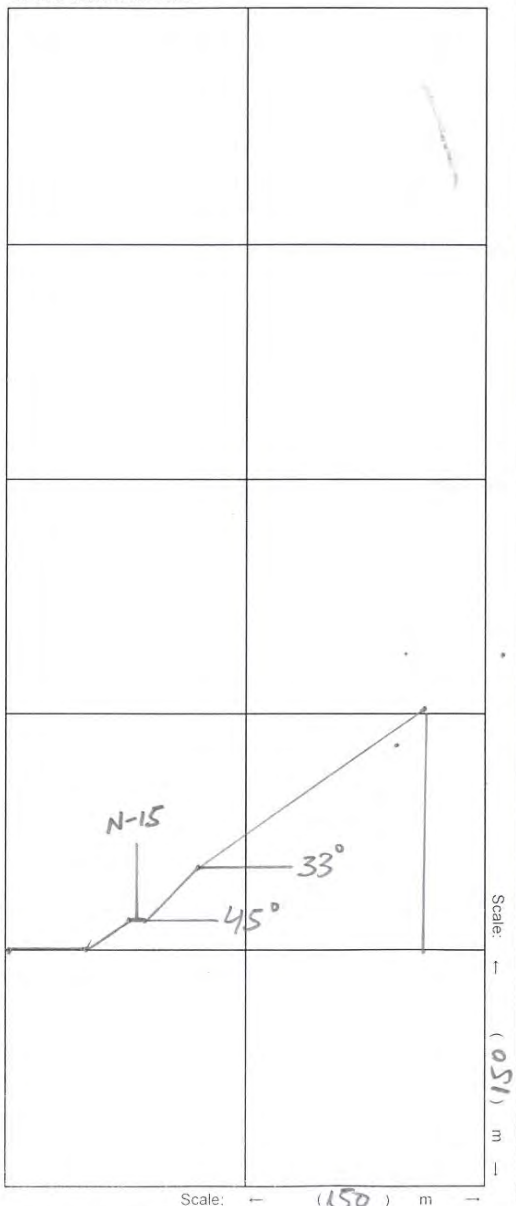
Date	6/19/2018
Inspector	Basharat, Yasir, Sajid, Shafi

Scarp
Drainage
Trees
Debris material
Bushes
Retaining wall
Houses
Glacial Material
Profile

Plane view



Cross sectional view



Code no.	N	#	_	4					
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	34° 55' 43.4"
	Longitude	73° 40' 51.4"
Road Name		Km

Date	6/19/2018
Inspector	Basharat, Yasir, Sajid, Shafi

Full view of the landslide

View of landslide on Valley side:

Road condition

View of the Landslide at the middle point

Existing countermeasures / anomalies: View of damaged Retaining Wall as counter measure

View of Glacier on the left flank of the Landslide

Evaluation sheet (debris flow)

Code no.	N15_8
Region Office	
Maintenance Unit	

Coordinates	Latitude	34º 56' 17.8"
	Longitude	73º 40' 51.4"
Road Name		Km

Date	6/20/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	√
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	
	3m - 5m	
	less than 3m	√
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 1000 m, W= 600 m, D= 6 m

[Countermeasure]

Type of countermeasure		Check
Gabion Wall Retaining walls		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	(1)	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

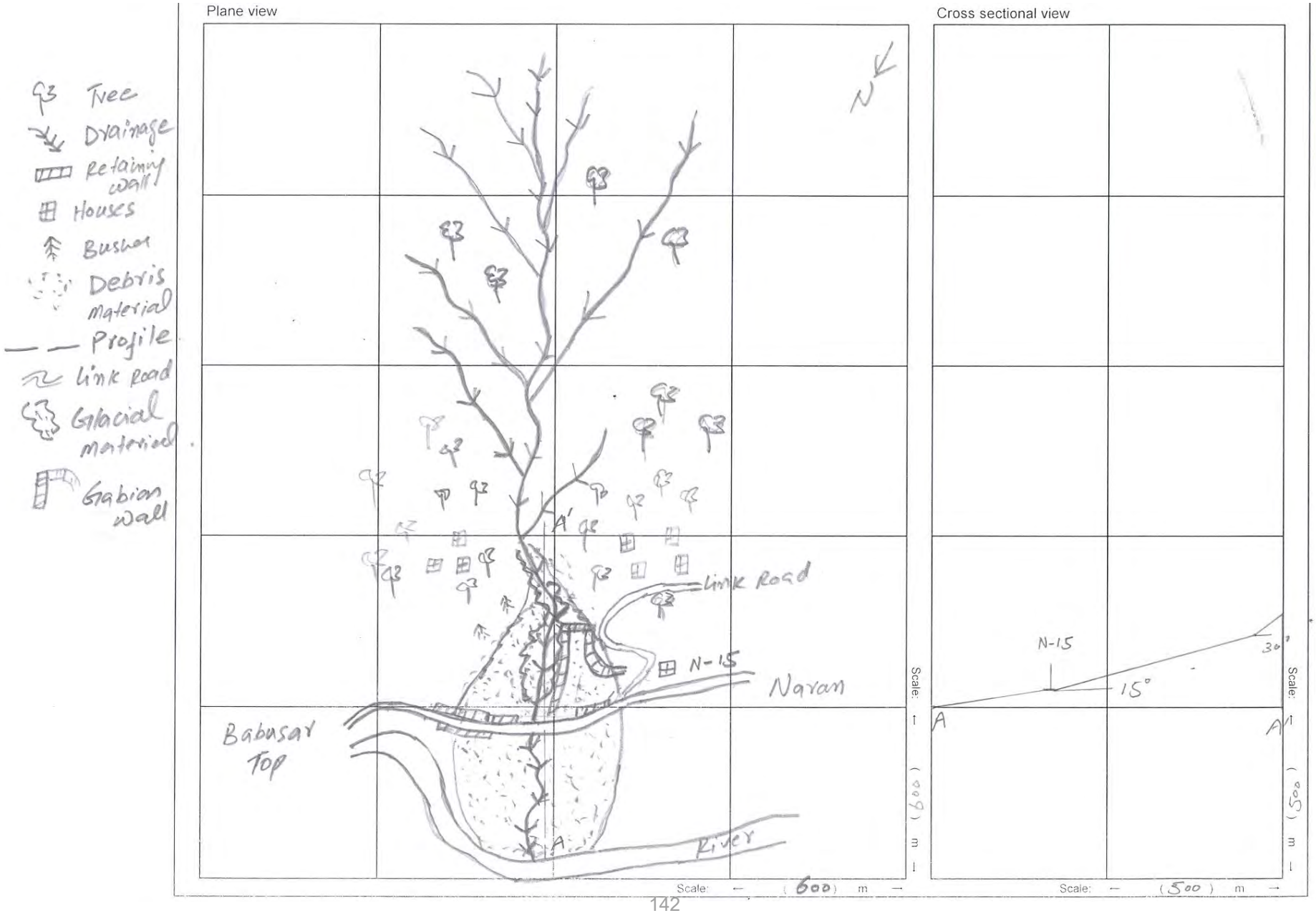
This is an active debris flow with large catchment area. The debris flow origin appears from the glacier valley. The debris material mainly comprises boulders, cobble, gravel, sand and silt. The size of the boulders ranges upto 5 m3. The debris flow has a large amount of water in the channel posing great and frequent risk to road. Very huge material is present on both the sides of the erosional channel. The gabion wall has seen at the mouth of the channel to control the debris, however, no culvert has been constructed for the outlet of the water and debris flow material. Therefore, this debris flow posing a significant threat for the continuity of traffic on the road, particularly during heavy rainfall. According to the local inhabitants a very serious debris flow disaster occurred after every five years at the site. For the mitigation measures it has been suggested to construct the culvert for the outlet of the

Code no.	N	1	5	_	8				
Region Office									
Maintenance Unit									

Sketch sheet

Coordinates	Latitude	34° 56' 17.8"
	Longitude	73° 40' 51.4"
Road Name		Km

Date	6/20/2018
Inspector	Yasir, Basharat, Shafiq, Saji



Code no.	N	1	5	_	8				
Region Office									
Maintenance Unit									

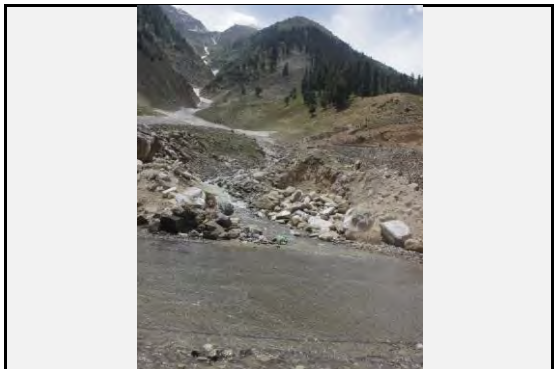
Photo sheet

Coordinates	Latitude	34° 56' 17.8"
	Longitude	73° 40' 51.4"
Road Name		Km

Date	6/20/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow



Front view of the debris flow

The boulder has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Gabion wall has been constructed along the Debris Flow

Evaluation sheet (debris flow)

Code no.	N 1 5 _ 9
Region Office	
Maintenance Unit	

Coordinates	Latitude	34º 56' 22.4"
	Longitude	73º 42' 45.6"
Road Name		Km

Date	6/21/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	
	3m - 5m	
	less than 3m	√
Beam height	less than 1m or	
	No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	√
Outflow of embankment	√
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 500 m, W= 200 m, D= 8-10 m

[Countermeasure]

Type of countermeasure		Check
Channel Diversion through Culvert Retaining walls		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

The debris material might be active during the rainfall and can also lead to a debris flow disaster in future. Presently, the water is flowing through a narrow channel and along the road it is diverted through channel to reduce its impact on road damage. The loose debris comprises boulder, cobble, gravel, sand and silt. It is likely that future debris flow will continue along the slope. A retaining wall is constructed to protect the road which is also partly damaged. However, no countermeasures have been taken to drain the water and protect the road from the debris material. The debris flow posing risk of road damage in

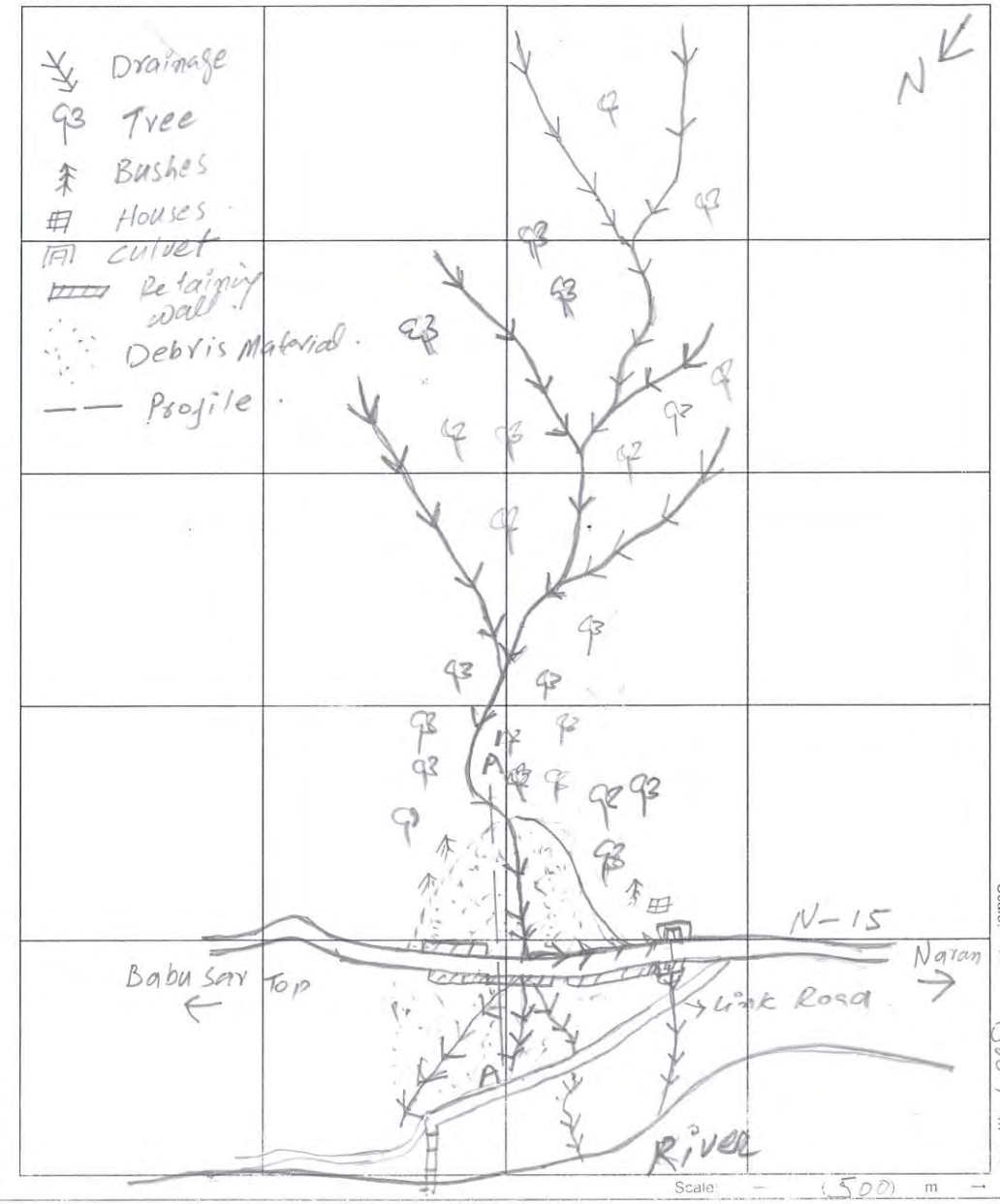
Code no.	N	1	5	_	9				
Region Office									
Maintenance Unit									

Sketch sheet

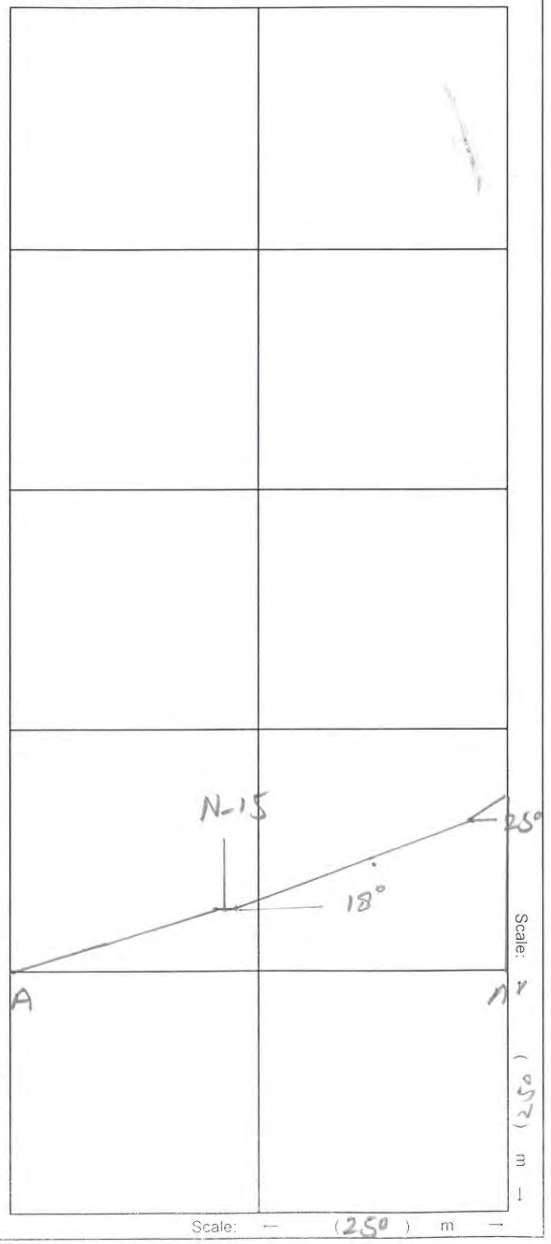
Coordinates	Latitude	34° 56' 22.4"
	Longitude	73° 42' 45.6"
Road Name		Km

Date	6/21/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Plane view



Cross sectional view



Code no.	N	1	5	_	9				
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	34° 56' 22.4"
	Longitude	73° 42' 45.6"
Road Name		Km

Date	6/21/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Outlet of Culvert constructed

The boulder has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining wall has been constructed along the Debris Flow which has been damaged by the debris material

Code no.	N 1 5 _ #
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34° 56' 19.9"
	Longitude	73° 50' 59.7"
Road name		Km

Date	6/22/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		√
			none		
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	
Natural slope	√

[Countermeasure]

Type of countermeasures
Culvert has been constructed along the slope failure

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	√

[Expected size of disaster](width, length, depth, etc.)

L= 400m, W= 350m, D = 56 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	(4)

[Description]

This slope failure is located about 100 meters away from the N-15. It is an active slope failure of loose material composed of boulder, cobble, gravel, sand and silt. On the back of the slope failure steep cliff is comprised of metamorphic rocks. Any impact to damage the road from the slope failure has not been observed. On the right side of the slope failure man made terraces has been formed. Active erosion on the slope leads to the development of the gullies. A retaining wall is built to protect the road, however, no mitigation measures have been taken to stabilize the slope failure. The slope failure is not being considered to endanger the road.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

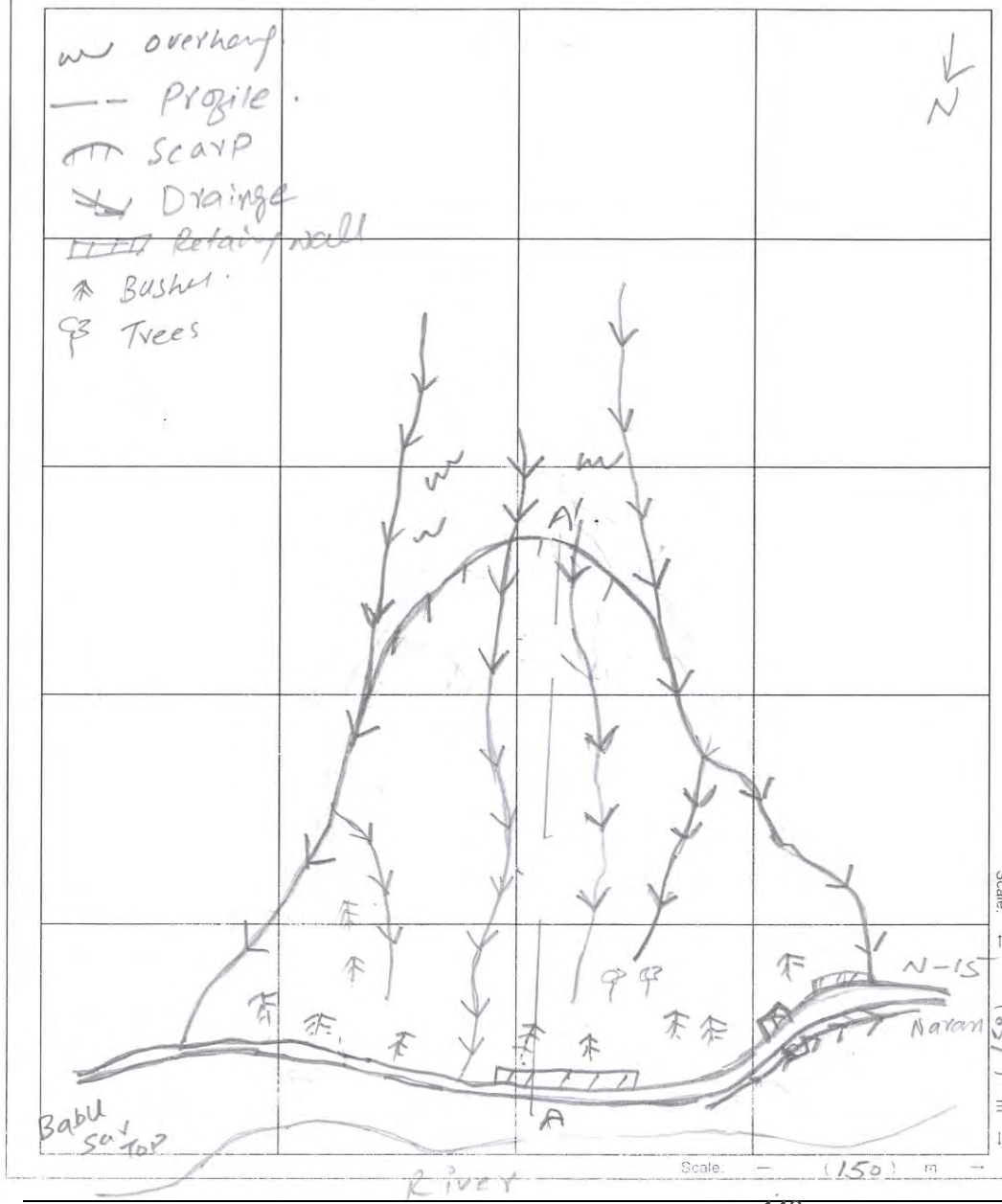
Sketch sheet

Code no.	N	1	5	_	24				
Region Office									
Maintenance Unit									

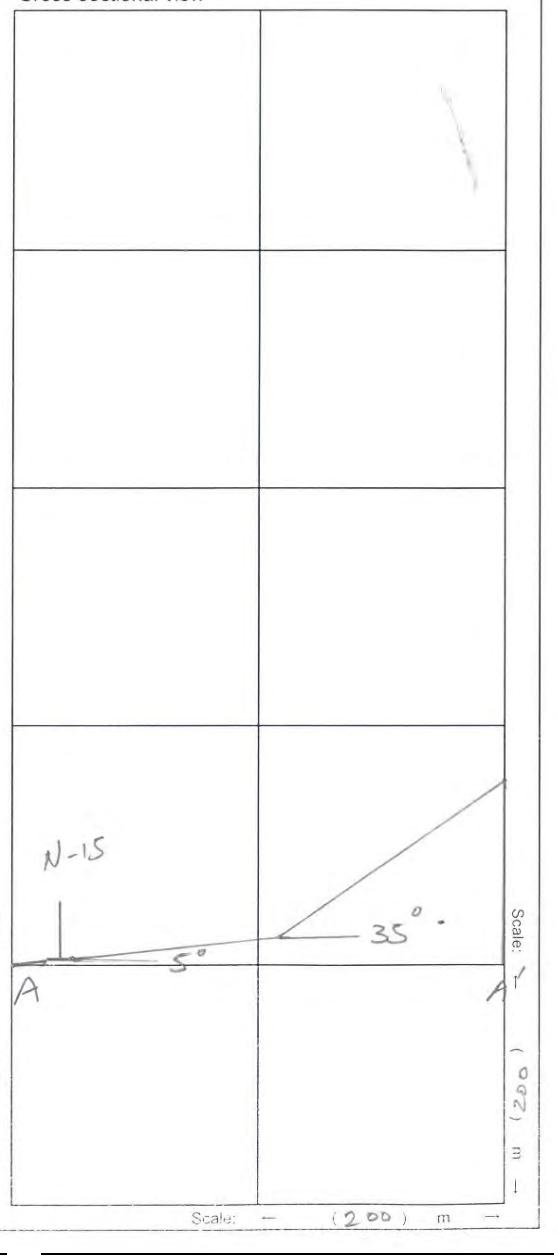
Coordinates	Latitude	34° 56' 19.9"										
	Longitude	73° 50' 59.7"										
Road Name					Km							

Date	6/22/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Plane view



Cross sectional view



Code no.	N	1	5	_	24			
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 56' 19.9"
	Longitude	73° 50' 59.7"
Road name		Km

Date	6/22/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies. Damaged retaining Wall

View of Box Culvert at the toe of slope

Evaluation sheet (debris flow)

Code no.	N15_34
Region Office	
Maintenance Unit	

Coordinates	Latitude	34º 58' 15.8"
	Longitude	73º 55' 37.1"
Road Name		Km

Date	6/23/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	√
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	
		none	√
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 600m, W= 70m, D= 4-5 m

[Countermeasure]

Type of countermeasure		Check
No Counter Measure		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

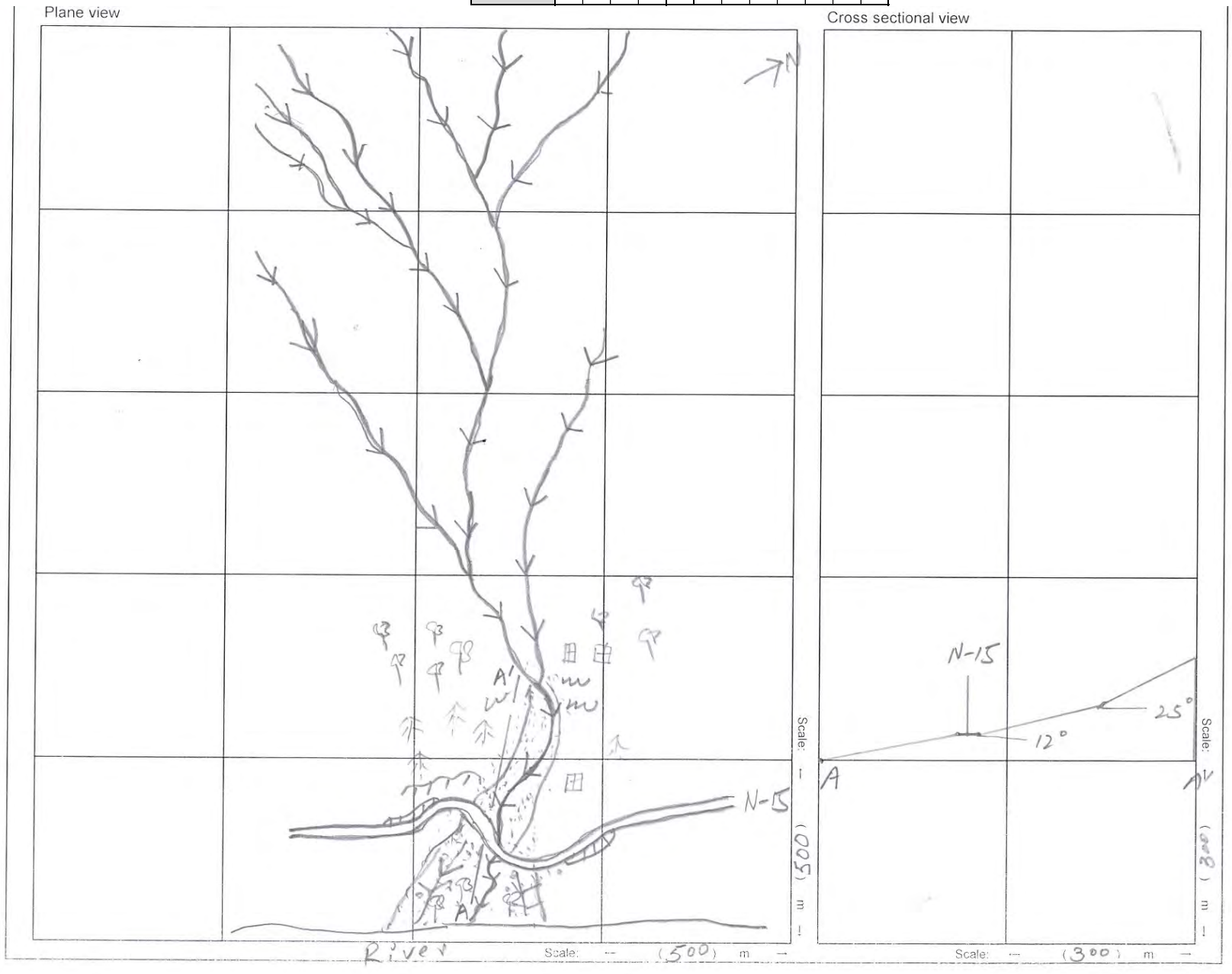
This is an active debris flow with large catchment area and flowing great amount of water. The debris is being mainly comprised of large boulders up to 5 m3 size. The loose material is present on both sides of the erosional channel. About 60 meters road has been damaged due to this debris flow. The debris flow has continuous water flowing on the road. A retaining wall is constructed to protect the road, however, no mitigation measures have been taken for the outflow of the water. To protect the road from this debris flow in the future, the construction of the bridge has been

Code no.	N	1	5	_	3	4	
Region Office							
Maintenance Unit							

Sketch sheet

Coordinates	Latitude	34° 58' 15.8"
	Longitude	73° 55' 37.1"
Road Name		Km

Date	6/23/2018
Inspector	Yasir, Basharat, Shafiq, Saji



Code no.	N	1	5	_	3	4			
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	34° 58' 15.8"
	Longitude	73° 55' 37.1"
Road Name		Km

Date	6/23/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

The boulder has been found along the debris flow

Road condition

Debris flowing on road

Evaluation sheet (landslide)

Code no.	N 15 _ 5 3
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 4' 28.0"
	Longitude	73° 56' 17.9"
Road Name	Km	

Date	6/24/2018
Inspector	Basharat, Yasir, Sajid, Shafi

[Main body of landslide]

Mountain side	
Valley side	
Both	√

[Causes]

Category			Check
Topographical factor	Result of photo interpretation	exist clearly	√
		exist but partial and not clear	
		exist but not clear	
	Surface anomalies	large and new cracks, steps and subsidence	
		small and old cracks, steps and subsidence	√
		slight deformation	
		no anomalies	
Geological conditions	Geological structure	fault, fracture zone	√
		dip slope	
		undip slope/ no characteristic feature	√
	Main rock formation of landslide body	metamorphic rock (schist, quartzite, phyllite etc.)	√
		sedimentary rock (sandstone, limestone etc.)	
		igneous rock (granite etc.)	√
		quaternary deposit (colluvial deposit etc.)	
	Hydrological feature	much springs / much seepage	
		little springs /little seepage	
		trace of water	
		no water observed	√

[History]

category			Check
Records of Landslide	Existing record (documents or patrimony)	obvious	√
		slight	
		none	
	Damage on road facilities and houses	obvious	
		slight	√
		none	

[Countermeasure]

Category		Check	Type of countermeasure
There is no countermeasure			Retaining Wall has been constructed
Effectiveness of countermeasure	No effect	√	
	Some effect		
	High effect		

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Expected size of disaster](width, length, depth, etc.)

L= 1000m , W= 60m , D= 70 m

[Description]

This is an old rock avalanche which triggered due to any tectonic activity in the ancient time. It is presumed the rock avalanche has blocked the stream and created a lake which is known as Lalusar Lake. A channel has been constructed for the outflow of the water from the lake. The rock avalanche material is mainly composed of granite and granite gneisses. The huge boulders are present at the site up to more than 10 m3 sizes. Presently, this rock avalanche has no impact on the road, however, in future if rock avalanche material will be remoblized it may block the water channel and disrupt the road. A retaining wall has been constructed to protect the road.

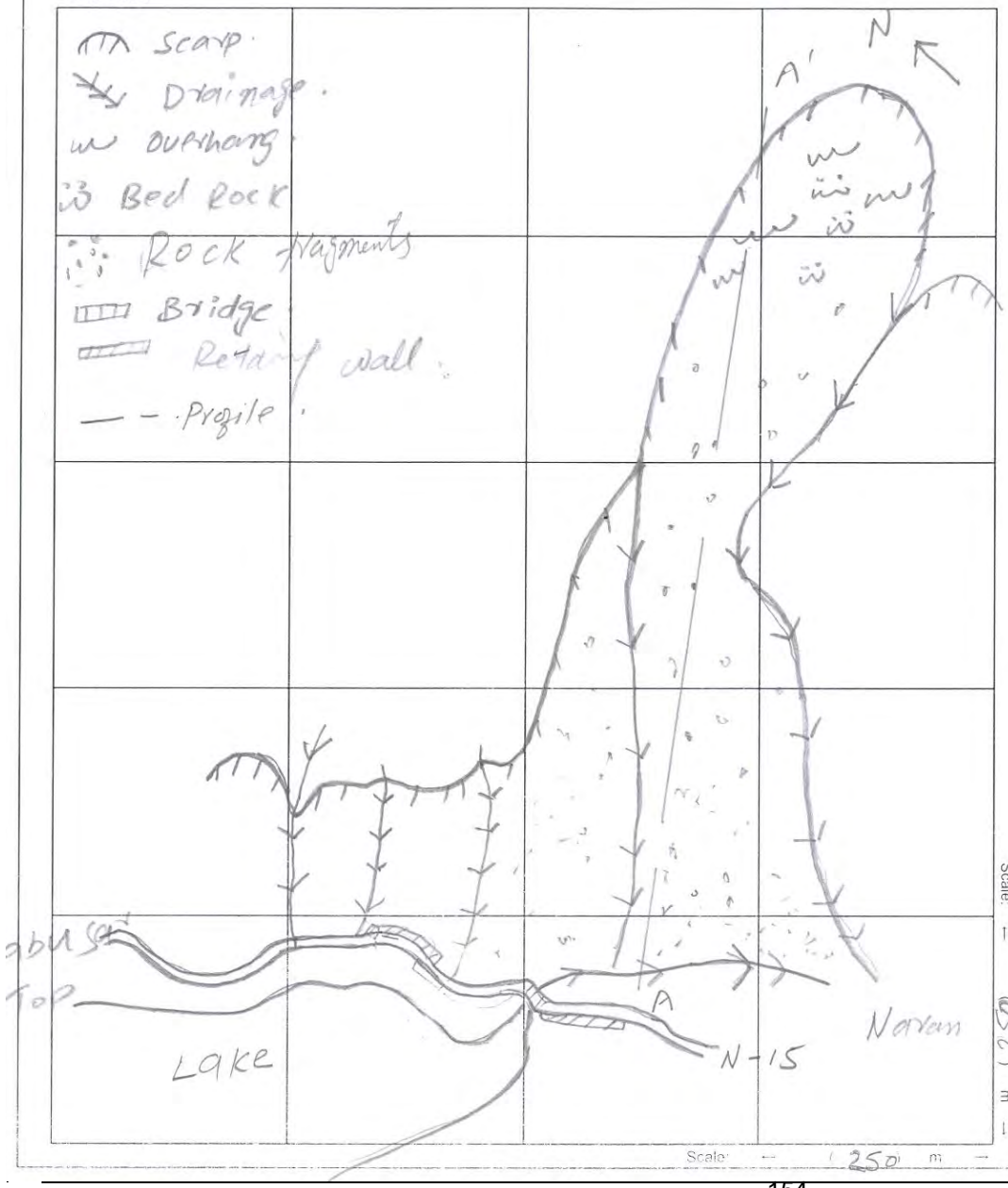
Code no.	N	15	_	5	3				
Region Office									
Maintenance Unit									

Sketch sheet

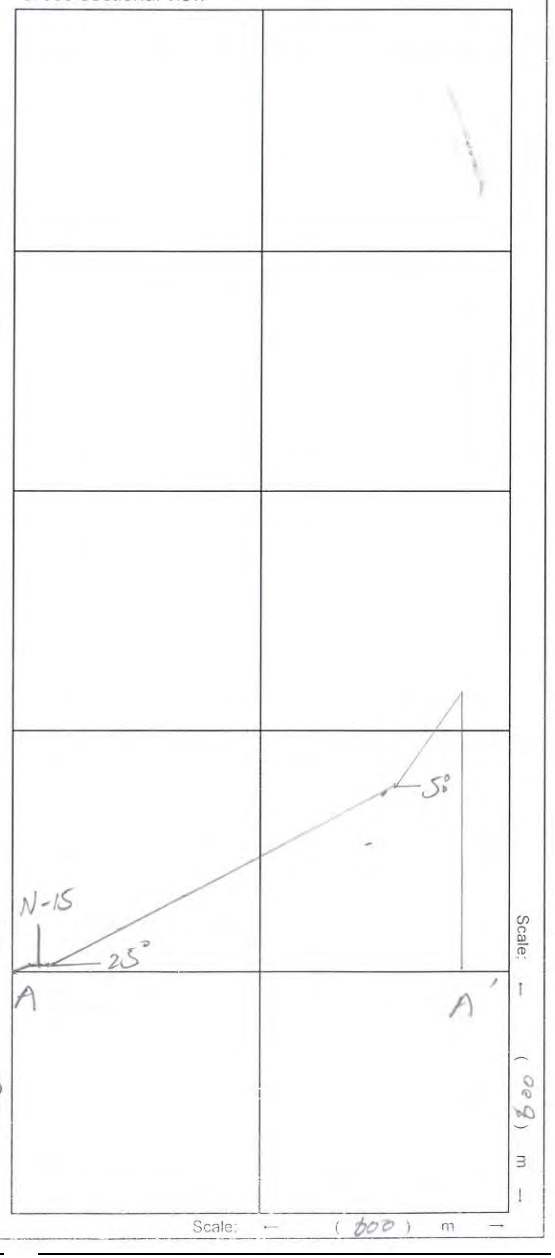
Coordinates	Latitude	35° 4' 28.0"
	Longitude	73° 56' 17.9"
Road Name		Km

Date	6/24/2018
Inspector	Basharat, Yasir, Sajid, Shafi

Plane view



Cross sectional view



Code no.	N	#	_	5	3	_	1		
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 4' 28.0"
	Longitude	73° 56' 17.9"
Road Name		Km

Date	6/24/2018
Inspector	Basharat, Yasir, Sajid, Shafi

Full view of the landslide

View of landslide on Valley side:

Road condition

View of the Landslide at the middle point

Existing countermeasures / anomalies: View of damaged Retaining Wall as counter measure

View of the toe of Landslide cut by the stream

Evaluation sheet (debris flow)

Code no.	N15_61
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 05' 46.6"
	Longitude	73º 57' 17.0"
Road Name		Km

Date	6/25/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	√
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 1000 m, W= 40 m, D= 3-4 m

[Countermeasure]

Type of countermeasure		Check
Culvert Retaining walls		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

This is an active debris flow located at the sharp bend along N-15. Presently, the erosional channel is covered with glacier and road has been severely damaged. The debris flow has very large surface run off with steep gradient. The water seeps beneath the road and boulders ranges between 1-3 m3 are present in the channel towards valley side. Due to this steep gradient debris flow posing serious debris flow disaster which cause to damage the road and discontinuity of the traffic. A culvert is constructed for the out flow of the water, however, it does not fulfill the requirement. The active landslides were also observed both side of the river bed along the road posing risk to damage the road. A retaining wall is constructed to protect the road which has been damaged due to the debris flow. For the mitigation purpose, a culvert for the outflow of the water and debris material should be redesign

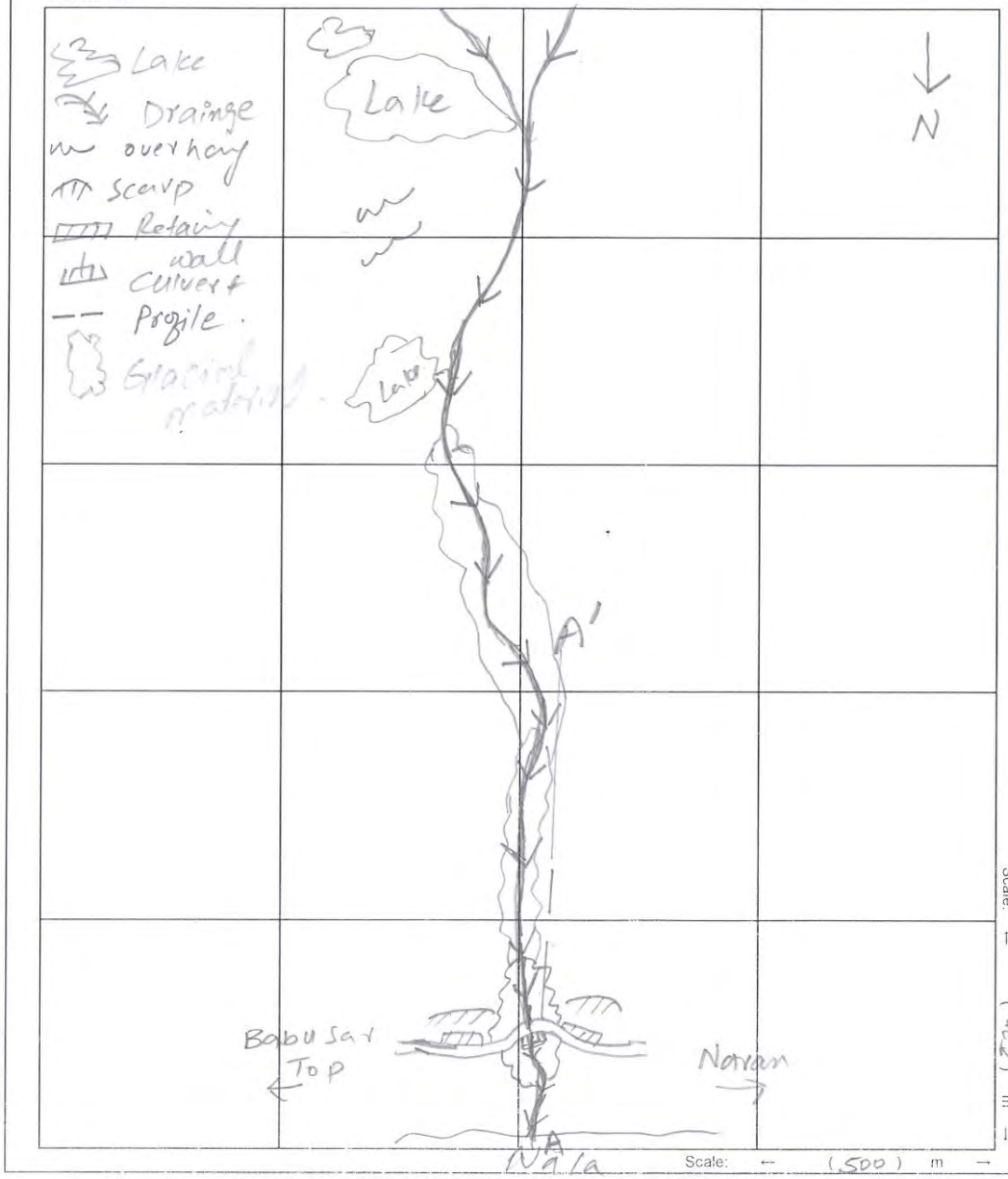
Code no.	N	1	5	_	6	1			
Region Office									
Maintenance Unit									

Sketch sheet

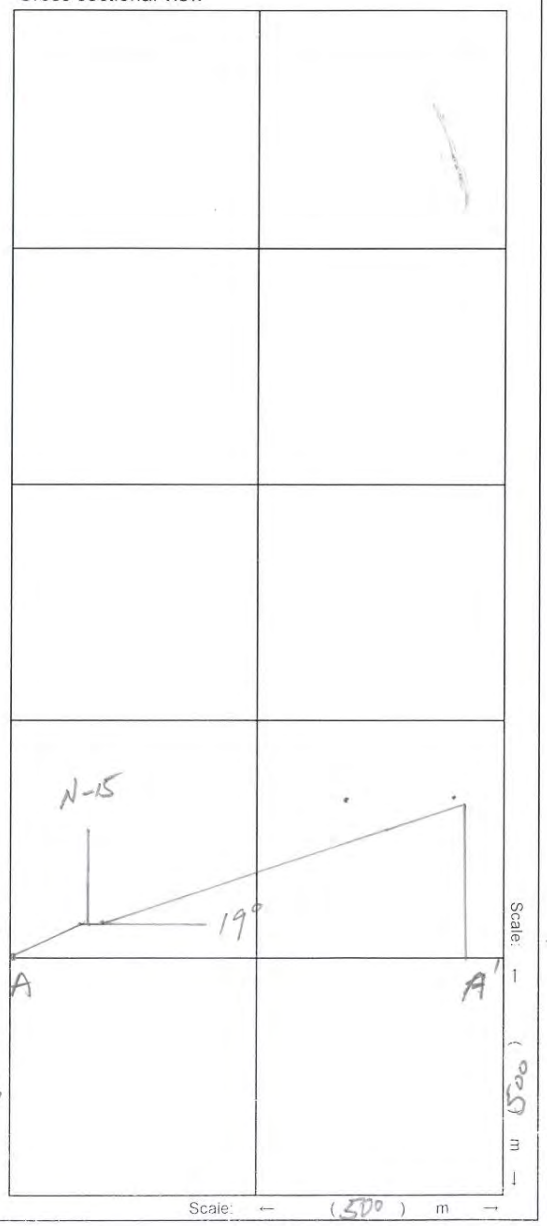
Coordinates	Latitude	35° 05' 46.6"
	Longitude	73° 57' 17.0"
Road Name		Km

Date	6/25/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Plane view



Cross sectional view



Code no.	N	1	5	_	6	1			
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 05' 46.6"
	Longitude	73° 57' 17.0"
Road Name		Km

Date	6/25/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Culvert outlet

The new slope failures has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining wall has been constructed along the Debris Flow

Evaluation sheet (debris flow)

Code no.	N15_72
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 11' 2.3"
	Longitude	74º 02' 38.1"
Road Name		Km

Date	6/26/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	√
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	√

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	
There is a history about debris flow though there is no obstacle to traffic.	√
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	√
Debris flooding on the road	

[Expected size of disaster] (width, length, depth, etc.)

L= 1000m, W= 29 m, D= 3-4 m

[Countermeasure]

Type of countermeasure		Check
Culvert Retaining walls		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	(4)

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

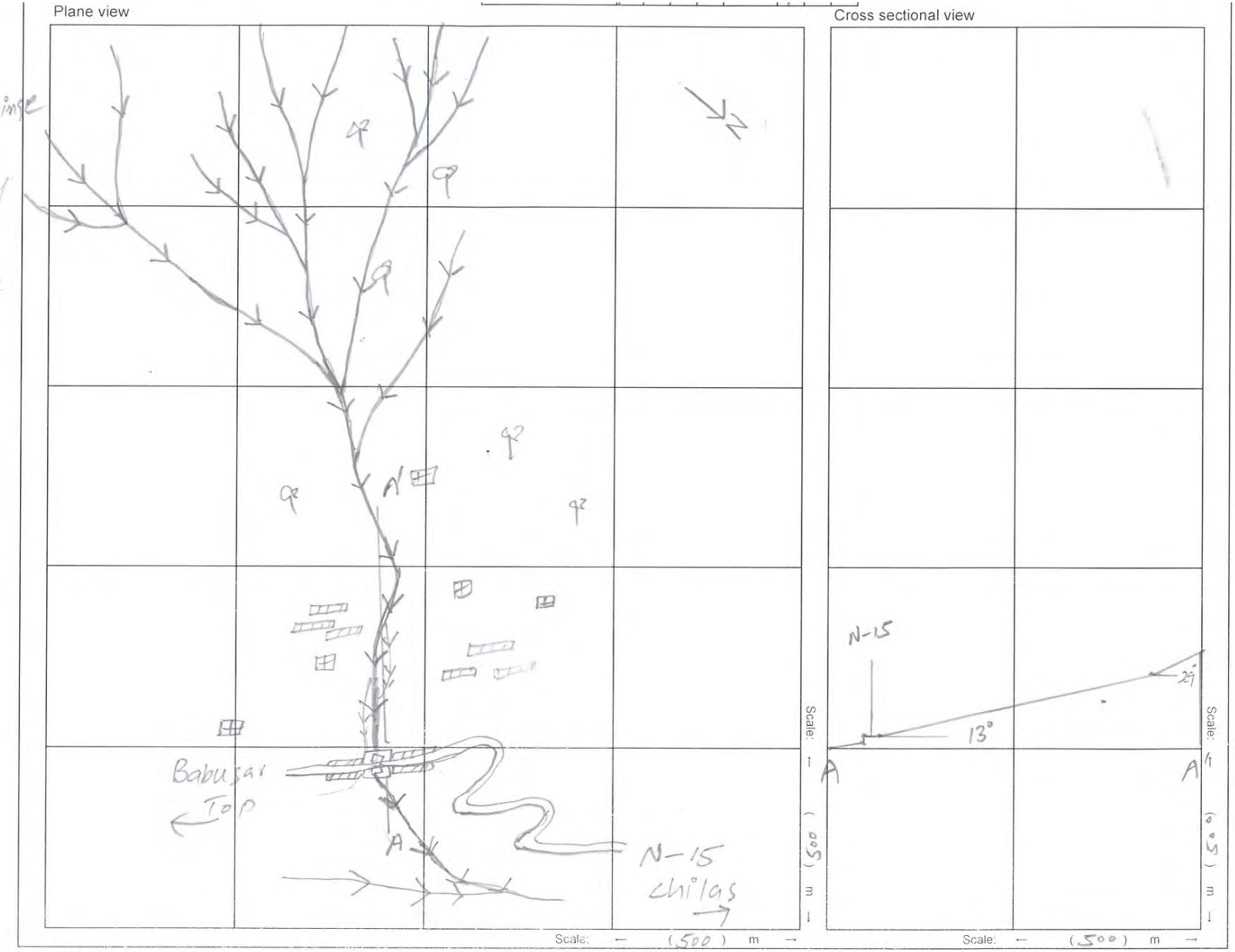
The debris flow is located along N-15 with large surface runoff. The debris flow origin appears from the top of the Babusar (13700 feet asl). This debris flow has very large catchment area and long run-out. It is a permanent stream with flowing water through out the year. The main source of water in the stream is glacier and springs. The shallow channel has been observed. A culvert has been constructed for the out let of the water, however, according to the local inhabitant during the heavey rain fall the water is following on the road. Man made terraces at the side of the stream has been developed. No damage of the road has been observed at the site. The width of the river bed is about 50 meters. The size of the boulders in the stream ranges between 1-5m3. Retaining wall has been constructed to protect the road. For the mitigation purposes depth of the channel should be increased for the ouflow

Sketch sheet

Code no.	N 1 5 _ 7 2
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 11' 2.3"
	Longitude	74° 02' 38.1"
Road Name		Km

Date	6/26/2018
Inspector	Yasir, Basharat, Shafiq, Saji



Code no.	N	1	5	_	7	2			
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 11' 2.3"
	Longitude	74° 02' 38.1"
Road Name		Km

Date	6/26/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

The culvert inlet along the debris flow

Road condition

Existing countermeasures / anomalies:Check Dams has been constructed along the Debris Flow

Evaluation sheet (debris flow)

Code no.	N 1 5 _ 7 5 _ 1
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 15' 36.0"
	Longitude	74º 05' 28.1"
Road Name		Km

Date	6/27/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	√
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 1000 m, W= 45m, D= 7-8 m

[Countermeasure]

Type of countermeasure		Check
Retaining walls		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

This is an active debris flow along N-15. The debris flow event occurred in July 2017 due to a very heavy rainfall in the area. The debris flow origin from the cliff and lead to a serious debris flow disaster. According to the local inhabitant, three vehicles and local irrigation system have been damaged and road has been blocked more than a week. After one week the material has been removed from the road for the continuity of the traffic. The debris flow has very long run-out and transported a huge debris material which covered the entire road section. Still huge material is deposited along the road site. Large size of the boulders ranges between 1-5m3 are present at the site. The boulders are comprised gabbro diorite and granitic rocks. It has been observed the debris flow is drained by the seasonal water. The gradient of the erosional channel is very steep and lead to potential in future disaster and significant damage of the road. The area is still very unstable and there is a high potential for more events occur. In future, there is possibility this debris flow block the Thak Nala and create a landslide dam. A retaining wall is constructed to protect the road which has been damaged due to this debris flow. For the mitigation purpose the construction of shed has been suggested to protect the road in the future.

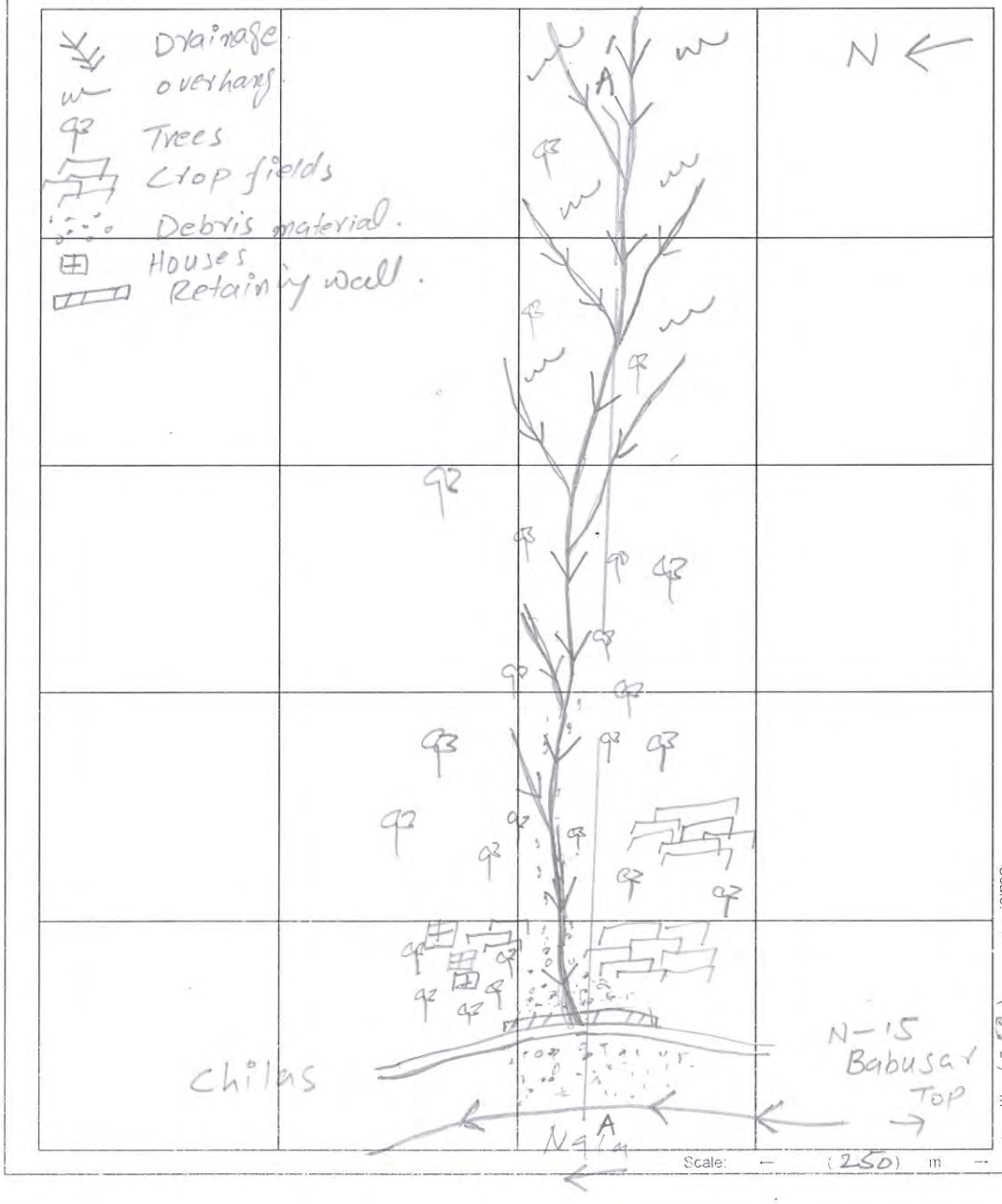
Code no.	N	1	5	_	7	5	_	1	
Region Office									
Maintenance Unit									

Sketch sheet

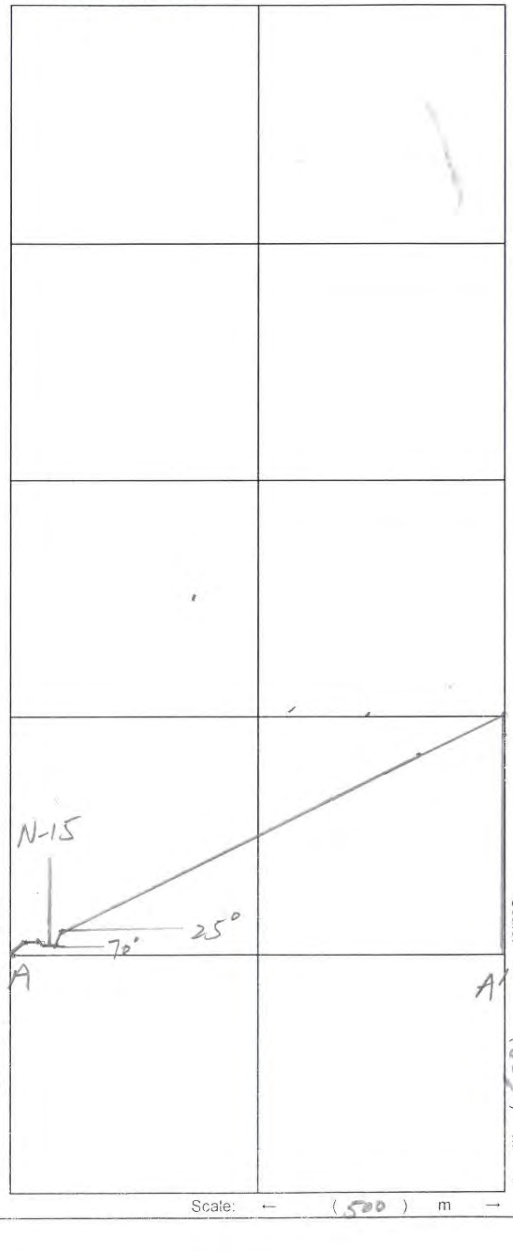
Coordinates	Latitude	35° 15' 36.0"
	Longitude	74° 05' 28.1"
Road Name		Km

Date	6/27/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Plane view



Cross sectional view



Code no.	N	1	5	_	7	5	_	1	
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 15' 36.0"
	Longitude	74° 05' 28.1"
Road Name		Km

Date	6/27/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Mid view of the debris flow

The Check dams has been built along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining Wall (Damaged) has been constructed along the Debris Flow

Evaluation sheet (debris flow)

Code no.	N 1 5 _ 7 5 _ 2
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 15' 40.2"
	Longitude	74º 05' 28.2"
Road Name		Km

Date	6/28/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	√
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 600 m, W= 54 m, D= 7-8 m

[Countermeasure]

Type of countermeasure		Check
No Counter Measure		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	(1)	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

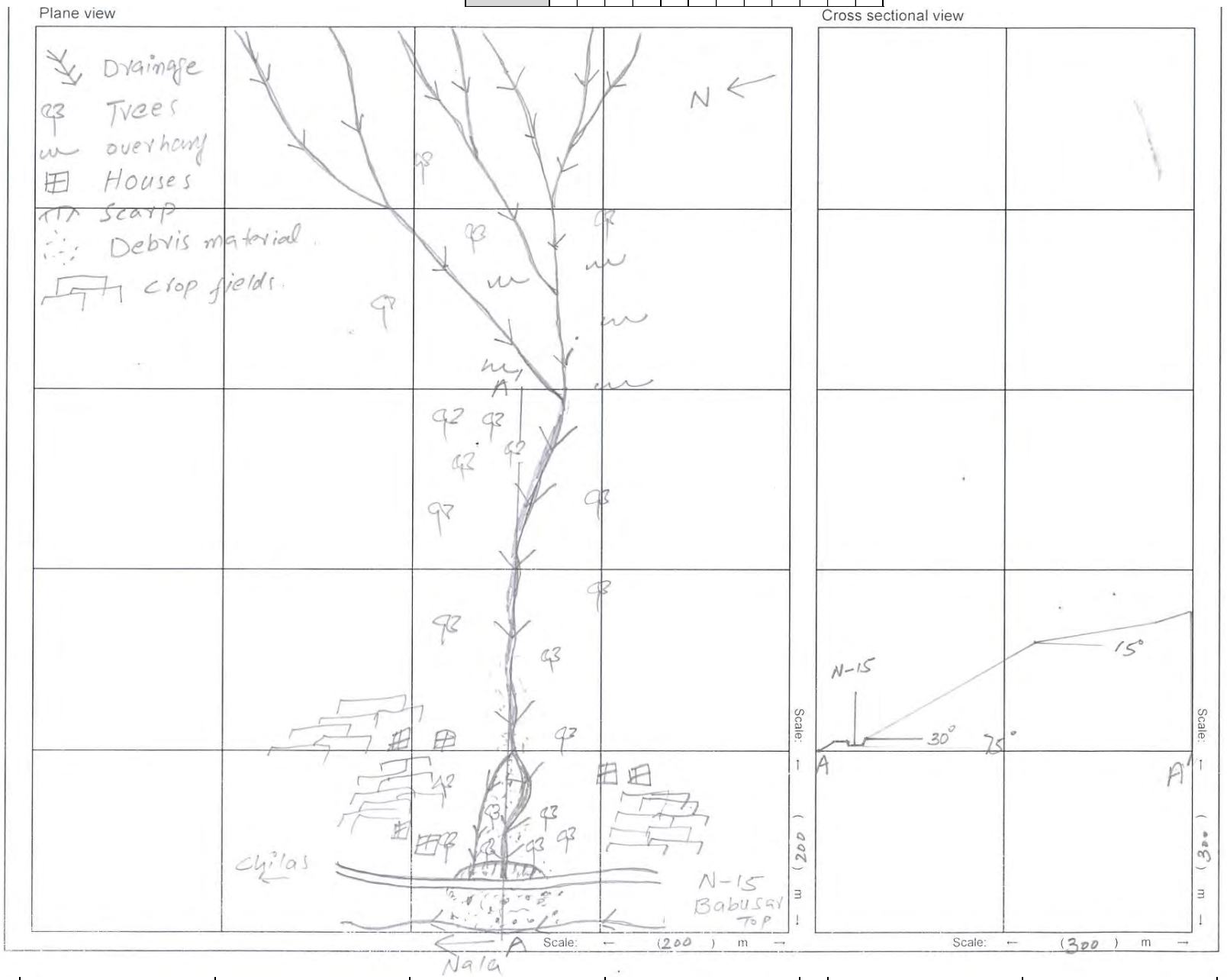
This active debris flow also occurred in July 2017 during heavy rainfall at the 100 meters away from the previous location. The debris flow leads to similar disaster as N-15-75-1. Due to this debris flow about 60 meters road has been partially damaged. The source of the debris flow has very steep cliff. The debris flow comprises two water channel, however, both channels have been drained by seasonal water. The erosional channel has a very steep gradient. Detached boulders of the size range between 1-5m3 was present in the channel and large number of boulders are still hanging along the road that lead to further disaster. The area is still very unstable and there is a high potential for more events occur. Due to the recent debris flow no mitigation measures have been taken to protect the road. Therefore, construction of shed is suggested to protect the road in the future.

Code no.	N	1	5	_	7	5	_	2	
Region Office									
Maintenance Unit									

Sketch sheet

Coordinates	Latitude	35° 15' 40.2"
	Longitude	74° 05' 28.2"
Road Name		Km

Date	6/28/2018
Inspector	Yasir, Basharat, Shafiq, Saji



Code no.	N	1	5	_	7	5	_	2	
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 15' 40.2"
	Longitude	74° 05' 28.2"
Road Name		Km

Date	6/28/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Mid view of the debris flow

The Check dams has been built along the debris flow

Road condition

Existing countermeasures / anomalies: No Counter Measure

Evaluation sheet (debris flow)

Code no.	N15_78
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 21' 18.8"
	Longitude	74º 08' 18.8"
Road Name		Km

Date	6/29/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	√
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	
		none	√
	traces of large slope failure in stream	certain	
		none	√

[Road structure]

structure	category of score	Check
River width	10m or more	√
	5m - 10m	
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 600m, W= 60 m, D= 3-4 m

[Countermeasure]

Type of countermeasure		Check
No Counter Measure		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

This debris flow is located on N-15. It is an old debris flow with large catchment area. The unconsolidated debris material is present both sides of the erosional channel. A temporary house is constructed in the middle of the stream and is prone to disaster. No countermeasures have been taken to avoid the debris material on the road. Therefore the road has been damaged due to this debris flow. Presently water is not flowing in the stream, therefore, the stream has been drained by seasonal water. It is likely that future debris flow will continue on the road. For the mitigation purpose construction of the bridge or a culvert has been suggested for the smooth outflow of the water and the debris material

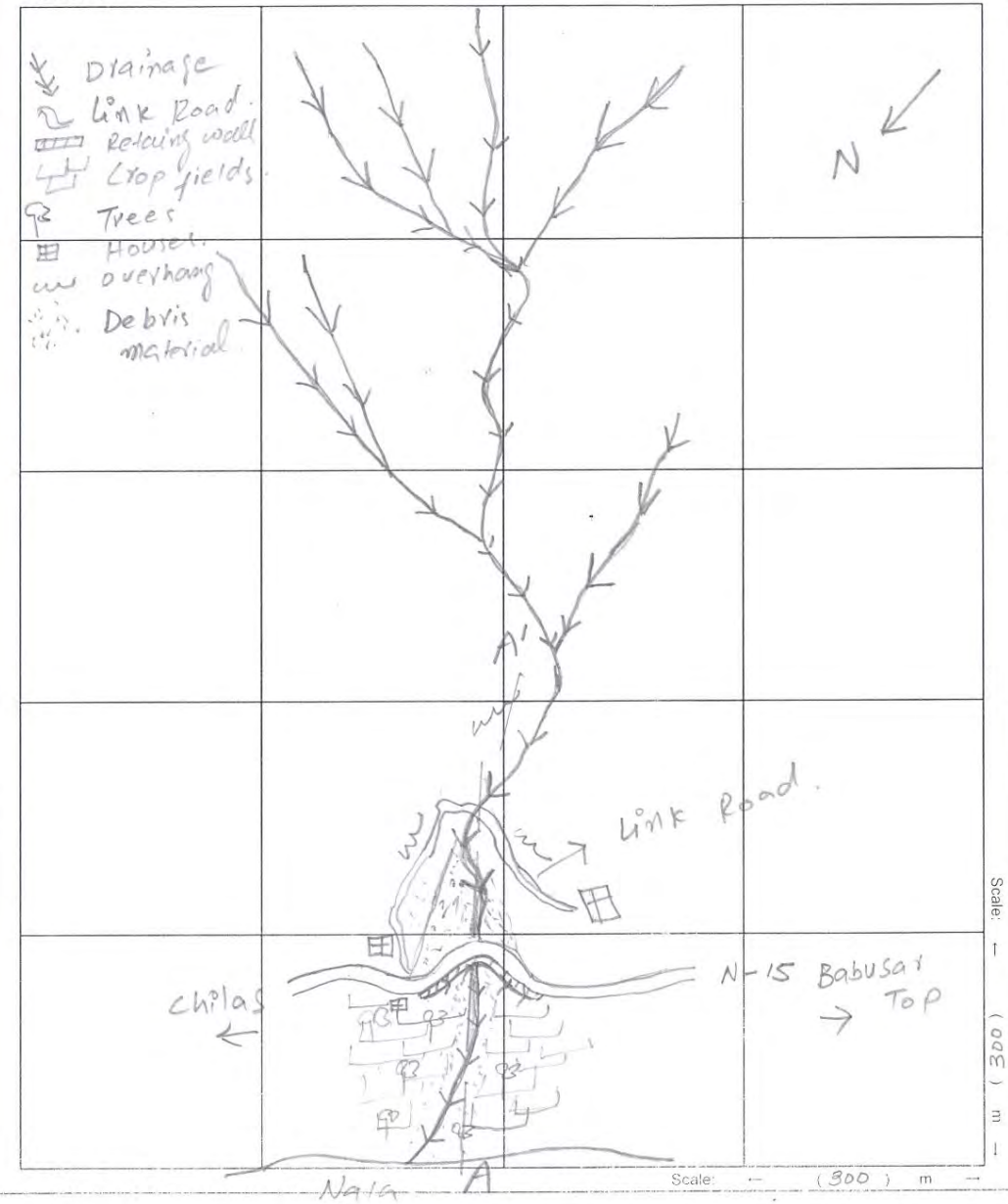
Code no.	N	1	5	_	7	8			
Region Office									
Maintenance Unit									

Sketch sheet

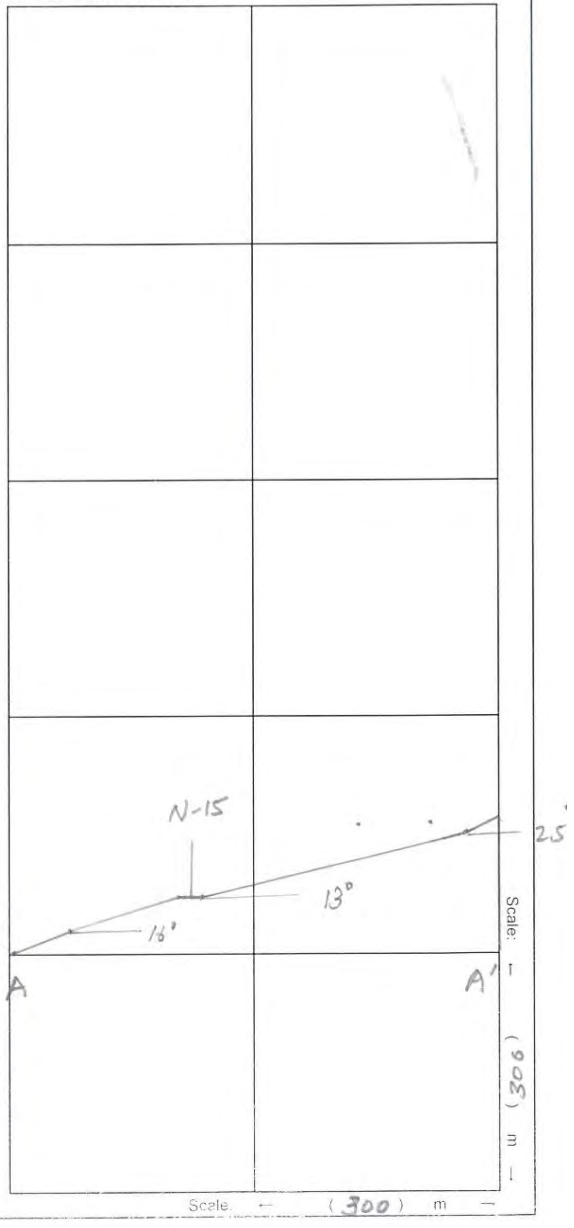
Coordinates	Latitude	35° 21' 18.8"
	Longitude	74° 08' 18.8"
Road Name		Km

Date	6/29/2018
Inspector	Yasir, Basharat, Shafiq, Saji

Plane view



Cross sectional view



Code no.	N	1	5	_	7	8			
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 21' 18.8"
	Longitude	74° 08' 18.8"
Road Name		Km

Date	6/29/2018
Inspector	Yasir, Basharat, Shafiq, Sajid

Mountain side view of the debris flow

Valley side view of the debris flow

Mid view of the debris flow

The Check dams has been built along the debris flow

Road condition

Existing countermeasures / anomalies:No Counter Measure. House has been damaged along the Debris Flow

Evaluation sheet (Slope failure/Rockfall)

Code no.	N – 9 0 0 1
Region Office	
Maintenance Unit	

Coordinates	Latitude	34° 52' 59.2"
	Longitude	72° 45' 50.17"
Road name		Km

Date	31/03/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		√
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m	height	
			15≦H＜30m	height	
			H＜15m	height	
			i≧70°	dip	
			45°≦i＜70°	dip	√
			i＜45°	dip	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Box Culvert for drainage	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 360 m, W= 315 m, D= 1-2 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

This is a cut slope mainly triggered due to road construction. Active erosion is present leading to water gullies. Eroded talus is present along the road. Detached boulders are present on the slide. Part of the slide is prone to debris flow and also rock fall. Tension cracks are also observed. Two roads passes through the slide. Loose debris is present on the slide. It is disrupting the road traffic mainly during the rainy season. No mitigation

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Long 72 45' 50.17"

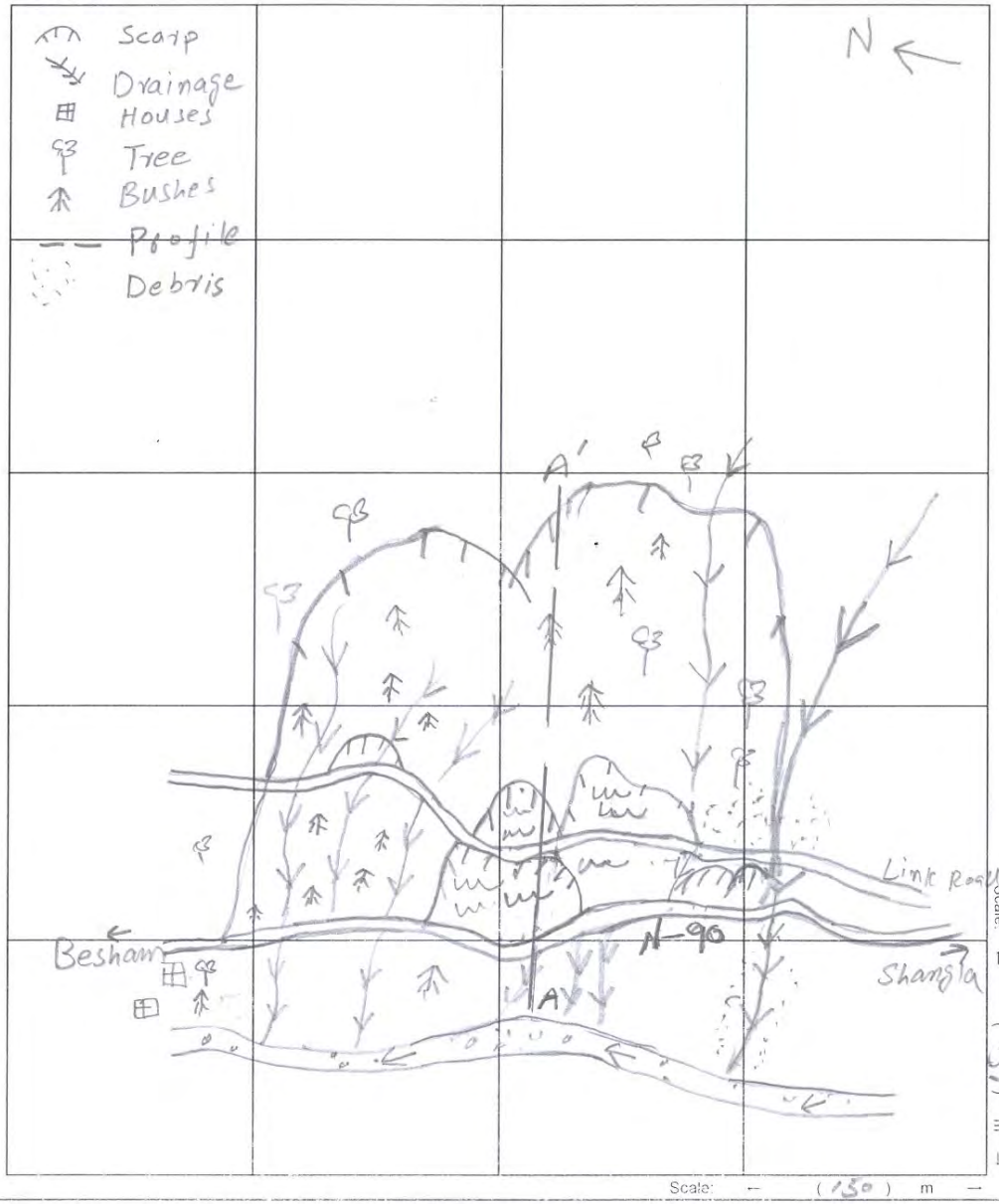
Sketch sheet

Code no.	N – 9 0	0 1
Region Office		
Maintenance Unit		

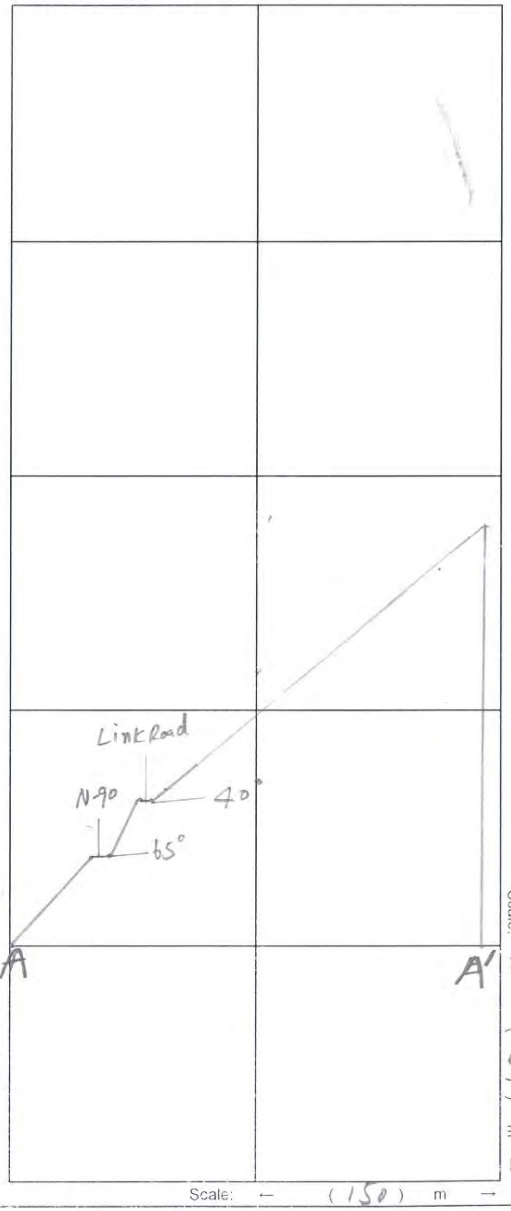
Coordinates	Latitude	34° 52' 59.2"
	Longitude	72° 45' 50.17"
Road name	N-90	Km Km

Date	31/03/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	0			0	1
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 52' 59.2"
	Longitude	72° 45' 50.17"
Road name		Km

Date	31/03/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

View of Gully erosion along the slope failure

Existing countermeasures / anomalies: View of culvert inlet at the toe of slope failure

Code no.	N	–	9	0					0	2
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34° 54' 38.3"
	Longitude	72° 49' 20.7"
Road name		Km

Date	1/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		
			None		√
		debris on impermeability bedrock, ~~the upper part is a hard /the toe of slope is weak.~~	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		√
			seepage		
			none		
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, ~~piping hole, subsidence, heaving, bending of tree root,~~ fallen tree, crack, ~~open crack, anomaly of countermeasure~~		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Check dams along gulleys. Retaining wall for N-90	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 300 m, W= 310 m, D= 2-3 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

A rotation landslide is mainly triggered during the road construction. The slide is mainly active along the road. Active soil erosion is present leading to development of water gullies. The check dams are developed along the gullies to minimize the erosion. Hanging debris is also present on the slide. The slide is obstructing the traffic mainly during the rainfall. Detached and hanging boulders are also present. Bedrock is impermeable. Shrubs and grass is present on the slide. Talus is present mainly with the road. Spring water is present. No counter measures to protect the slide.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

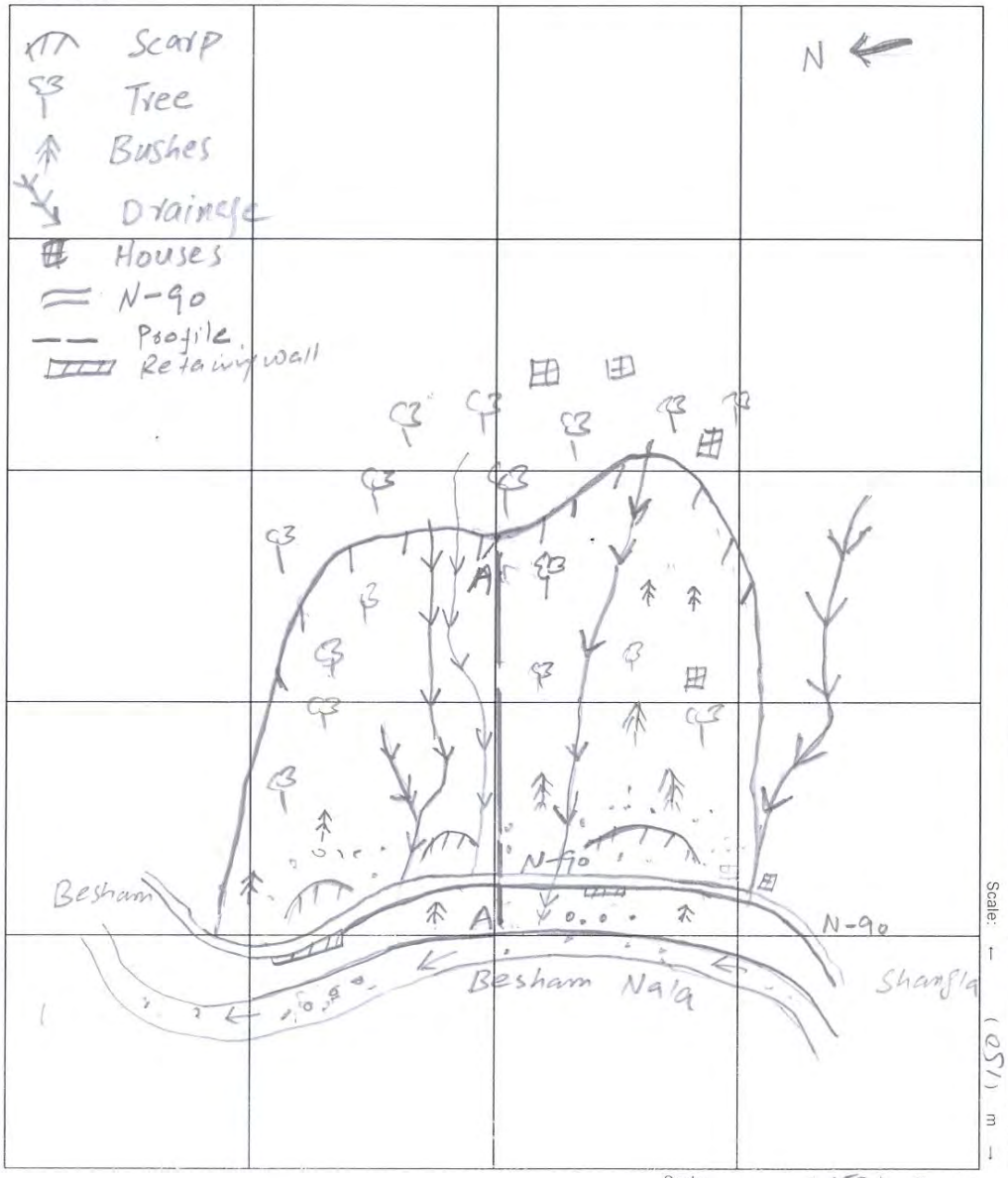
Code no.	N	-	9	0				0	2
Region Office									
Maintenance Unit									

Sketch sheet

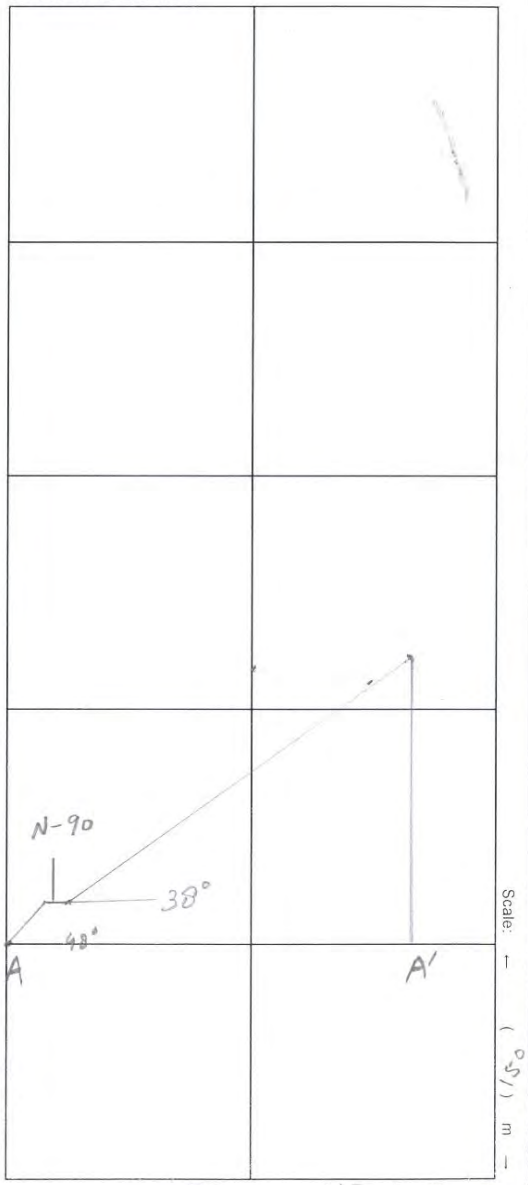
Coordinates	Latitude	34° 54' 38.3"
	Longitude	72° 49' 20.7"
Road name	M-1	Km 0+2

Date	1/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	0			0	2
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 54' 38.3"
	Longitude	72° 49' 20.7"
Road name		Km

Date	1/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

View of Slope Failure on Valley side and existing road damage
can be seen

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of check dam as counter measure

View of seepages in the slope failure

Code no.	N	–	9	0					0	3
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name		Km

Date	2/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		√
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		√
			seepage		
			none		
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No counter measures. Retaining wall for N-90. Box culvert for drainage	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 500 m, W= 550 m, D= 0-1 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

This is a cut slope located on the N90. The landslides is a slope failure triggered due to construction of the road. With the Schist and granite as a bed rock of the slide, part of the slide is also prone to rock fall with detached and hanging boulders. Active soil erosion mainly during the rain, is present on the slide leading to presence of talus is present along the road and gullies on the slide. Spring water is present in the slide. No effective counter measures are present. A culvert is built to drain out the channel water. A retaining wall is built

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

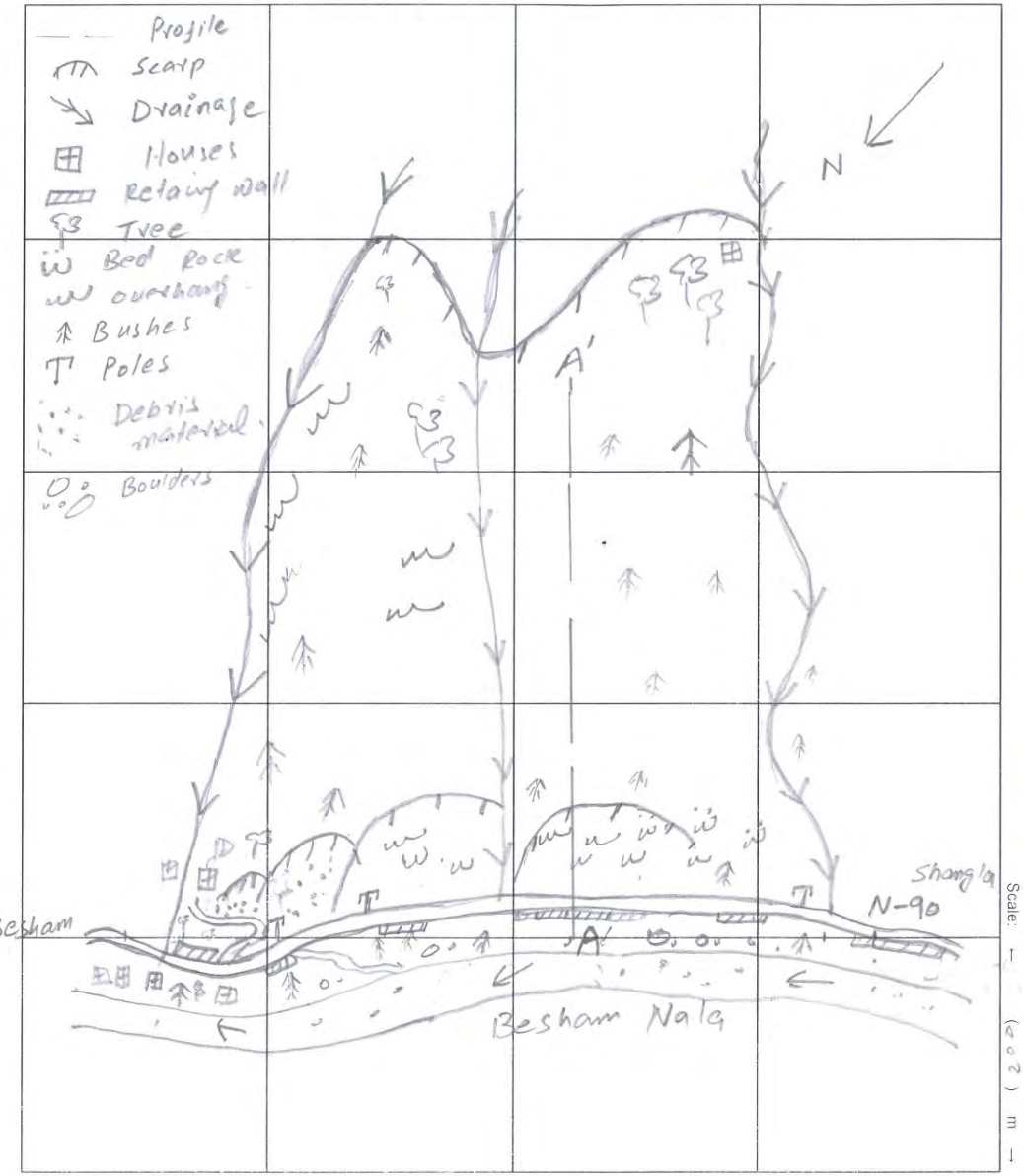
Sketch sheet

Code no.	N	-	9	0					0	3
Region Office										
Maintenance Unit										

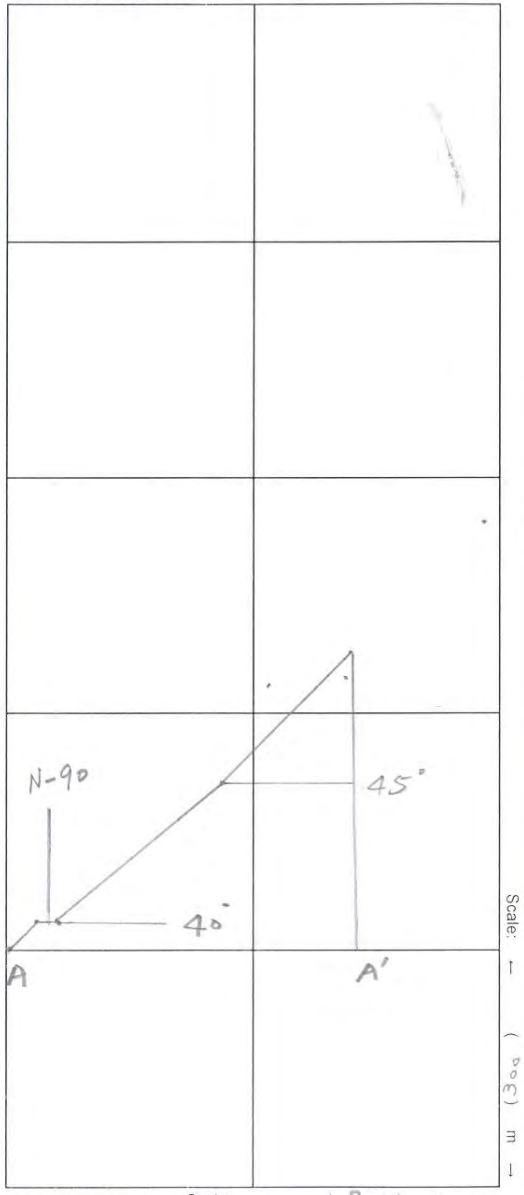
Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name	N-	Km 03

Date	2/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	0			0	3
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name		Km

Date	2/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of Retaining Wall as counter measure

View of drainage that cuts the slope

Evaluation sheet (Slope failure/Rockfall)

Code no.	N – 9 0 0 4
Region Office	
Maintenance Unit	

Coordinates	Latitude	34° 55' 11.3"
	Longitude	72° 49' 43.8"
Road name		Km

Date	3/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		√
			seepage		
			none		
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No counter measures. Retaining wall for N-90. Box culvert for drainage	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 500 m, W= 660 m, D= 1-2 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

This is an old landslide which is retriggered during the construction of road. Detached boulder are present on the slide. Loose debris on the bedrock are prone to sliding. Active soil erosion on the slide leads to the development of gullies. Shrubs are present on the slide with no trees. No counter measures are present to protect the slide.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

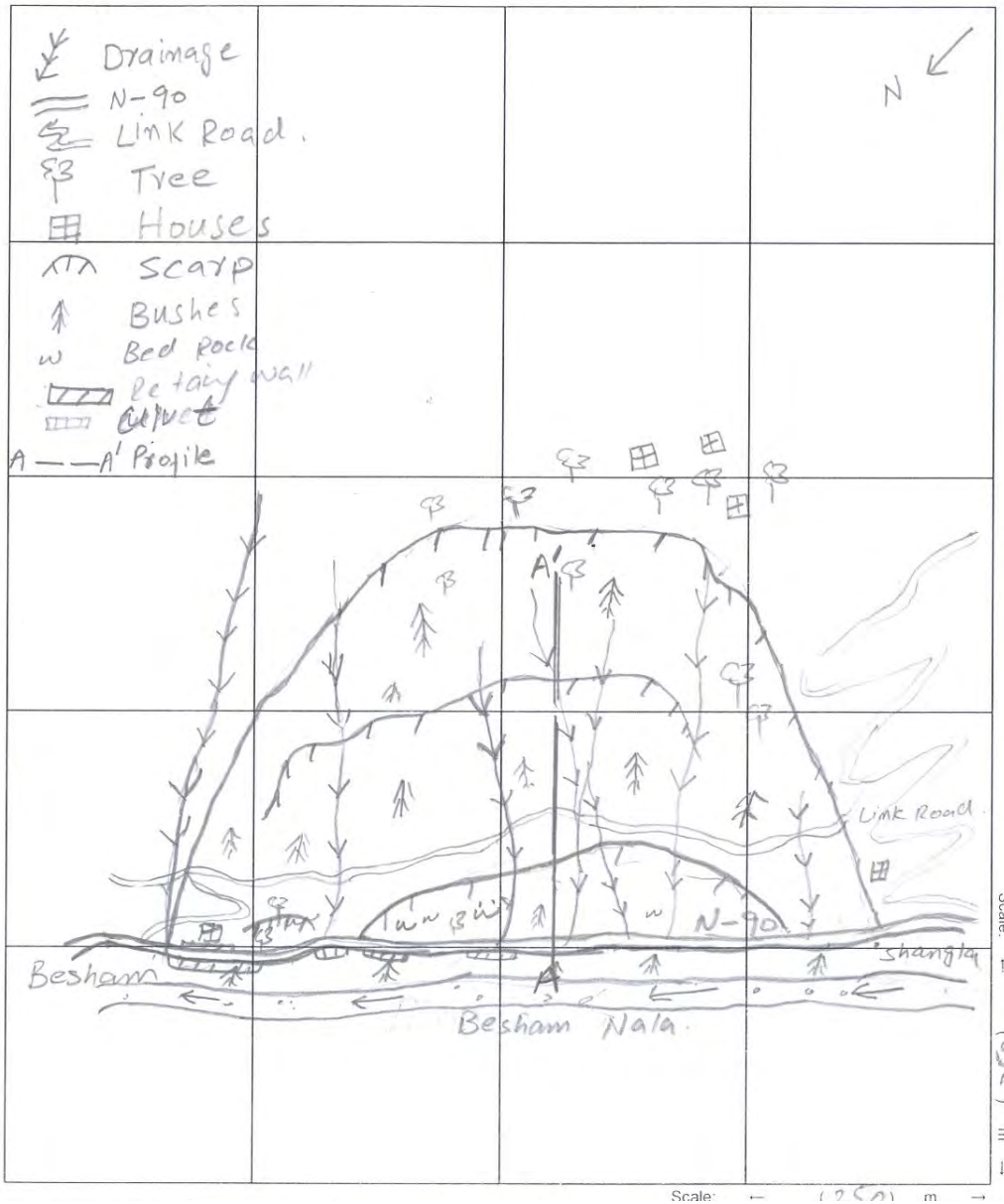
Code no.	N	-	9	0				0	4
Region Office									
Maintenance Unit									

Sketch sheet

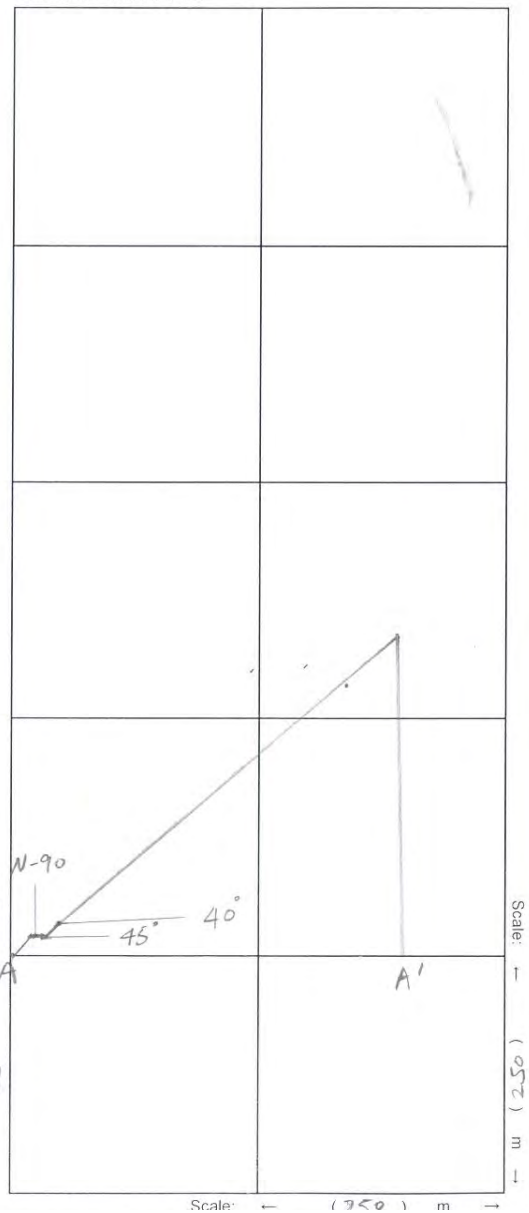
Coordinates	Latitude	34° 55' 11.3"
	Longitude	72° 49' 43.8"
Road name	N-90	Km 0 4

Date	3/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	0			0	4
Region Office								
Maintenance Unit								

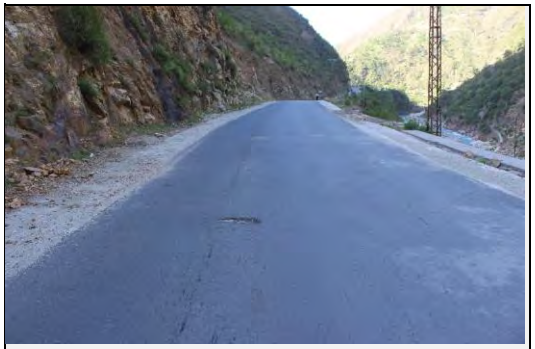
Photo sheet

Coordinates	Latitude	34° 55' 11.3"
	Longitude	72° 49' 43.8"
Road name		Km

Date	3/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:



Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of Retaining wall as counter measure

View of Drainage pipe and damaged retaining wall

Evaluation sheet (debris flow)

Code no.	N－90　　05
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 27' 33.5"
	Longitude	73º 58' 11.2"
Road Name		Km

Date	4/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	√
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	
	3m - 5m	
	less than 3m	√
Beam height	~~less than 1m or~~	
	No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 420 m, W=60 m, D= 2-3 m

[Countermeasure]

Type of countermeasure		Check
Drainage Diversion by Locals		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

A very active debris flow mainly triggered during the intense monsoon rainfall of 2010 blocking the road for 3 weeks. The debris flow is active mainly during the rainy season blocking the road and obstructing the traffic. A channel is develop to drain the debris flow. Spring water is percolating in the slide debris. Active erosion leads to the development of gullies. Hanging boulders are also present on the slide. Two roads are passes through the slide.

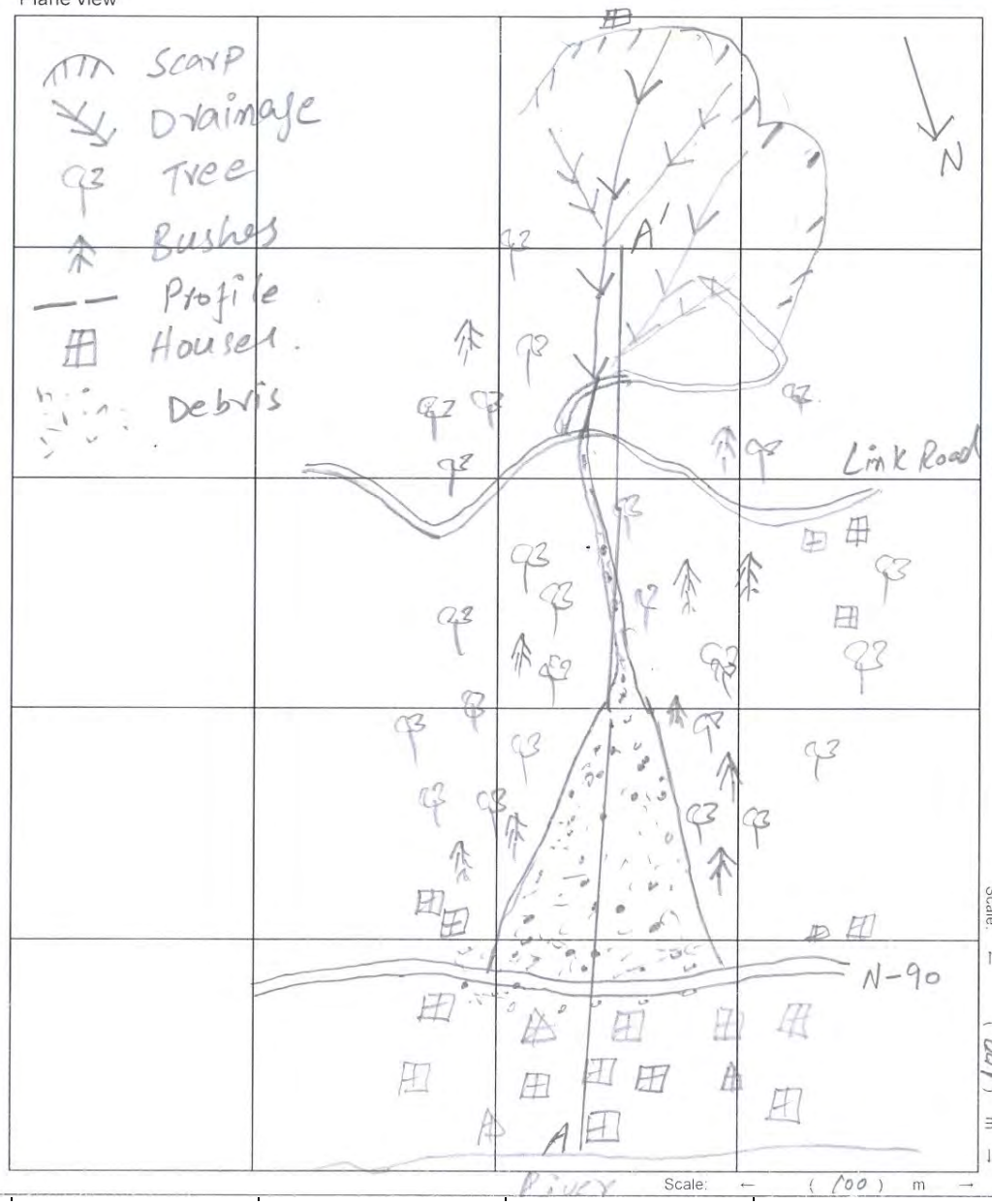
Sketch sheet

Code no.	N - 9 0 0 5
Region Office	
Maintenance Unit	

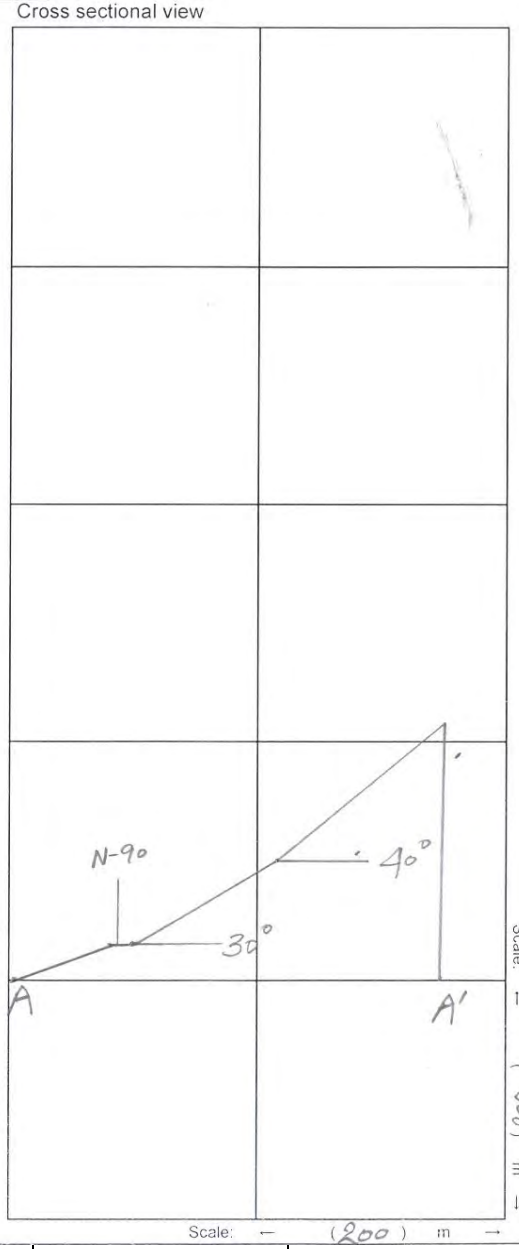
Coordinates	Latitude	35° 27' 33.5"
	Longitude	73° 58' 11.2"
Road Name		Km

Date	4/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view

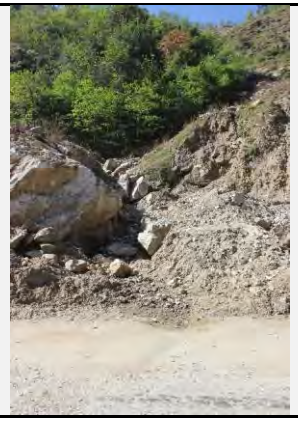


Code no.	N	–	9	0				0	5
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 27' 33.5"
	Longitude	73° 58' 11.2"
Road Name		Km

Date	4/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara



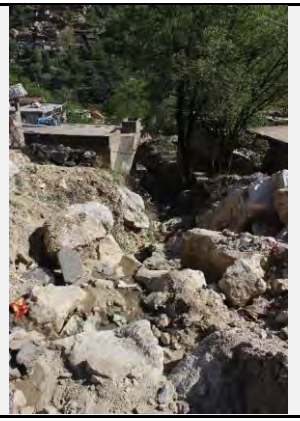
Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

View of fallen block with the debris flow that can damage the population along the downstream.

Road condition



Existing countermeasures / anomalies: Drainage convertion by the locals to avoid the damages from the debris flow in future.

Code no.	N	–	9	5					0	1
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 19' 29.9"
	Longitude	72° 36' 41.9"
Road name		Km

Date	6/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m	height	
			15≦H＜30m	height	
			H＜15m	height	
			i≧70°	dip	
			45°≦i＜70°	dip	
			i＜45°	dip	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No counter measures	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 380 m, W= 620 m, D= 2-3 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

A deep seated translational landslide. Loose debris of the slide is comprised of boulders, gravels sand and silt. The slide is also prone to debris flow mainly during the rainy season. Active soil erosion on the slide leads to development of gullies on the slide. Around 15 meter of slide scarp is prone to rock fall that often reach to the road. Two road are present in the slide, one the middle of the slide and second at the slide toe. The slide has the potential to damage the road and disrupt the traffic mainly during the rainy season. No countermeasure are constructed to

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

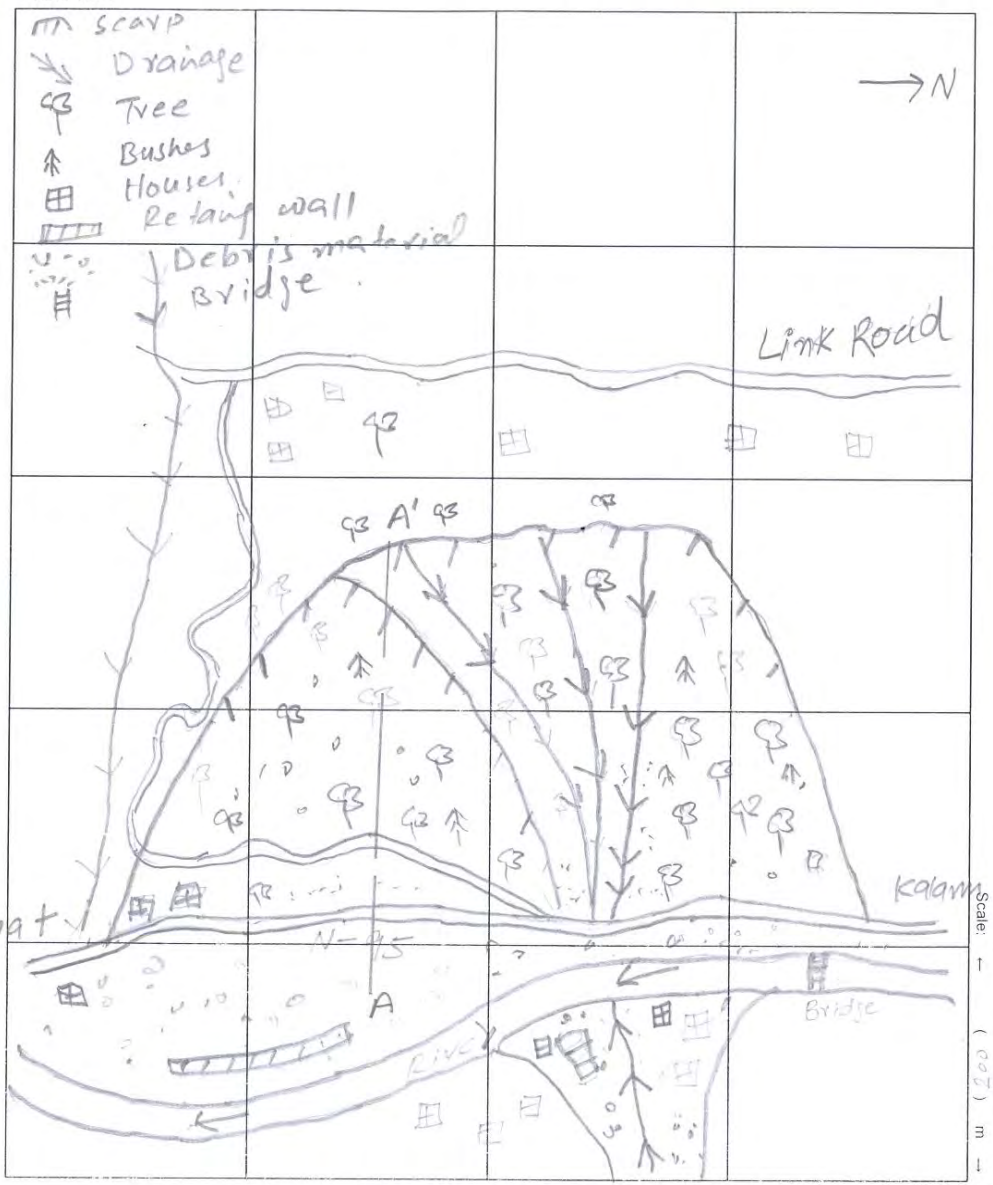
Sketch sheet

Code no.	N – 9 5 0 1
Region Office	
Maintenance Unit	

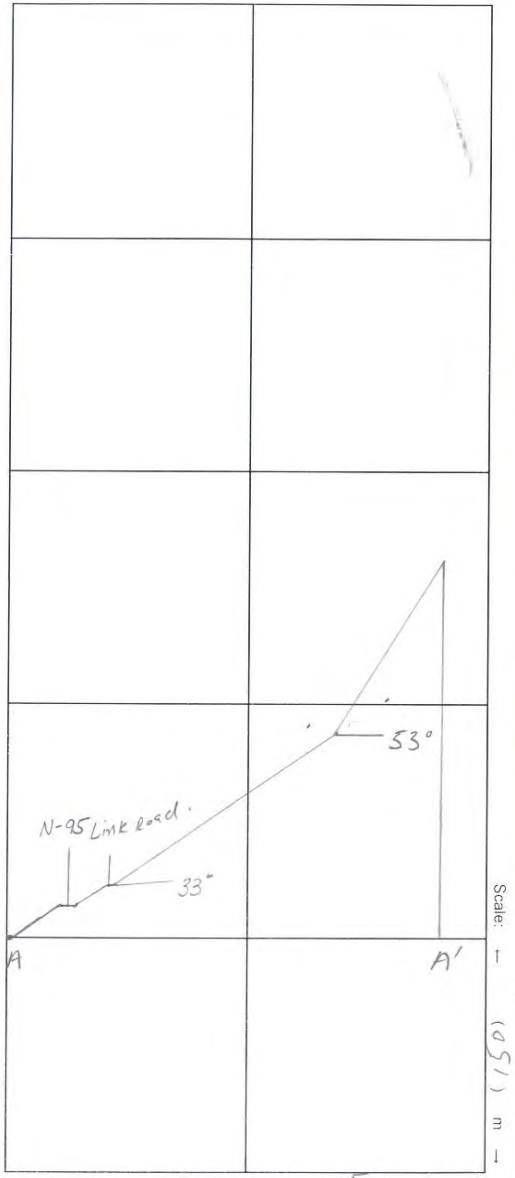
Coordinates	Latitude	35° 19' 29.9"
	Longitude	72° 36' 41.9"
Road name		Km

Date	6/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	5			0	1
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 19' 29.9"
	Longitude	72° 36' 41.9"
Road name		Km

Date	6/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side and a river diversion structure built at the toe of the slope failure

Road condition:Cut slope at the start point

View of the slope failure at the left flank

Existing countermeasures / anomalies: View of check dams as counter measure

View of scarp of the slope failure

Evaluation sheet (debris flow)

Code no.	N－95　　02
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 20' 18.9"
	Longitude	72º 36' 39.0"
Road Name		Km

Date	7/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	√
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	
	3m - 5m	√
	less than 3m	
Beam height	~~less than 1m or~~ No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 1900 m, W=140 m, D= 1-2 m

[Countermeasure]

Type of countermeasure		Check
No Counter Measures		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

This is an active debris flow. Channel of the DF is well developed with detached boulders and gravels. The DF is drained by the spring water. Source of the DF is steep scrap with detached and jointed boulders. Eroded talus is present. The slide is mainly triggered during the rainy season. The DF can affect the road and disrupt the traffic. No mitigation measures

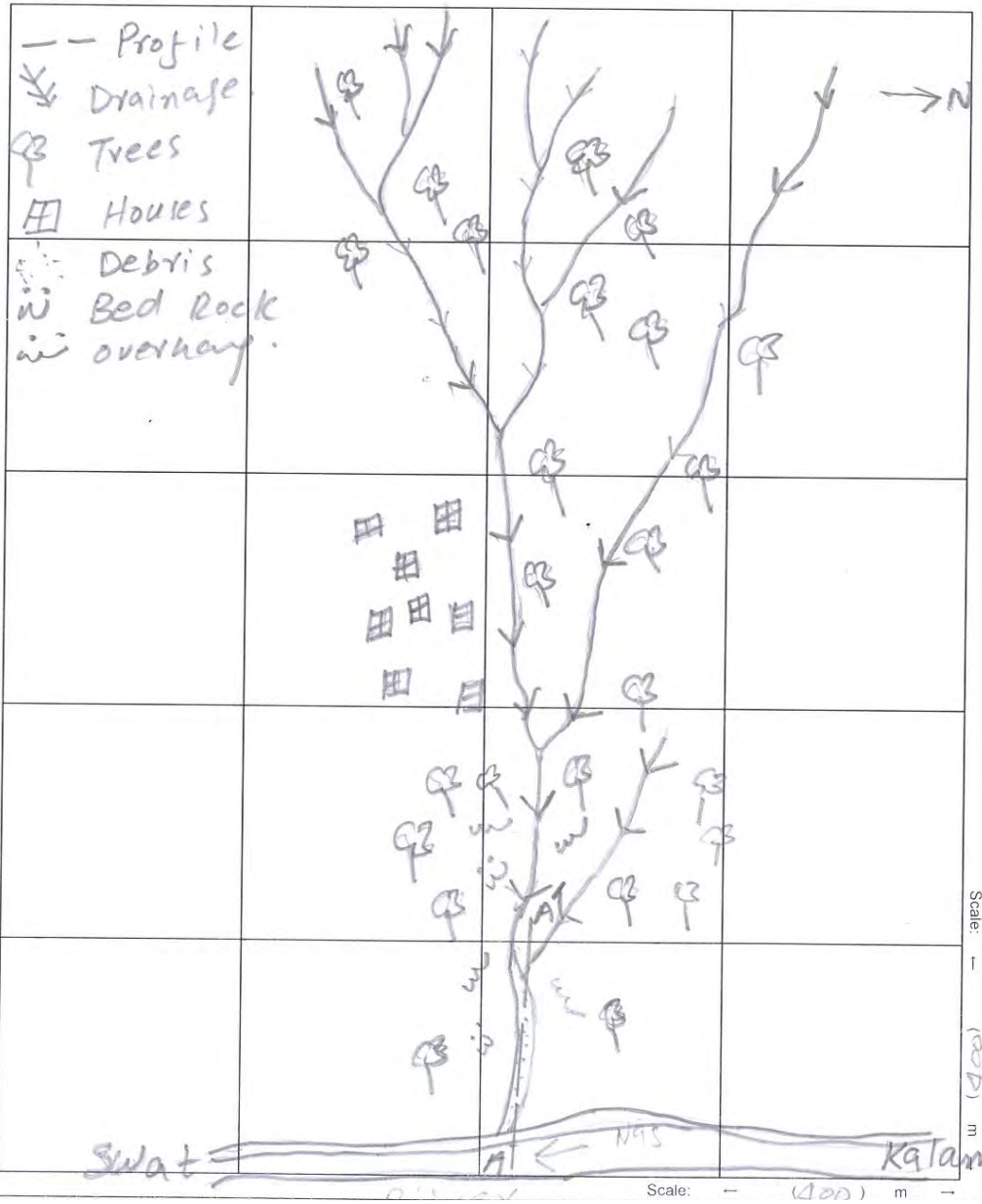
Code no.	N – 9 5				0 2
Region Office					
Maintenance Unit					

Sketch sheet

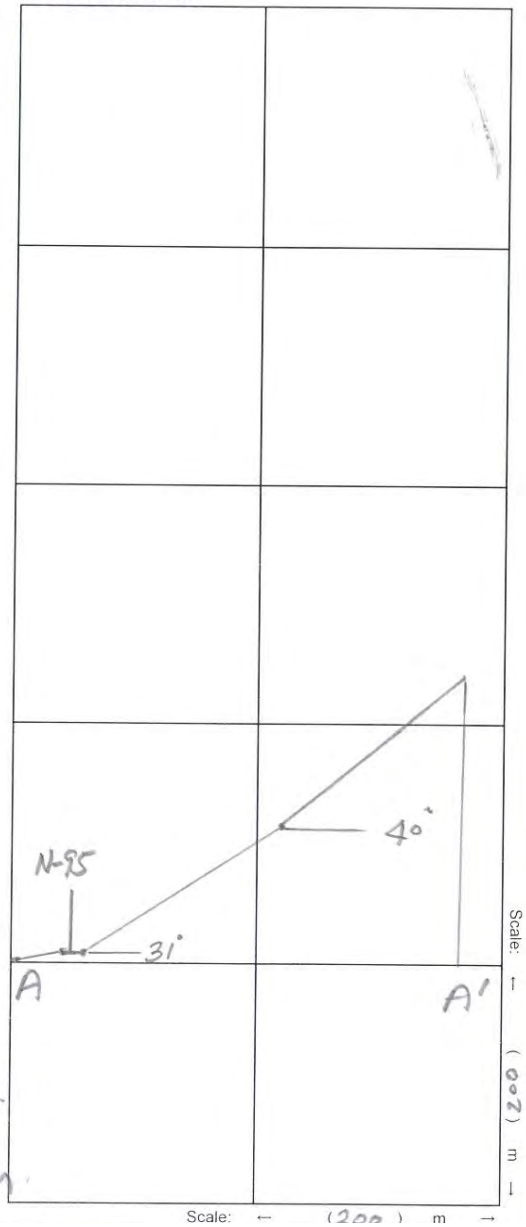
Coordinates	Latitude	35° 20' 18.9"
	Longitude	72° 36' 39.0"
Road Name	– 9 5 K	Km 2

Date	7/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	5				0	2
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 20' 18.9"
	Longitude	72° 36' 39.0"
Road Name		Km

Date	7/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

A view of slope failures along the debris flow

Road condition

Existing countermeasures / anomalies: Retaining wall is being constructed at the toe of the debris flow

Evaluation sheet (debris flow)

Code no.	N－95　　03
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 25' 19.6"
	Longitude	72º 36' 5.6"
Road Name		Km

Date	8/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	√
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	
	3m - 5m	
	less than 3m	√
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	√
Outflow of embankment	
Debris flooding on the road	

[Expected size of disaster] (width, length, depth, etc.)

L= 1200 m, W=50 m, D= 2-3 m

[Countermeasure]

Type of countermeasure		Check
Drainage Culvert		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

An active debris flow. Water is coming in the slide from the upstream glaciers. Upstream of the debris flow is also prone to rock fall. Detached boulders are present in the DF channel. The DF can be activated during the rainfall. No counter measures are constructed to stabilize

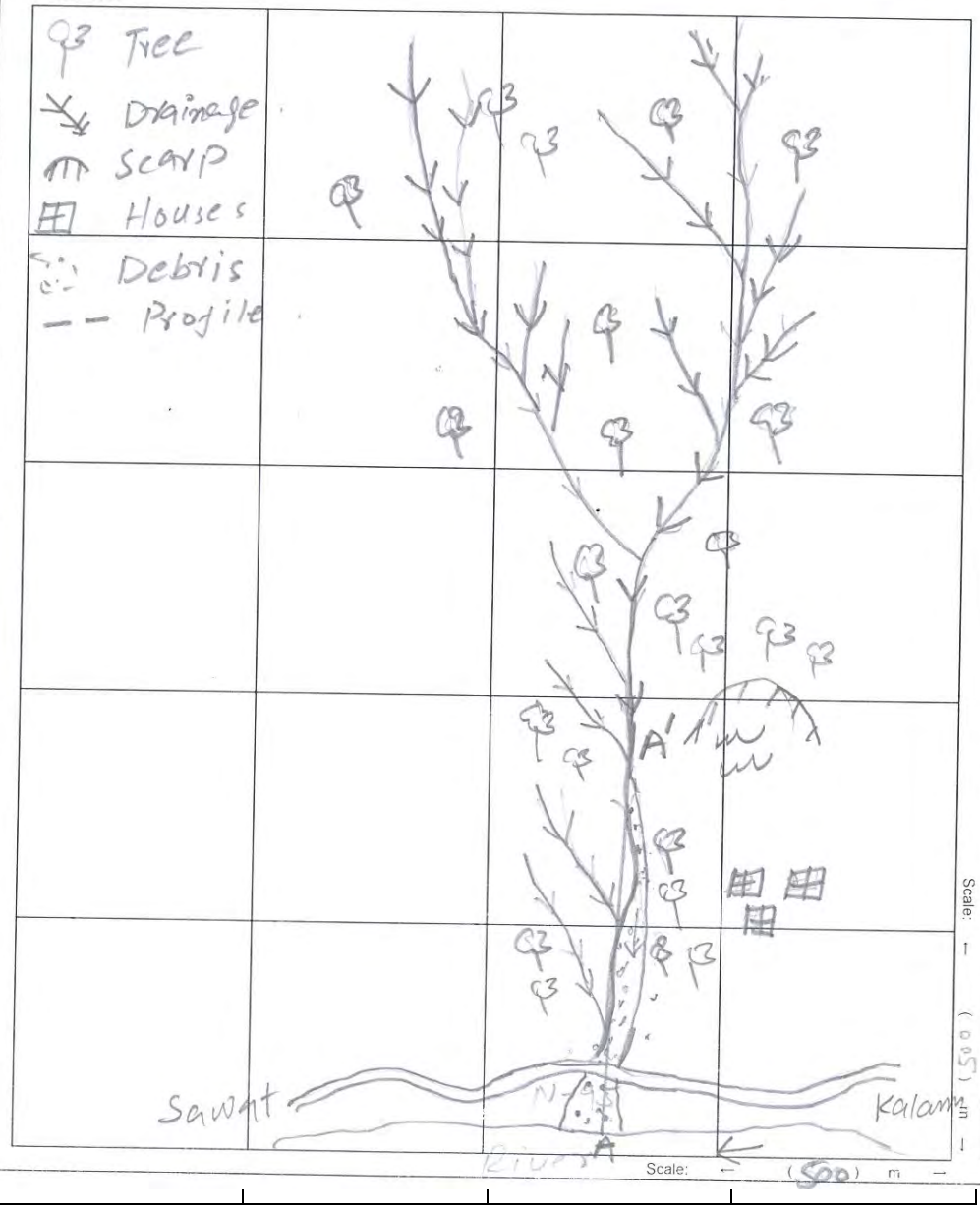
Code no.	N – 9 5					0 3
Region Office						
Maintenance Unit						

Sketch sheet

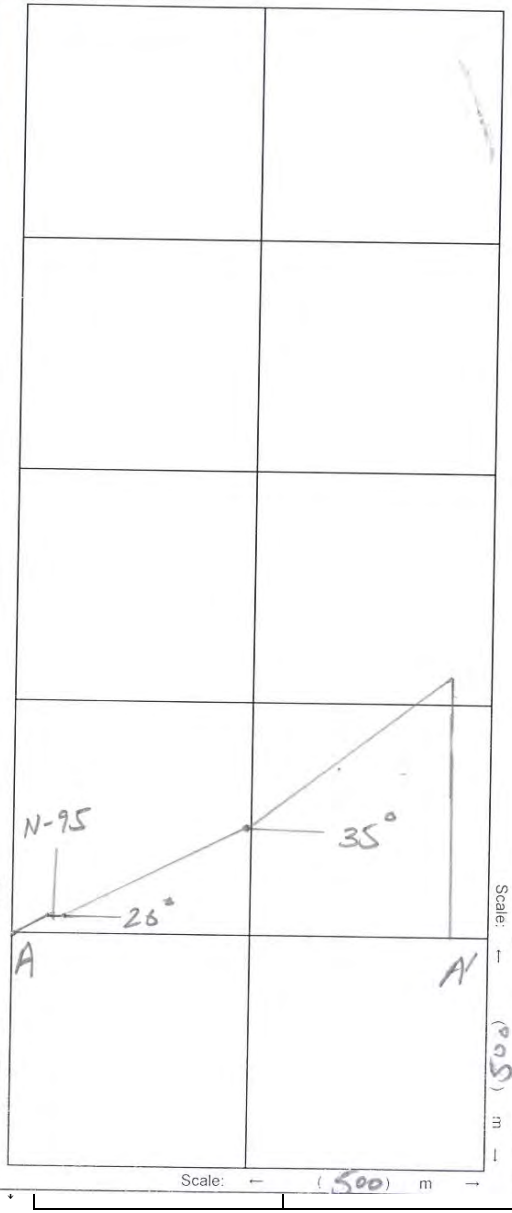
Coordinates	Latitude	35° 25' 19.6"
	Longitude	72° 36' 5.6"
Road Name	N 9 5	K Km 3

Date	8/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	5				0	3
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 25' 19.6"
	Longitude	72° 36' 5.6"
Road Name		Km

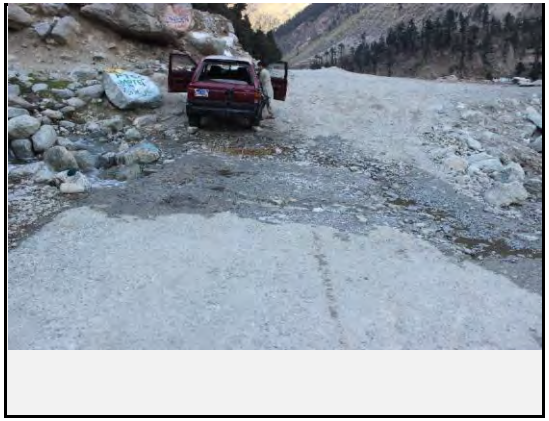
Date	8/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Mountain side view of the debris flow

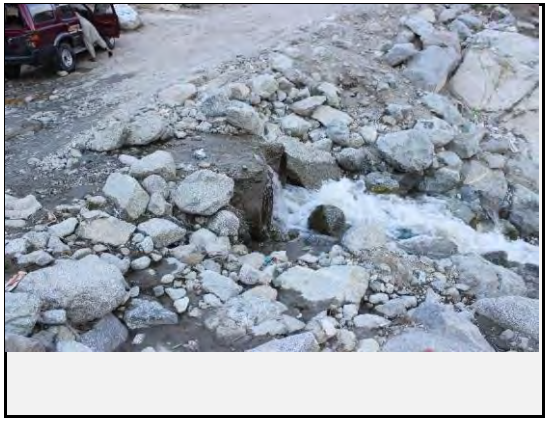
Valley side view of the debris flow

Front view of the debris flow

The damage on road has been observed with inlet of pipes for debris flow



Road condition



Existing countermeasures / anomalies: Culvert / Pipes has been installed at the toe of the debris flow

Code no.	N	–	9	5					0	4
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35º 30' 58.7"
	Longitude	72º 33' 2.0"
Road name		Km

Date	9/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	√

[Countermeasure]

Type of countermeasures	
Appro. 1m high Retainaing wall at the toe of Slope Failure	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 780 m, W= 1500 m, D= 3-4 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

It is a complex slide comprising of rock fall and debris flow. Debris is comprised of boulders, gravels, sand and silt. Source of debris is from steep outcrop with fractured and jointed rocks. Hanging and detached boulders are lying on the debris that are prone to sliding during the rainfall. Soil erosion leads to development of water channels in the slide. The loose material on the slide is prone to debris flow during the rainy season. Excavation of the loose debris for construction material also trigger the slide. A small retaining wall is built, however, it is also damaged due to

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

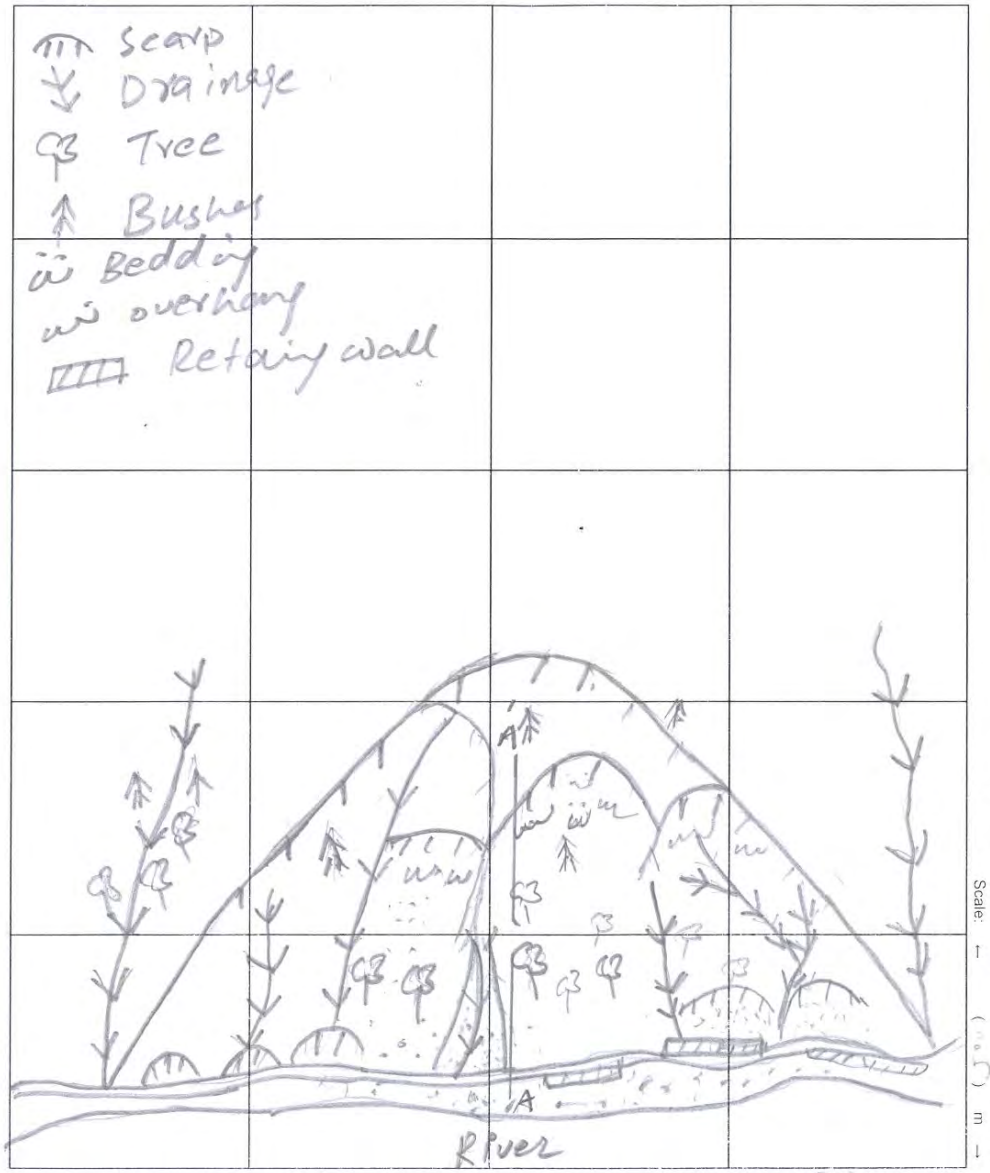
Sketch sheet

Code no.	N – 9 5					0 4
Region Office						
Maintenance Unit						

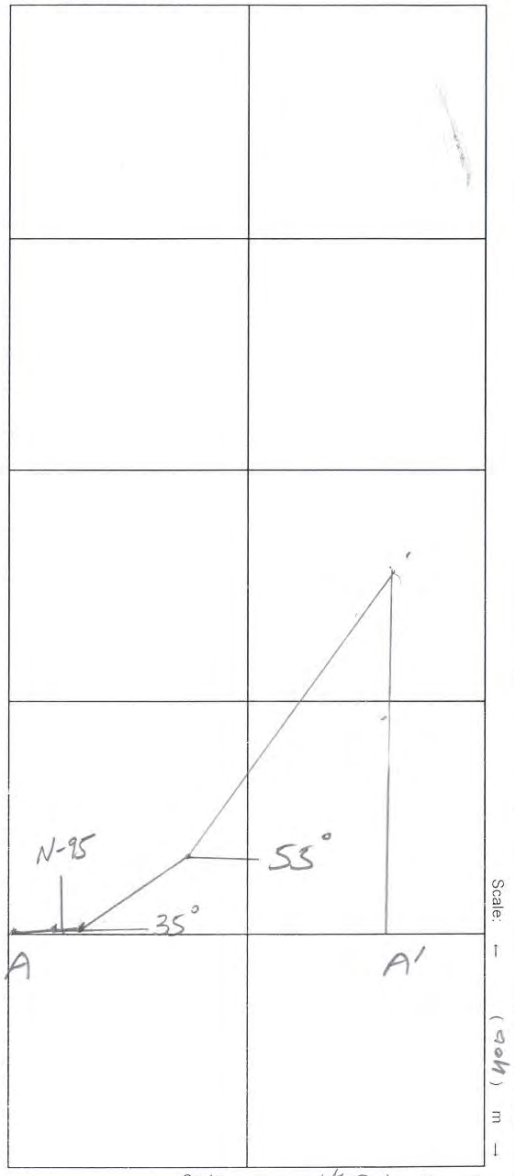
Coordinates	Latitude	35° 30' 58.7"
	Longitude	72° 33' 2.0"
Road name	– 9 5 K	Km 4

Date	9/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	5			0	4
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 30' 58.7"
	Longitude	72° 33' 2.0"
Road name		Km

Date	9/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of Retaining Wall as counter measure

View of gully developed in the slope failure

Evaluation sheet (debris flow)

Code no.	N－95　　05
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 30' 59.8"
	Longitude	72º 32' 7.5"
Road Name		Km

Date	10/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15°or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	√
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

structure	category of score	Check
River width	10m or more	
	5m - 10m	√
	3m - 5m	
	less than 3m	
Beam height	less than 1m or No bridge / box culvert	√
	1m - 2m	
	2m - 3m	
	3m - 5m	
	5m or more	

[History]

category of score	Check
There is a history about debris flow that were obstacles to the road traffic after construction of recent measures.	√
There is a history about debris flow though there is no obstacle to traffic.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

[Expected size of disaster] (width, length, depth, etc.)

L= 1280 m, W=460 m, D= 2-3 m

[Countermeasure]

Type of countermeasure		Check
No Counter Measures		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

[Description/comments]

This is an old debris flow and the road is built in the debris. Debris is comprised of boulder, gravels, sand and silt. Detached boulders are lying on the debris that are prone to slide to the road. Active erosion leads to development of gullies. Scarp of the slide is prone to rock fall. Eroded talus is present along the road. Excavation of the loose debris for construction material also trigger the slide. The slide is frequently damaging the road and obstructing the traffic, however, no mitigation measures are constructed to stabilize the slide.

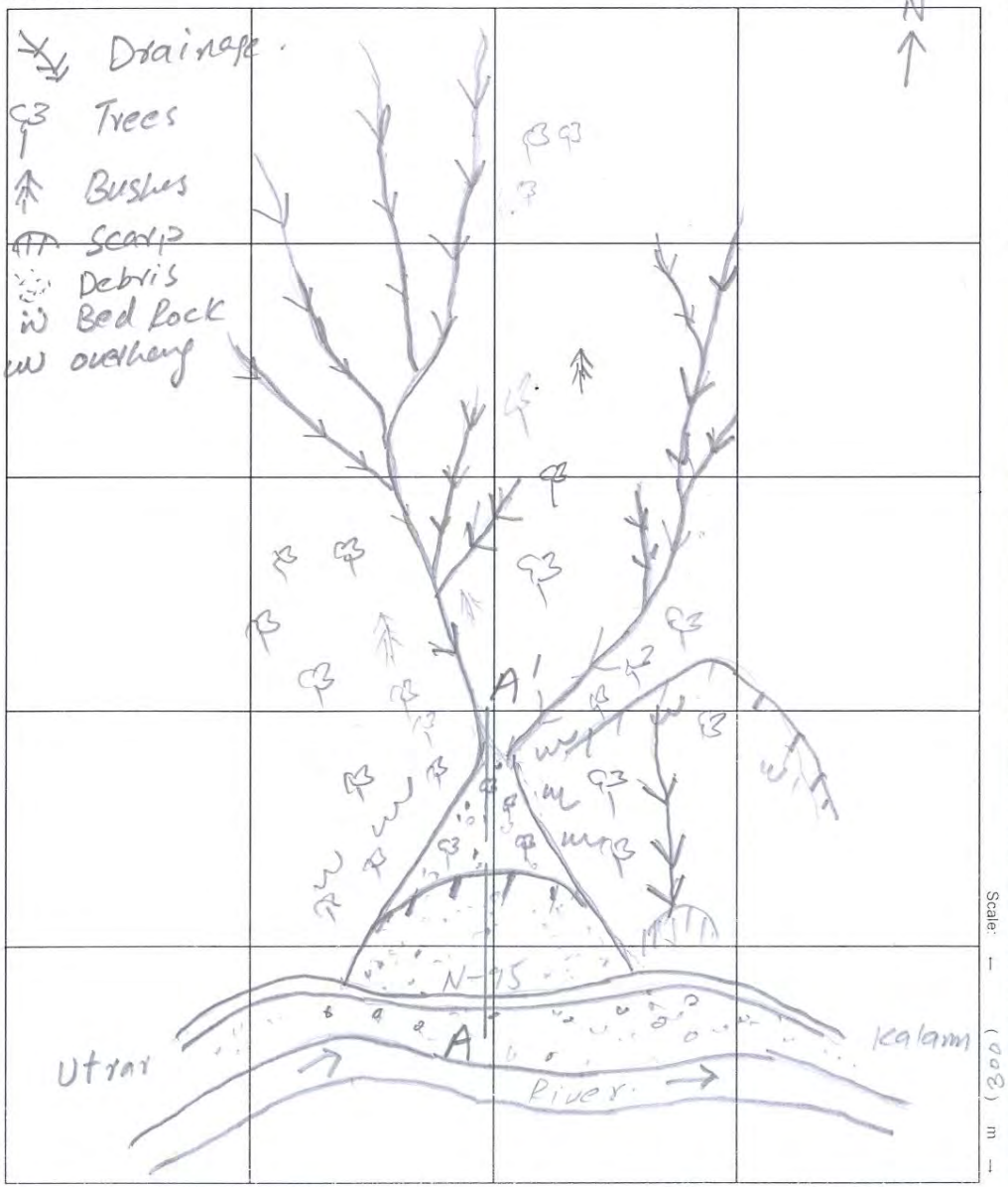
Sketch sheet

Code no.	N – 95 0 5
Region Office	
Maintenance Unit	

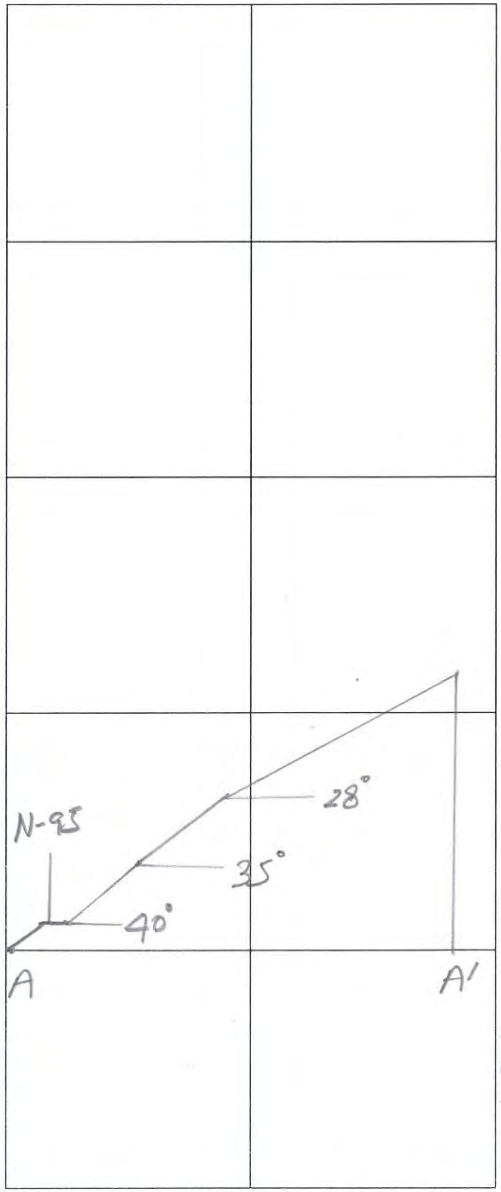
Coordinates	Latitude	35° 30' 59.8"
	Longitude	72° 32' 7.5"
Road Name	N-95 K	Km S

Date	10/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	9	5				0	5
Region Office									
Maintenance Unit									

Photo sheet

Coordinates	Latitude	35° 30' 59.8"
	Longitude	72° 32' 7.5"
Road Name		Km

Date	10/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

The existing road has been damaged. Red line shows the old road displaced by the debris flow.

Road condition

View of debris material and old road

Code no.	N	–	4	5					0	1
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35º 39' 37.3"
	Longitude	71º 45' 58.9"
Road name		Km

Date	12/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		
			None		√
	Rock	high density of cracks and a weak layers	marked		
		susceptible to erosion, fast weathering	a little marked		√
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		
			None		√
Surface codition	Topsoil, detached rock and unsteady rock		instability		
			a little unstable		√
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures
No Counter Measure for rock fall. Retaining wall for N-45

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 140 m, W= 95 m, D= 0-0.5 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

This cut slope is generated during excavation for N-45. Marble and quartzite is exposed in this section which is jointed and cracked with a risk of over hang blocks. Clayey material is found on both sides of the rock fall. Drainage is also found on the right side of the rock fall. This site is also under consideration for the exploration of Marble for decorative stone.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

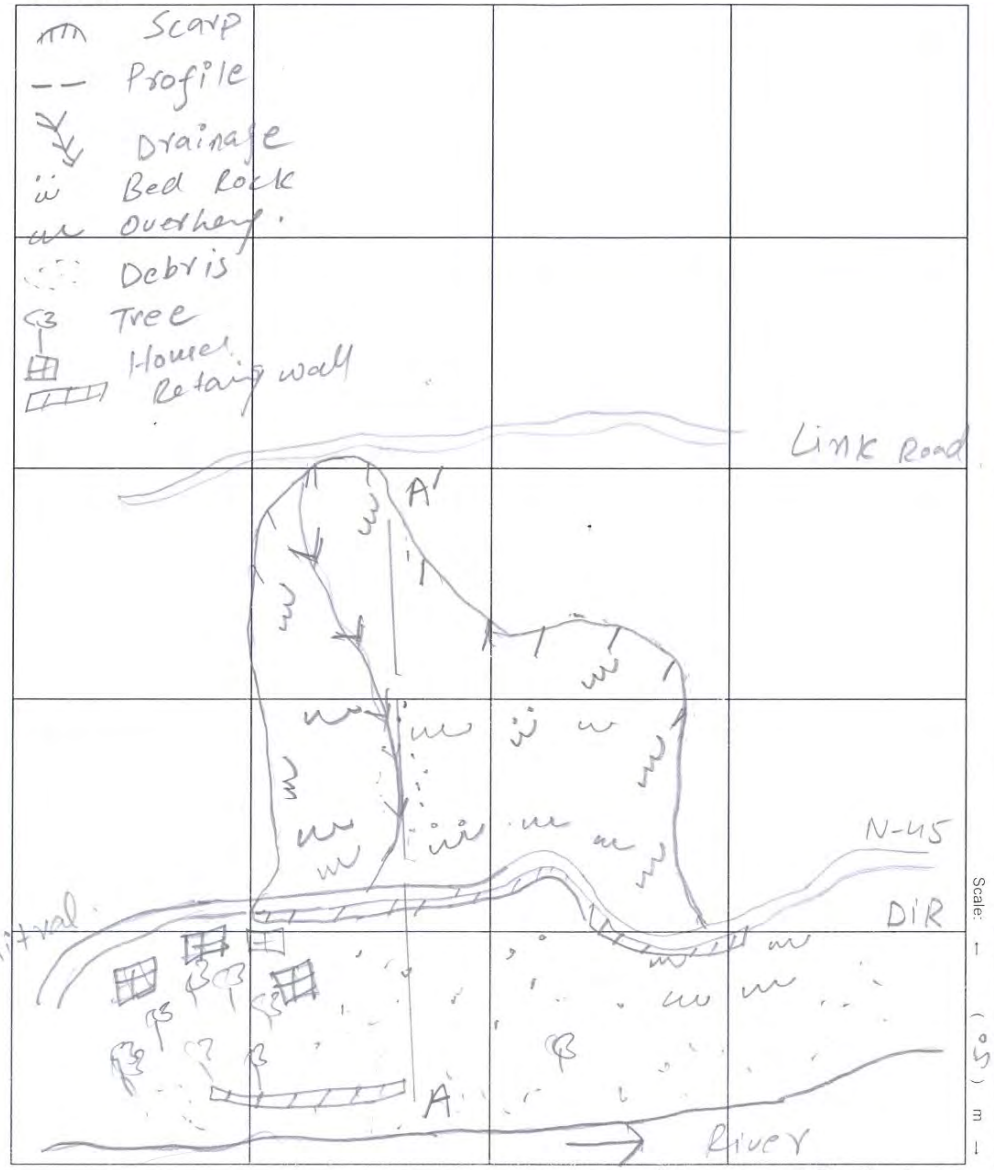
Sketch sheet

Code no.	N - 45 01
Region Office	
Maintenance Unit	

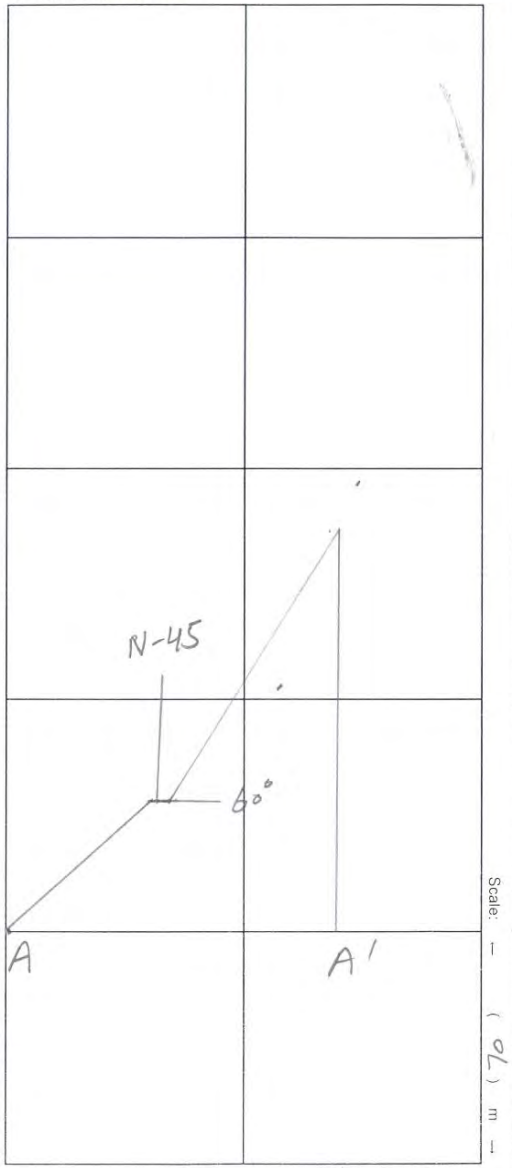
Coordinates	Latitude	35° 39' 37.3"
	Longitude	71° 45' 58.9"
Road name	N-45	Km 1

Date	12/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	4	5			0	1
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 39' 37.3"
	Longitude	71° 45' 58.9"
Road name		Km

Date	12/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the landslide

View of landslide on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of retaining wall as counter measure for N-45

View of unconsolidated material with damaged retaining wall.

Code no.	N	–	4	5					0	2
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35º 40' 54.8"
	Longitude	71º 45' 59.6"
Road name		Km

Date	13/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		
			None		√
	Rock	high density of cracks and a weak layers	marked		
		susceptible to erosion, fast weathering	a little marked		√
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		
			a little unstable		√
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	√
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	√
				45°≦i＜70°	
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures
No Counter Measure for rock fall. Retaining wall for N-45

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	√

[Expected size of disaster](width, length, depth, etc.)

L= 50 m, W= 130 m, D= 0 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	(4)

[Description]

This cut slope is generated during excavation for N-45. Marble is exposed in this section which is cracked and some open cracks are also observed with a risk of over hang blocks. Drainage is also found on the both sides of the rock fall. Bedding plane also corresponds to the dip slope. Highly

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

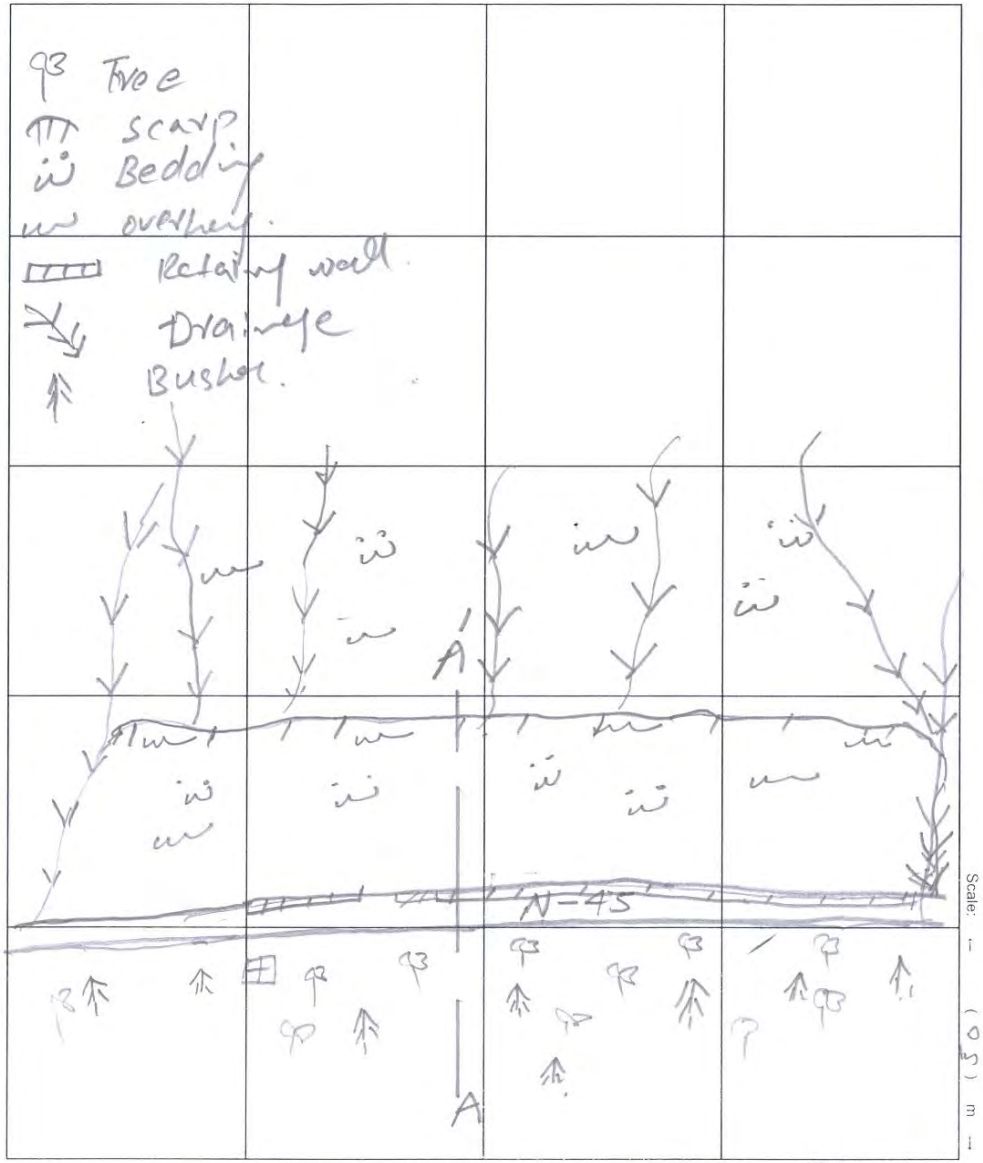
Sketch sheet

Code no.	N - 4 5					0 2
Region Office						
Maintenance Unit						

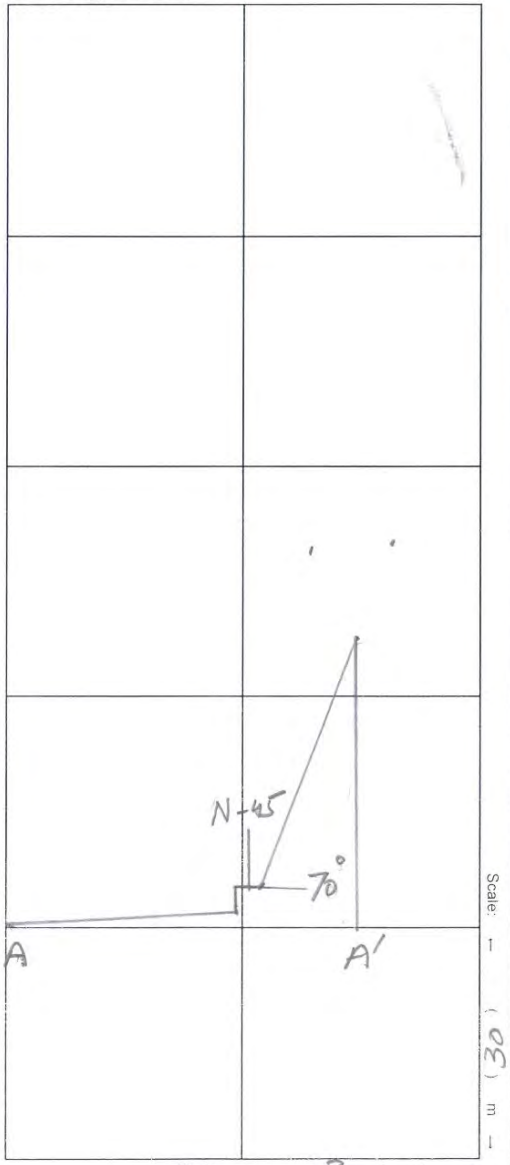
Coordinates	Latitude	35° 40' 54.8"
	Longitude	71° 45' 59.6"
Road name	N-45 K	Km 2

Date	13/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	4	5			0	2
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 40' 54.8"
	Longitude	71° 45' 59.6"
Road name		Km

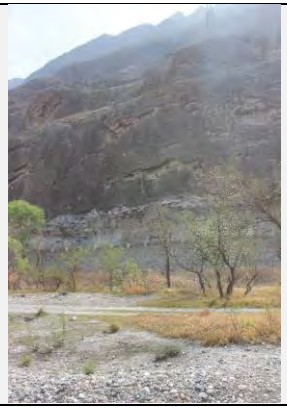
Date	13/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point



Existing countermeasures / anomalies:

View of drainage that cuts the slope

Code no.	N	–	4	5					0	3
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name		Km

Date	14/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		
			a little marked		
			None		√
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	√

[Countermeasure]

Type of countermeasures	
Small drainage at the toe of the slope failure	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 322 m, W= 363 m, D= 4-5 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

Rounded to sub rounded boulders, gravels, pebbles and cobbles with sandy, silty clayey matrix. About 0.5 to 1m thick sand layers are also observed at different lavels along the slope. Few boulders at the top and mid of the slope failure which threaten the road and traffic. This 300 to 400 m wide road section was highly susceptible to erosion. Minor scarps are also observed. 1 feet wide drainage (damaged) is also observed at the toe of slope failure. Gullies are observed at different intervals along the slope failure. No Bed rock is exposed in

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

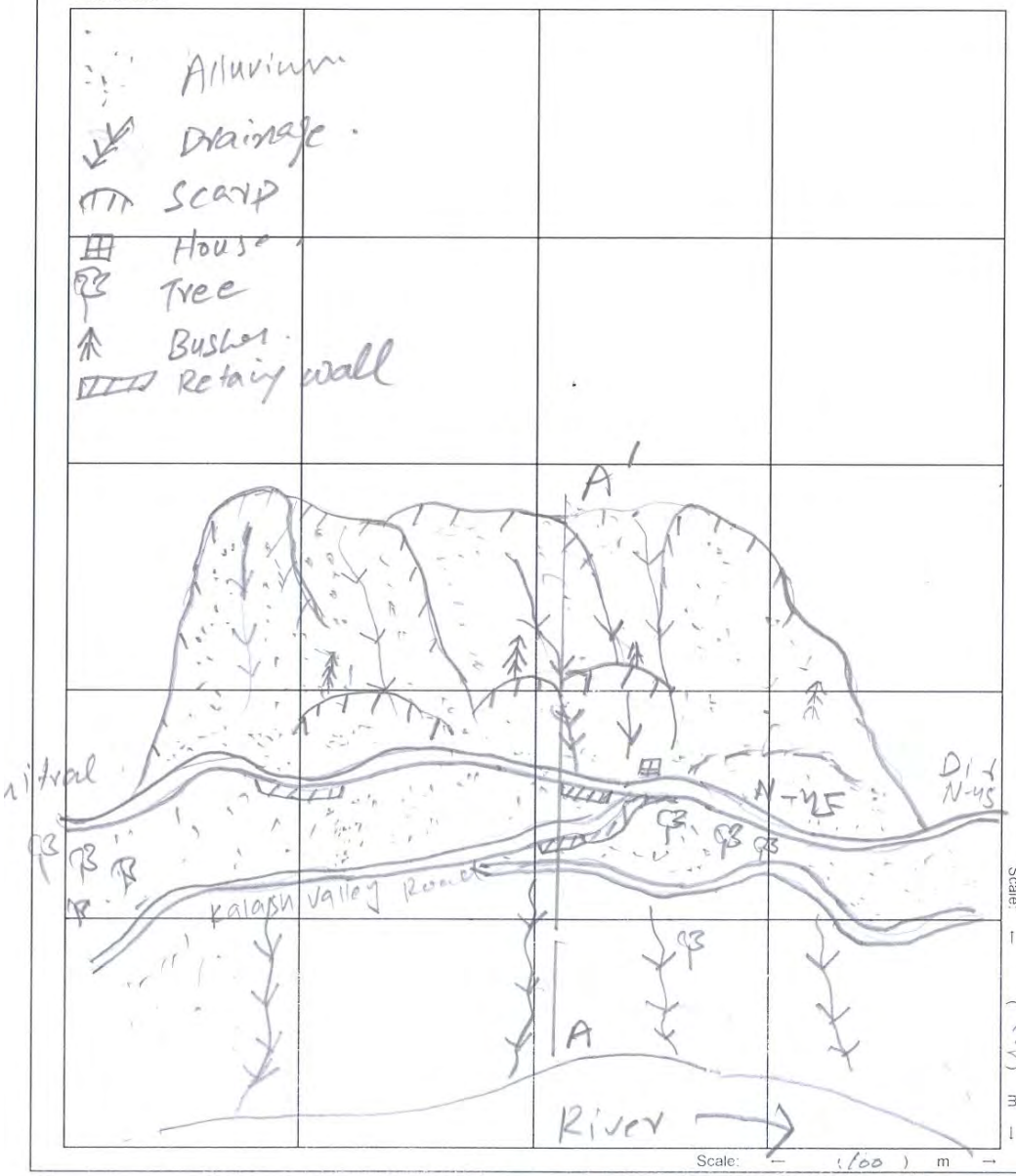
Sketch sheet

Code no.	N	-	4	5				0	3
Region Office									
Maintenance Unit									

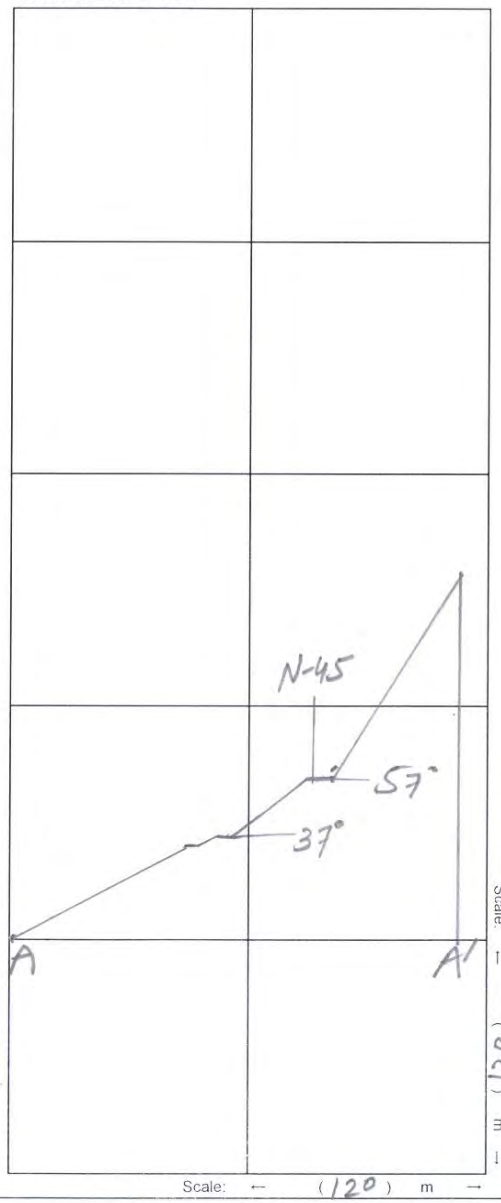
Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name	- 45	Km 3

Date	14/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	4	5			0	3
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 55' 25.6"
	Longitude	72° 50' 10.4"
Road name		Km

Date	14/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point with boulder which threaten the road and traffic.

Existing countermeasures / anomalies: View of channel at the toe of Slope Failure

View of sandy layer in the alluvial deposits.

Code no.	N	–	4	5					0	4
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34° 55' 11.2"
	Longitude	72° 49' 43.9"
Road name		Km

Date	15/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		
			a little marked		
			None		√
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	√

[Countermeasure]

Type of countermeasures
No Counter Measure for slope failure. Culvert at one of the gully drainage.

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 309 m, W= 520 m, D= 2-3 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

Rounded to sub rounded, angular to sub angular boulders, gravels, pebbles and cobbles with sandy, silty clayey matrix. About 0.5 to 1m thick sand layers are also observed at different lavels along the slope. This 300 to 400 m wide road section was highly susceptible to erosion. Gullies are observed at different intervals along the slope failure. Drainage is bounded on both sides of the slope failures.Road is often blocked during rainy seasons due to material overflow on the road. No bedrock is exposed along this slope failure.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

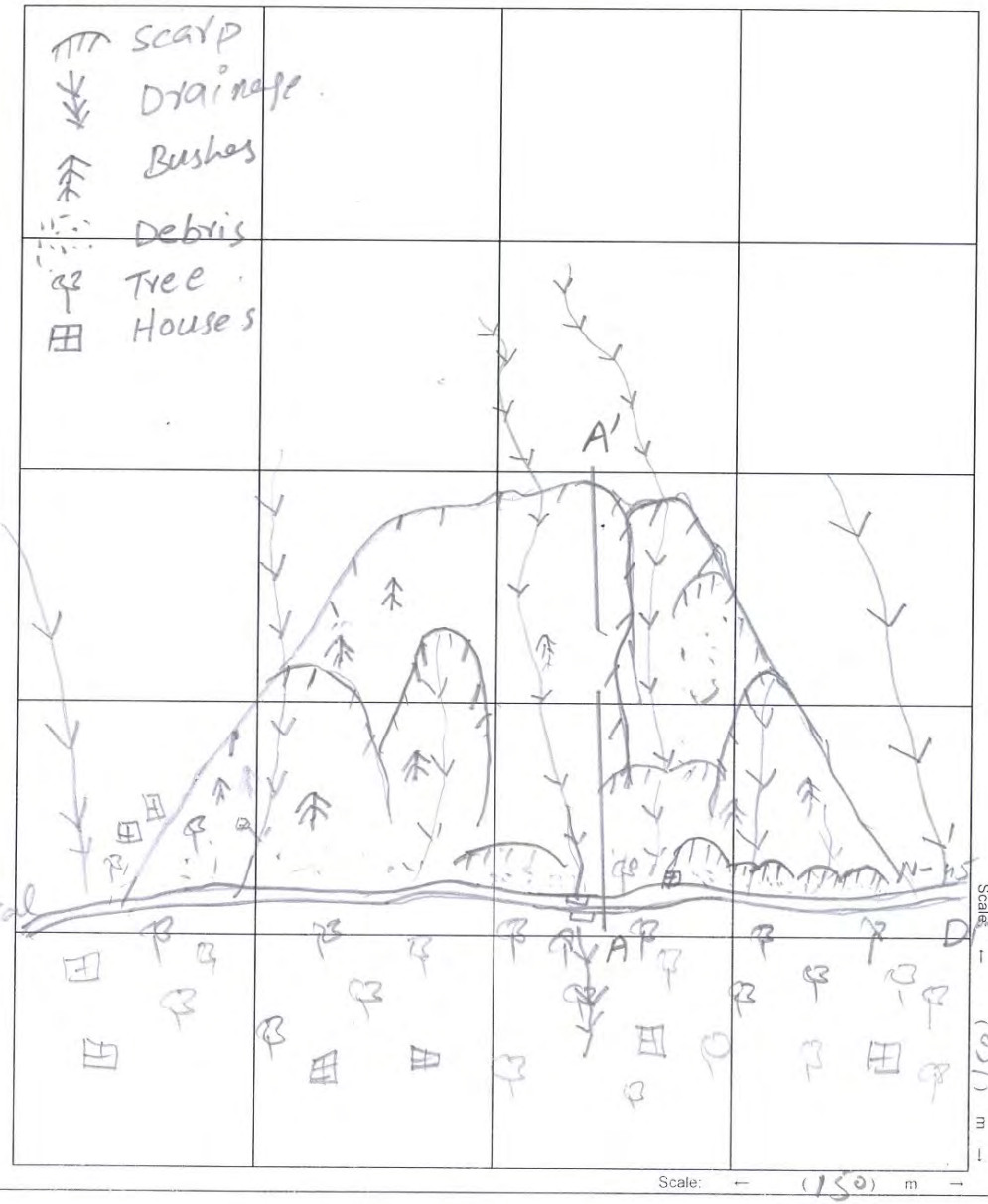
Sketch sheet

Code no.	N - 45 0 4
Region Office	
Maintenance Unit	

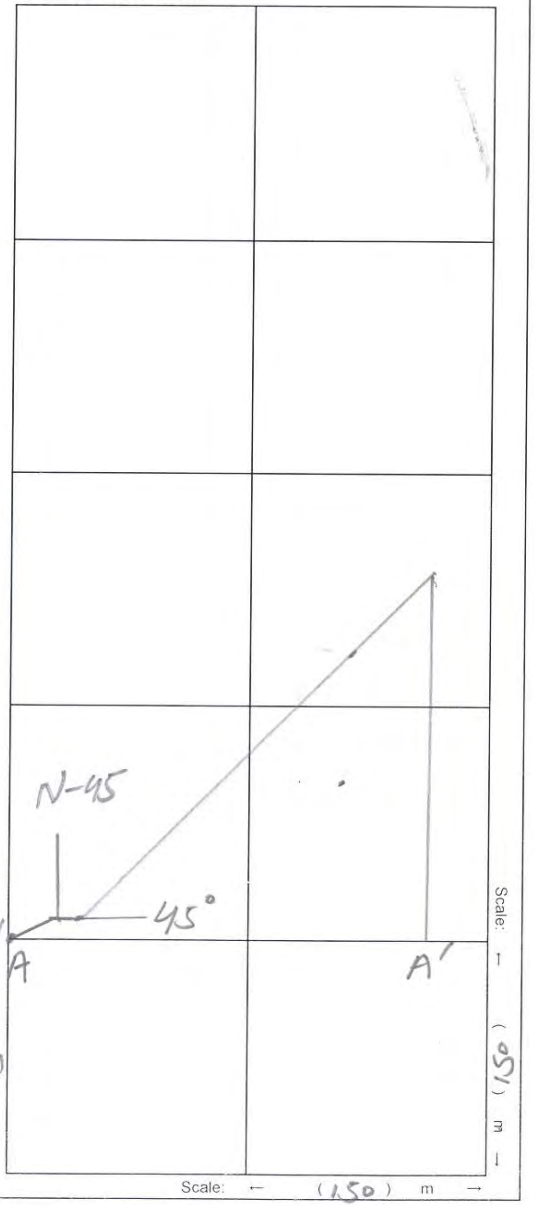
Coordinates	Latitude	34° 55' 11.2"
	Longitude	72° 49' 43.9"
Road name	- 45 K	Km 4

Date	15/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



Code no.	N	–	4	5			0	4
Region Office								
Maintenance Unit								

Photo sheet

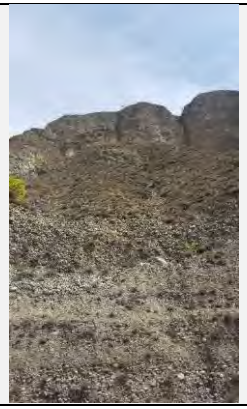
Coordinates	Latitude	34° 55' 11.2"
	Longitude	72° 49' 43.9"
Road name		Km

Date	15/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

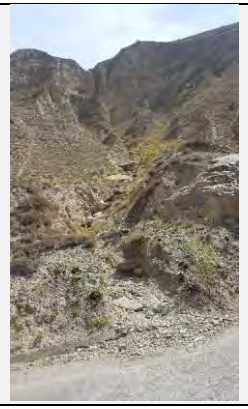
View of Slope Failure on Valley side:

Road condition:Cut slope at the start point



View of the slope failure at the middle point

Existing countermeasures / anomalies: View of water channel at the toe of slope failure and parapit wall as counter measure



View of gully erosion in the middle of slope failure

Code no.	N	–	4	5					0	5
Region Office										
Maintenance Unit										

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 47' 9.9"
	Longitude	71° 46' 24.7"
Road name		Km

Date	16/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		√
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane / Joint Planes	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /~~the toe of slope is~~ weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring water		
			seepage		
			none		√
	Surface condition		bare land with minor vegetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	~~Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure~~		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	√

[Countermeasure]

Type of countermeasures	
Stepped retaining wall at the centre of slope failure.	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, ~~or there is not effective even if countermeasures are not performed.~~	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	√
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

[Expected size of disaster](width, length, depth, etc.)

L= 460 m, W= 275 m, D= 1-2 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

Schist is exposed along this slope failure. 4-5 m thick alluvial deposit is also observed along the slope failure. Highly fractured rock along the slope failure. Minor scarps are also observed. 1 feet wide drainage (damaged) is also observed at the toe of slope failure. Gullies are observed at different intervals along the slope failure. Water channel for local supplies is also found at the top of the slope failure.

Organization responsible for countermeasure works according to the scale of the disaster

-Big: Grant aid

-Medium: Major contractor in Pakistan

-Small: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

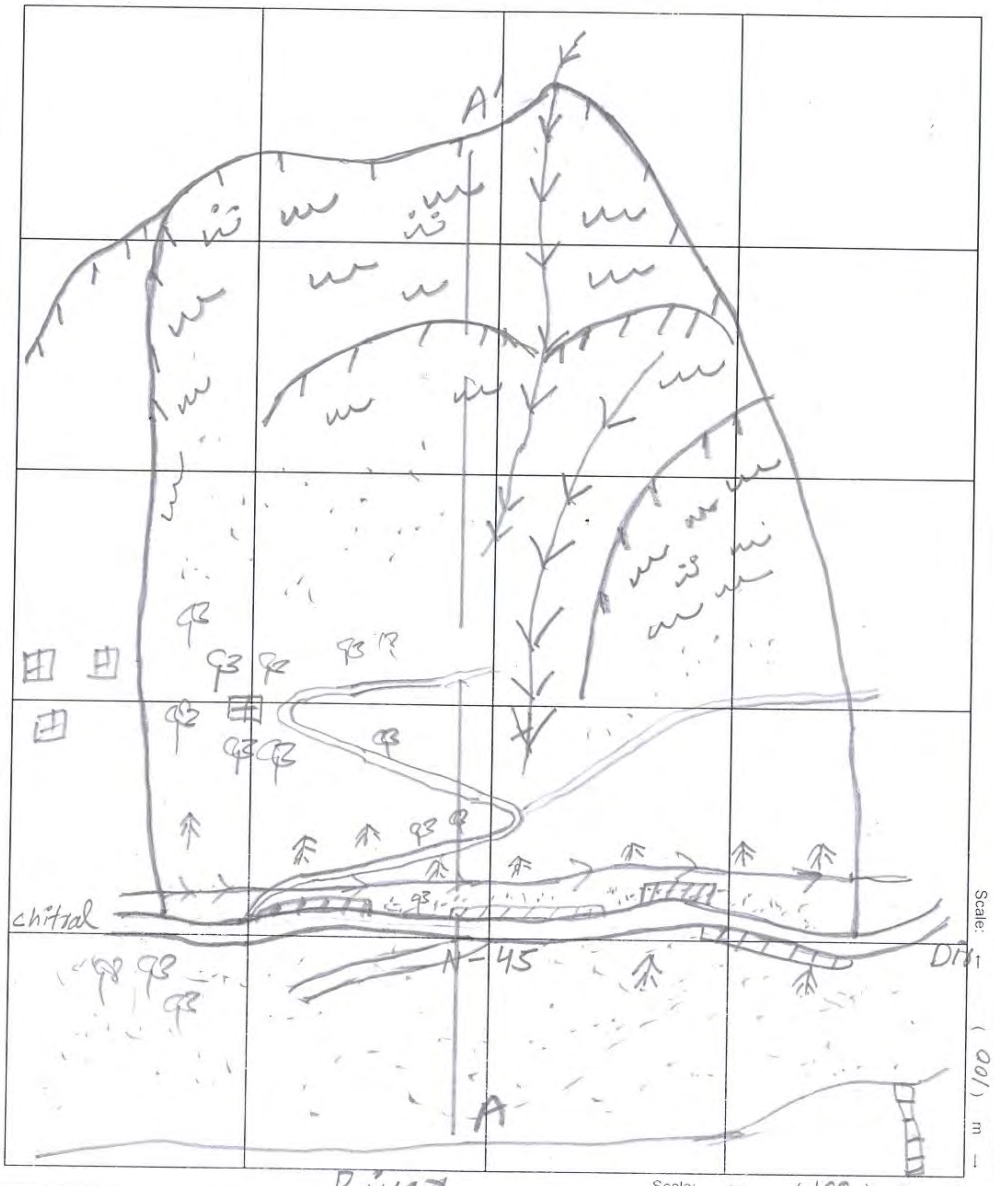
Sketch sheet

Code no.	N - 45 05
Region Office	
Maintenance Unit	

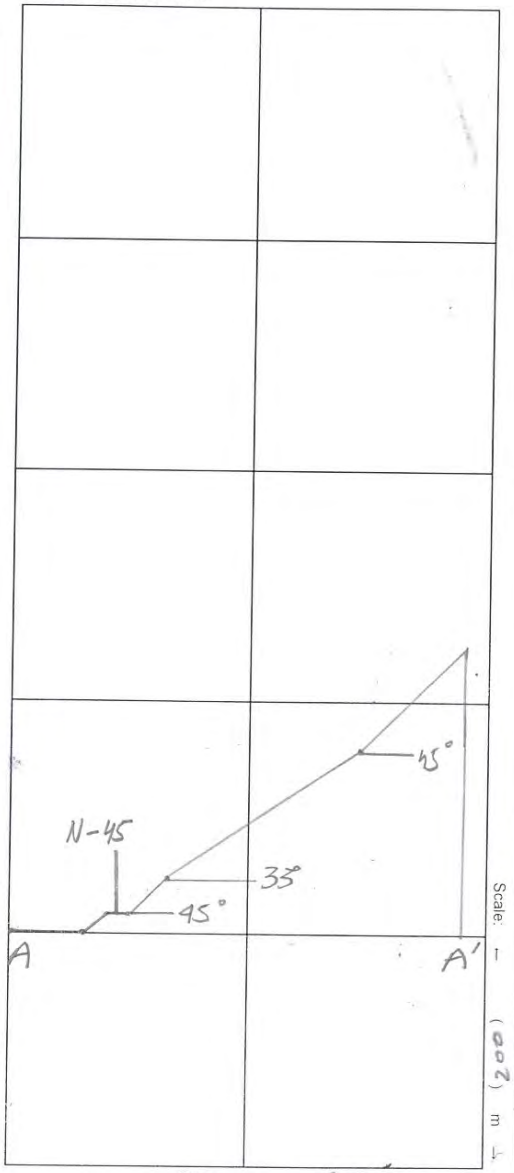
Coordinates	Latitude	35°47'9.96"
	Longitude	71° 46' 24.77"
Road Name	N-45	Km 0.5

Date	16/4/2018
Inspector	Yasir, Sajid, Shafique, Basharat

Plane view



Cross sectional view



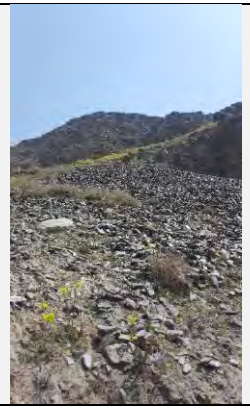
Scarp
Bed Rock
overhang
Drainage
Houses
Trees
Bushes
Retaining wall
Link Road
Drainage path
Bridge
Alluvium

Code no.	N	–	4	5			0	5
Region Office								
Maintenance Unit								

Photo sheet

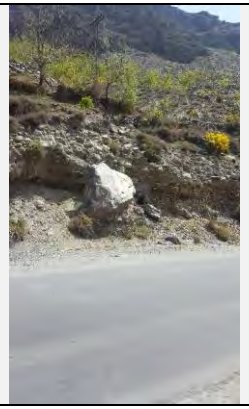
Coordinates	Latitude	35° 47' 9.9"
	Longitude	71° 46' 24.7"
Road name		Km

Date	16/4/2018
Inspector	Yasir, Sajid, Shafique, Bashara



Full view of the slope failure

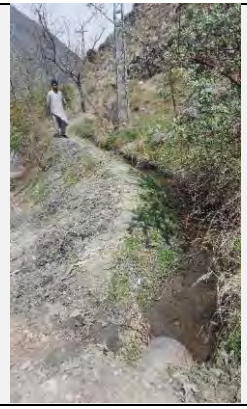
View of slope failure on Valley side:



Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of Stepped Retaining Wall as counter measure



View of water Supply Scheme passing in the middle of the slope failure