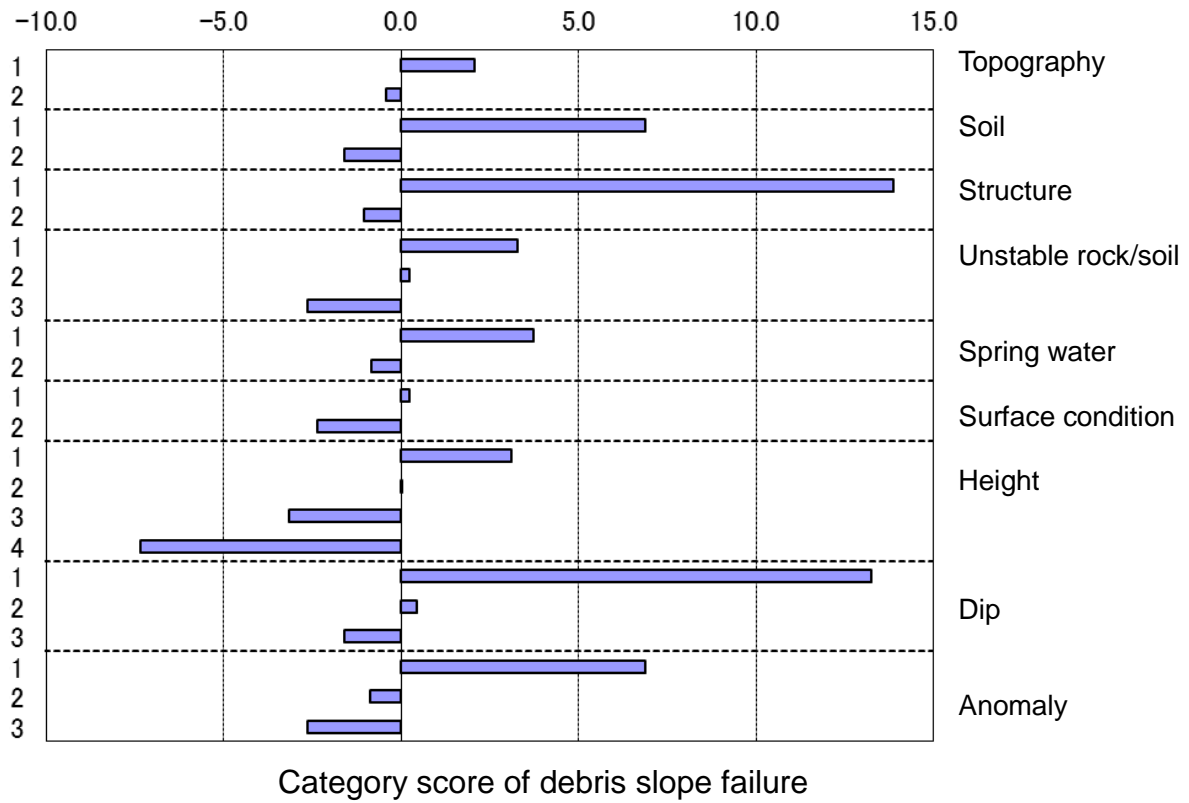


Appendix 13

危險度分析結果
Results of the Risk Analysis

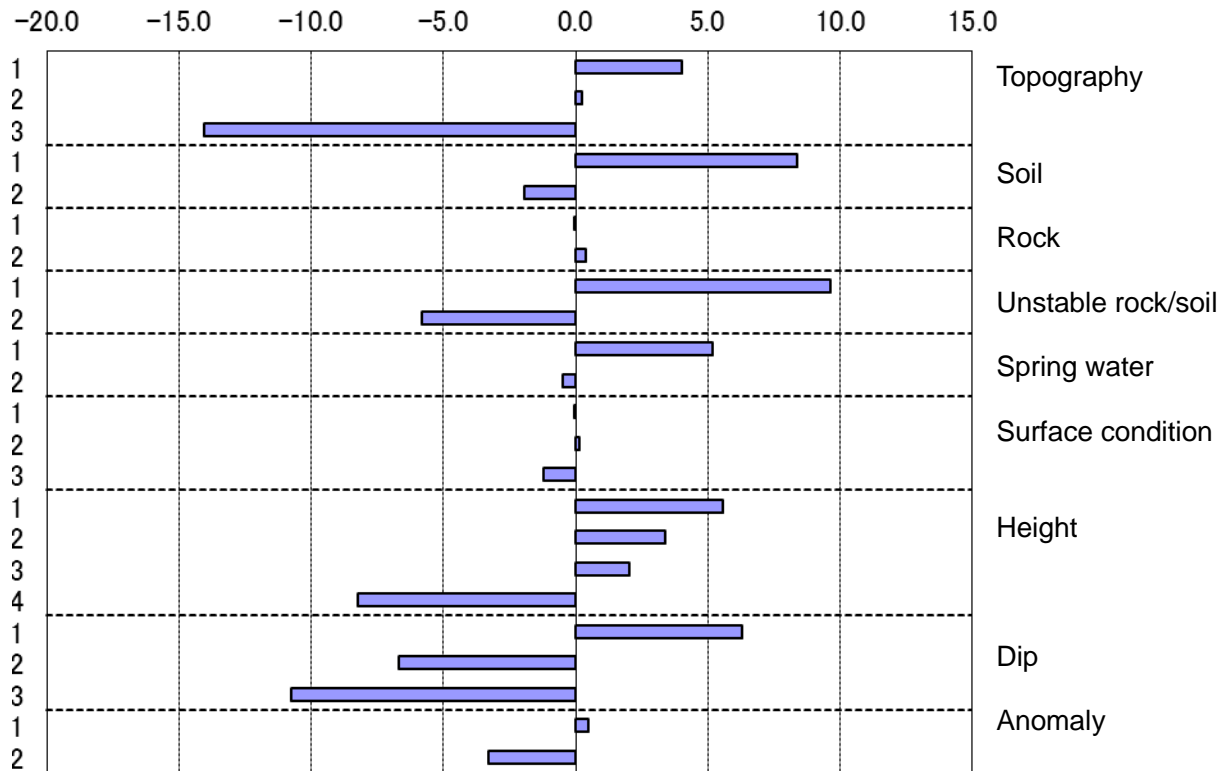
	A	B	D	F	G	H	I	J	K
	Topography	Geological conditions		Surface condition			Profile		Anomaly
	Collapsed factor	Soil	Structure	Unstable rock/soil (Topsoil, detached rock and unsteady rock)	Spring water	Surface condition	Height (H), dip (i)		Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure
	Talus slope, clear convex break of slope, eroded toe of slope, overhang, water catchment slope	Susceptible to erosion less strength with water	Dip slope of bedding plane				Height	Dip	
1	2 or more correspondences	marked	It corresponds.	instability	notable spring waster or seepage	bare land with minor vegetation or intermediate (bare/grass/ tree)	$H \geq 50m$	$i \geq 70^\circ$	2 or more correspondences/ clarity
2	1 or less correspondences	a little marked or none	none	a little unstable	none	mainly structure, mainly tree	$30 \leq H < 50m$	$45^\circ \leq i < 70^\circ$	certain/unclarity
3				stability			$15 \leq H < 30m$	$i < 45^\circ$	none
4							$H < 15m$		



Category range and partial correlation coefficient of debris slope failure

Item	Category range		Partial correlation coefficient	
	Mean	Rank	Coefficient	Rank
Topography	2.493	9th	0.063	8th
Soil	8.501	5th	0.219	5th
Structure	14.929	1st	0.244	1st
Unstable rock/soil	5.924	6th	0.097	7th
Spring water	4.571	7th	0.114	6th
Surface condition	2.586	8th	0.052	9th
Height	10.427	3rd	0.228	4th
Dip	14.855	2nd	0.236	2nd
Anomaly	9.508	4th	0.231	3rd

	A	B	C	F	G	H	I	J	K
	Topography	Geological conditions		Surface condition			Profile		Anomaly
	Collapsed factor	Soil	Rock	Unstable rock/soil (Topsoil, detached rock and unsteady rock)	Spring water	Surface condition	Height (H), dip (i)		Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure
	Talus slope, clear convex break of slope, eroded toe of slope, overhang, water catchment slope	Susceptible to erosion less strength with water	High density of cracks and a weak layers, susceptible to erosion, fast weathering				Height	Dip	
1	2 or more correspondences	marked	marked or a little marked	instability	notable spring waster	bare land with minor vegetation	$H \geq 50m$	$i \geq 70^\circ$	2 or more correspondences/ clarity or certain/unclarity
2	1 correspondences	a little marked or none	none	a little unstable or stability	seepage or none	intermediate (bare/grass/tree)	$30 \leq H < 50m$	$45^\circ \leq i < 70^\circ$	none
3	no correspondences					mainly structure, mainly tree	$15 \leq H < 30m$	$i < 45^\circ$	
4							$H < 15m$		

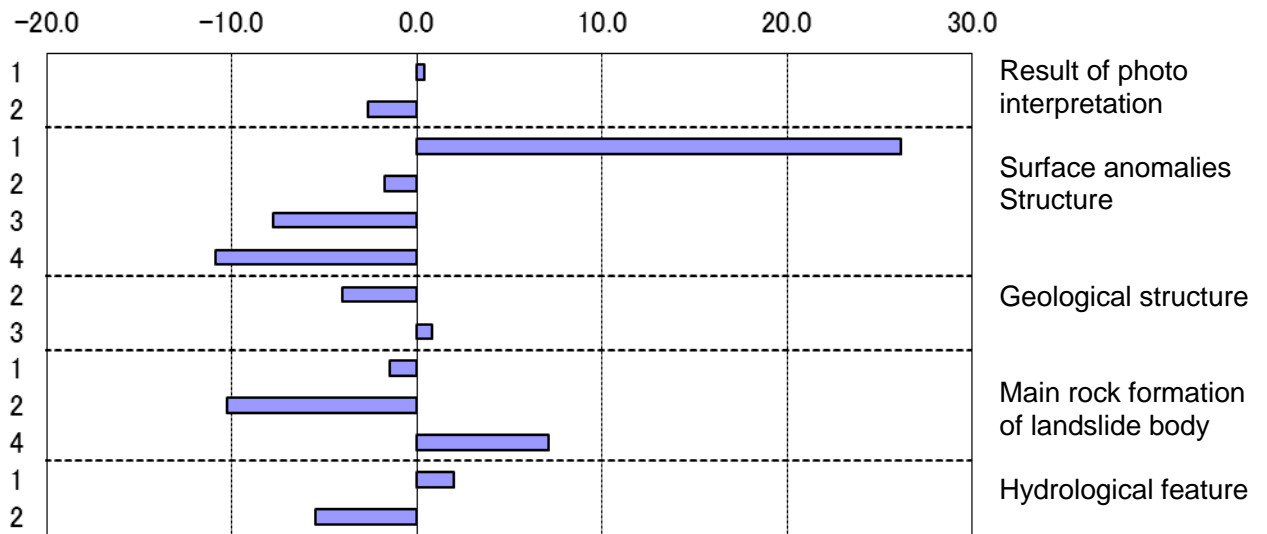


Category score of rock slope failure

Category range and partial correlation coefficient of rock slope failure

Item	Category range		Partial correlation coefficient	
	Score	Rank	Coefficient	Rank
Topography	18.071	1st	0.313	3rd
Soil	10.329	5th	0.216	5th
Rock	0.424	9th	0.008	9th
Unstable rock/soil	15.457	3rd	0.352	1st
Spring water	5.655	6th	0.094	6th
Surface condition	1.349	8th	0.014	8th
Height	13.790	4th	0.292	4th
Dip	17.094	2nd	0.338	2nd
Anomaly	3.778	7th	0.070	7th

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



Category score of landslide

Category range and partial correlation coefficient of landslide

Item	Category range		Partial correlation coefficient	
	Mean	Rank	Coefficient	Rank
Result of photo interpretation	3.007	5th	0.064	5th
Surface anomalies Structure	37.022	1st	0.630	1st
Geological structure	4.885	4th	0.118	4th
Main rock formation of landslide body	17.367	2nd	0.247	2nd
Hydrological feature	7.517	3rd	0.216	3rd

Appendix 14

環境社会配慮条件

*Check List of Environmental and
Social Considerations and
Impacts*

	Items	Contents	Yes or No	Impact			Mitigation measure
				Plan	constructions	Maintenance	
Pollution	Air pollution	Air pollution by traffic	Yes			Vehicles for maintenance and inspection could release pollution materials.	The volume of the air pollution materials is estimated based on the past traffic. However, the construction work for the countermeasures for slope disasters is the same as normal constructions, which means that it does not release worse pollution materials.
		Air pollution by constructions	Yes		Construction vehicles could release pollution materials.		Use of low-emission vehicles, decent ration of construction sites, and deconcentration of construction periods are useful. In case of resident areas, watering for the slopes and the roads is necessary to control the dust. Smaller machines for construction are selected, and idling for the machine is stopped. Sound insulating walls are available to avoid spreading pollution materials.
		Air pollution by countermeasures	No Pollution materials are NOT released from the countermeasures.				
	Water pollution	Water pollution by constructions	Yes		Mud water could flow out with debris by cutting and filling.		Quality standard of discharge water is set. Facilities for purification and filtration are installed. Smaller machines for construction are selected to decrease rolling debris. A temporary ditch is constructed to prevent debris from flowing out by cutting and filling with rainfall.
		Water pollution by drainage water	No Pollution materials are NOT released from the countermeasures.				
		Water pollution by drainage water from parking	No Parking is NOT constructed by the countermeasures.				
		Water quality impact by drainage	Yes		Flow of surface water could be changed by the constructions		Drainage countermeasures are designed based on the detailed investigation and analysis. The concept of the drainage is not to change the current water flow. Monitoring during/after constructions is needed.
		Water pollution by countermeasures	No Pollution materials are NOT released from the countermeasures.				
	Waste	Waste from parking	No Parking is NOT constructed by the countermeasures.				
		Waste by constructions	Yes		Waste could be generated with the constructions.		The contractor is educated about waste, and prepares and submits check sheets.
		Waste soil by constructions	Yes		Waste soil could be generated with the constructions.		Less waste soil is considered when designing the countermeasures. Waste soil is recycled for other construction sites. Waste sites are selected for certain areas. The contractor is educated about waste soil, and prepares and submits check sheets.
	Noise and vibrations	Noise and vibrations by constructions	Yes		Construction vehicles, drilling machines etc. could generate noise and vibrations		The noise and vibrations are not avoidable, it is explained to the local residents. The construction period is limited only to the daytime. Sound insulating walls are available to avoid noise.
	Ground subsidence	Ground subsidence by groundwater drainage	Yes		Ground subsidence could occur from groundwater drainage with the constructions.	Ground subsidence could occur from groundwater drainage.	Drainage countermeasures are designed based on the detailed investigation and analysis. The concept of the drainage is not to change the current ground water level. Monitoring during/after construction is needed. However, a slope disaster would occur due to excessive ground water. Understanding that slope disasters and ground subsidence is a trade-off relationship is needed.

	Items	Contents	Yes or No	Impact			Mitigation measure
				Plan	constructions	Maintenance	
	Offensive odors	Offensive odors by constructions	No Offensive odors are NOT released from the countermeasures.				
	Bottom sediment	Pollution of bottom sediment by constructions	No The countermeasures are not affect the bottom sediment.				
	Accidents	Traffic accidents under constructions	Yes		Risk of traffic accidents could increase due to traffic regulation from the constructions.		The contractor is educated about the risk of traffic accidents. Fluorescent panels are installed.
		constructions accidents	Yes		Slope disasters could happen.		Excessive cutting is avoided. The construction is tentatively suspended when it is raining or the snow is melting, and when cracks are opening on the slope. Monitoring during/after construction is needed.
Natural environment	Protected areas	Protected area by law or international regulation	Yes		Constructions could destroy protected areas.		Confirmation is needed when planning. Countermeasure are considered if needed.
	Biota and ecosystems	Protecting habitat of wild animals/plants	Yes		Constructions could destroy protected habitats.		Confirmation is needed when planning. Countermeasure are considered if needed.
		Habits of rare species	Yes		Constructions could destroy habitats.		Confirmation is needed when planning. Countermeasures are considered if needed.
		Ecological impact	Yes		Wild animals could invade the construction sites. Constructions could affect nest building.	Vegetation for slope stability could affect the ecosystem in the area.	Original wild vegetation is available. Nests are transferred to safer areas. The construction is postponed to winter season when not nest building. A Fence preventing wild animals from entering is needed. Nest boxes are installed for birds.
		Interception of wild animals/ livestock/ habits	Yes			Animals/ livestock/ habits could be intercepted by the countermeasures.	Bridge(S) and fences are needed for water ditches. Bigger box culverts are installed to avoid the interception of wild animals/ livestock/ habits
		Exotic species	Yes			Exotic species could effect the ecosystem.	Original wild vegetation is available.
		Environmental impact in untouched areas	Yes		Constructions could affect environmental impact in untouched areas.	Construction could affect environmental impact in untouched areas.	Confirmation is needed when planning. Countermeasures are considered if needed.
	Water usage	Negative impact for surface water and groundwater	Yes		Negative impact could happened for surface water and groundwater by the drainage.	Negative impact could happened for surface water and groundwater by the drainage.	Drainage countermeasures are designed based on the detailed investigation and analysis. The concept of the drainage is not to change the current ground water level. Monitoring during/after construction is needed. However, slope disasters would occur due to excessive surface and ground water. Therefore it is necessary to understand that the change of water conditions is not avoidable.
	Geographical features	Slope disasters by bad geology	Yes		Constructions could be a trigger of slope disasters		Slope disasters and countermeasure are considered beforehand under bad geology. Covering by plastic sheets is useful to avoid the penetration of rainfall.
		Slope disasters by cutting/filling	Yes		Constructions could be a trigger of slope disasters		Slope disasters and countermeasures are considered beforehand under cutting/filling construction. A surface ditch is installed on a landslide block to avoid flowing into the roads.
Discharge of sediment by constructions		Yes		Constructions could be a trigger of discharge of sediment		The contractor is educated about the procedure. Temporary protection fencing is installed.	
Modification of topography and geological structure by constructions		Yes		Topography and geological structure could be heavily modified by the constructions		Excessive cutting is avoided. However, it is necessary to understand that modification of topography and geological structures are not avoidable.	

	Items	Contents	Yes or No	Impact			Mitigation measure
				Plan	constructions	Maintenance	
Social environment	Involuntary resettlement	Involuntary resettlement	Yes	Involuntary resettlement and compensation for farming and grazing could be necessary for the constructions.			Involuntary resettlement is avoided as much as possible when planning. Several stakeholder meetings are available to persuade the local residents. Compensation for resettlement, farming and grazing are necessary beforehand. Relocation destination is secured and relocation cost is compensated.
	Lifestyle and livelihood	Lifestyle and livelihood	Yes	Land acquisition could be necessary for the constructions.			Land acquisition is avoided as much as possible when planning. Several stakeholder meetings are available to persuade the local residents. Compensation for resettlement, farming and grazing are necessary beforehand. Relocation destination is secured and relocation cost is compensated.
	Heritage	Cultural heritage	No	The countermeasure is constructed on current roads, not near heritage sites.			
	Landscape	Landscape	Yes			Countermeasures could impair landscape.	Excessive impairing is avoided when planning, such as greening of slope surface. However, understanding that modification of landscape is not avoidable is needed.
	Ethnic minorities and indigenous peoples	Ethnic minorities and indigenous people	No	The countermeasure is constructed on current roads, not near residential areas			
	Working conditions	Working conditions	Yes		Poor working conditions and lack of safety measures/education could be a trigger of accidents Labor could usurp local residents.		The contractor is educated about the working conditions and safety measures. The manual is useful for the laborers.

Appendix 15

各対策工による影響度

*Degree of the Impacts for each
Countermeasure*

LANDSLIDE

	Item	contents	LANDSLIDE										Surface Drainage	Re-vegetation
			Surface Drainage (Open ditch)	Open-Blind Ditch (French drain)	Horizontal Drainage	Drainage Well	Drainage Tunnel	Earth Removal	Counterweight Fill	Steel Pile work	Cast-in place concrete Shaft (Caisson)	Ground Anchor		
Pollution	Air pollution	Air pollution by constructions	3	3	3	3	3	3	3	3	3	3	3	3
	Water pollution	Water pollution by constructions	4	4	3	4	4	2	2	4	4	4	4	4
		Water quality impact by drainage	3	3	2	2	2	3	3	4	4	4	3	4
	Waste	Waste by constructions	3	3	3	2	2	1	3	3	2	3	3	3
		Waste soil by constructions	3	3	3	2	2	1	3	3	2	3	3	3
	Noise and vibrations	Noise and vibrations by constructions	2	2	2	1	1	2	2	1	2	2	2	3
	Ground subsidence	Ground subsidence by groundwater drainage	3	3	1	1	1	4	4	4	4	4	4	4
	Accidents	Traffic accidents under constructions	2	2	2	2	2	2	2	2	2	2	2	2
Construction accidents		2	2	2	2	2	2	2	2	2	2	2	2	
Natural environment	Protected areas	Protected area by law or international regulation	2	2	2	2	2	2	2	2	2	2	2	2
	Biota and ecosystems	Protecting habitat of wild animals/plants	2	2	2	2	2	2	2	2	2	2	2	2
		Habits of rare species	2	2	2	2	2	2	2	2	2	2	2	2
		Ecological impact	2	2	2	2	2	2	2	2	2	2	2	2
		Interception of wild animals/ livestock/ habits	2	3	3	3	3	2	2	3	3	3	2	2
		Exotic species	4	4	4	3	3	3	3	4	4	4	4	2
		Environmental impact in untouched areas	3	3	3	2	2	2	2	3	3	3	3	3
	Water usage	Negative impact for surface water and groundwater	2	2	1	1	1	3	3	4	4	4	2	4
	Geographical features	Slope disasters by bad geology	3	3	3	3	2	1	1	3	3	3	3	3
		Slope disasters by cutting/filling	3	3	3	3	2	1	1	3	3	3	3	3
Discharge of sediment by constructions		3	3	3	3	2	1	1	3	3	3	3	3	
Modification of topography and geological structure		3	3	3	3	2	1	1	3	3	3	3	3	
Social environment	Involuntary resettlement	Involuntary resettlement	2	2	2	2	2	2	2	2	2	2	2	2
	Lifestyle and livelihood	Lifestyle and livelihood	2	2	2	2	2	2	2	2	2	2	2	2
	Landscape	Landscape	3	3	3	2	2	1	1	2	2	2	3	2
	Working conditions	Working conditions	2	2	2	2	2	2	2	2	2	2	2	2

Impact
 1 Large
 2 Middle
 3 Small
 4 No

		DEBRIS SLOPE FAILURE										ROCK SLOPE FAIL		
Item	contents	Wicker Fence	Wooden Log Crib	Stone Pitching	Retaining Wall	Barrier Wall	Re-shaping slope with Benching	Concrete Crib	Shotcrete	Ground Anchor	Rock Removal	Retaining Wall	Barrier Wall	
Pollution	Air pollution	Air pollution by constructions	3	3	3	3	3	3	3	3	3	3	3	
	Water pollution	Water pollution by constructions	4	4	4	4	4	4	4	4	4	4	4	4
		Water quality impact by drainage	4	4	4	4	4	4	4	4	4	4	4	4
	Waste	Waste by constructions	3	3	3	3	3	3	3	3	3	1	3	3
		Waste soil by constructions	3	3	3	3	3	3	3	3	3	1	3	3
	Noise and vibrations	Noise and vibrations by constructions	3	3	2	2	2	2	2	2	2	1	2	2
	Ground subsidence	Ground subsidence by groundwater drainage	4	4	4	4	4	4	4	4	4	4	4	4
Accidents	Traffic accidents under constructions	2	2	2	2	2	2	2	2	2	2	2	2	
	Construction accidents	2	2	2	2	2	2	2	2	2	2	2	2	
Natural environment	Protected areas	Protected area by law or international regulation	2	2	2	2	2	2	2	2	2	2	2	
	Biota and ecosystems	Protecting habitat of wild animals/plants	2	2	2	2	2	2	2	2	2	2	2	2
		Habits of rare species	2	2	2	2	2	2	2	2	2	2	2	2
		Ecological impact	2	2	2	2	2	2	2	2	2	2	2	2
		Interception of wild animals/ livestock/ habits	2	2	2	2	2	2	2	2	3	2	2	2
		Exotic species	2	2	4	4	4	4	4	4	4	3	4	4
		Environmental impact in untouched areas	3	3	3	3	3	3	3	3	3	2	3	3
Water usage	Negative impact for surface water and groundwater	4	4	4	4	4	4	4	4	4	3	4	4	
Geographical features	Slope disasters by bad geology	3	3	3	3	3	2	3	3	3	1	3	3	
	Slope disasters by cutting/filling	3	3	3	3	3	2	3	3	3	1	3	3	
	Discharge of sediment by constructions	3	3	3	3	3	2	3	3	3	1	3	3	
	Modification of topography and geological structure	3	3	3	3	3	2	3	3	3	1	3	3	
Social environment	Involuntary resettlement	Involuntary resettlement	2	2	2	2	2	2	2	2	2	2	2	
	Lifestyle and livelihood	Lifestyle and livelihood	2	2	2	2	2	2	2	2	2	2	2	
	Landscape	Landscape	2	2	2	2	2	2	1	1	2	1	2	
	Working conditions	Working conditions	2	2	2	2	2	2	2	2	2	2	2	

Impact
1 Large
2 Middle
3 Small
4 No

		JRE		DEBRIS FLOW						ROCK FALL					
	Item	contents	Protection Rock Net	Rock Bolt (Nailing)/Anchor	Sabo Dam	Check Dam	French Cascade	Culvert	Buffer Forest	Shed Work	Rock Removal	Protection Wall	Rock Catch Net	Fixing Work by shotcrete	
Pollution	Air pollution	Air pollution by constructions	3	3	3	3	3	3	3	3	3	3	3	3	
	Water pollution	Water pollution by constructions	4	4	4	4	4	4	4	4	4	4	4	4	4
		Water quality impact by drainage	4	4	3	3	3	3	4	4	4	4	4	4	4
	Waste	Waste by constructions	3	3	2	2	2	3	3	3	1	3	3	3	3
		Waste soil by constructions	3	3	2	2	2	3	3	3	1	3	3	3	3
	Noise and vibrations	Noise and vibrations by constructions	3	2	2	2	2	2	3	2	1	2	3	2	2
	Ground subsidence	Ground subsidence by groundwater drainage	4	4	4	4	4	4	4	4	4	4	4	4	4
	Accidents	Traffic accidents under constructions	2	2	2	2	2	2	2	2	2	2	2	2	2
Construction accidents		2	2	2	2	2	2	2	2	2	2	2	2	2	
Natural environment	Protected areas	Protected area by law or international regulation	2	2	2	2	2	2	2	2	2	2	2	2	
	Biota and ecosystems	Protecting habitat of wild animals/plants	2	2	2	2	2	2	2	2	2	2	2	2	2
		Habits of rare species	2	2	2	2	2	2	2	2	2	2	2	2	2
		Ecological impact	2	2	2	2	2	2	2	2	2	2	2	2	2
		Interception of wild animals/livestocks/ habits	2	3	2	2	2	2	3	2	2	2	2	2	2
		Exotic species	4	4	4	4	4	4	2	4	3	4	4	4	4
		Environmental impact in untouched areas	3	3	3	3	3	3	3	3	2	3	3	3	3
	Water usage	Negative impact for surface water and groundwater	4	4	4	4	4	4	4	4	3	4	4	4	4
	Geographical features	Slope disasters by bad geology	3	3	3	3	3	3	3	3	1	3	3	3	3
		Slope disasters by cutting/filling	3	3	3	3	3	3	3	3	1	3	3	3	3
Discharge of sediment by constructions		3	3	3	3	3	3	3	3	1	3	3	3	3	
Modification of topography and geological structure		3	3	3	3	3	3	3	3	1	3	3	3	3	
Social environment	Involuntary resettlement	Involuntary resettlement	2	2	2	2	2	2	2	2	2	2	2	2	
	Lifestyle and livelihood	Lifestyle and livelihood	2	2	2	2	2	2	2	2	2	2	2	2	
	Landscape	Landscape	1	2	2	2	3	2	3	1	1	2	1	1	
	Working conditions	Working conditions	2	2	2	2	2	2	2	2	2	2	2	2	

Impact
1 Large
2 Middle
3 Small
4 No

	Item	contents	OTHERS			
			Shed Work	Tunnel -Route Shift-	Bridge -Route Shift-	Advanced Traffic Control (Early Warning
Pollution	Air pollution	Air pollution by constructions	3	1	2	4
	Water pollution	Water pollution by constructions	4	3	3	4
		Water quality impact by drainage	4	3	4	4
	Waste	Waste by constructions	3	1	1	4
		Waste soil by constructions	3	1	1	4
	Noise and vibrations	Noise and vibrations by constructions	2	1	1	4
	Ground subsidence	Ground subsidence by groundwater drainage	4	3	4	4
	Accidents	Traffic accidents under constructions	2	2	2	4
Construction accidents		2	2	2	4	
Natural environment	Protected areas	Protected area by law or international regulation	2	2	2	4
	Biota and ecosystems	Protecting habitat of wild animals/plants	2	2	2	4
		Habits of rare species	2	2	2	4
		Ecological impact	2	2	2	4
		Interception of wild animals/ livestock/ habits	2	2	2	4
		Exotic species	4	3	3	4
		Environmental impact in untouched areas	3	2	2	4
	Water usage	Negative impact for surface water and groundwater	4	2	4	4
	Geographical features	Slope disasters by bad geology	3	1	2	4
		Slope disasters by cutting/filling	3	1	2	4
Discharge of sediment by constructions		3	1	2	4	
Modification of topography and geological structure		3	1	2	4	
Social environment	Involuntary resettlement	Involuntary resettlement	2	2	2	4
	Lifestyle and livelihood	Lifestyle and livelihood	2	2	2	4
	Landscape	Landscape	1	1	1	4
	Working conditions	Working conditions	2	2	2	4

Impact

- 1 Large
- 2 Middle
- 3 Small
- 4 No

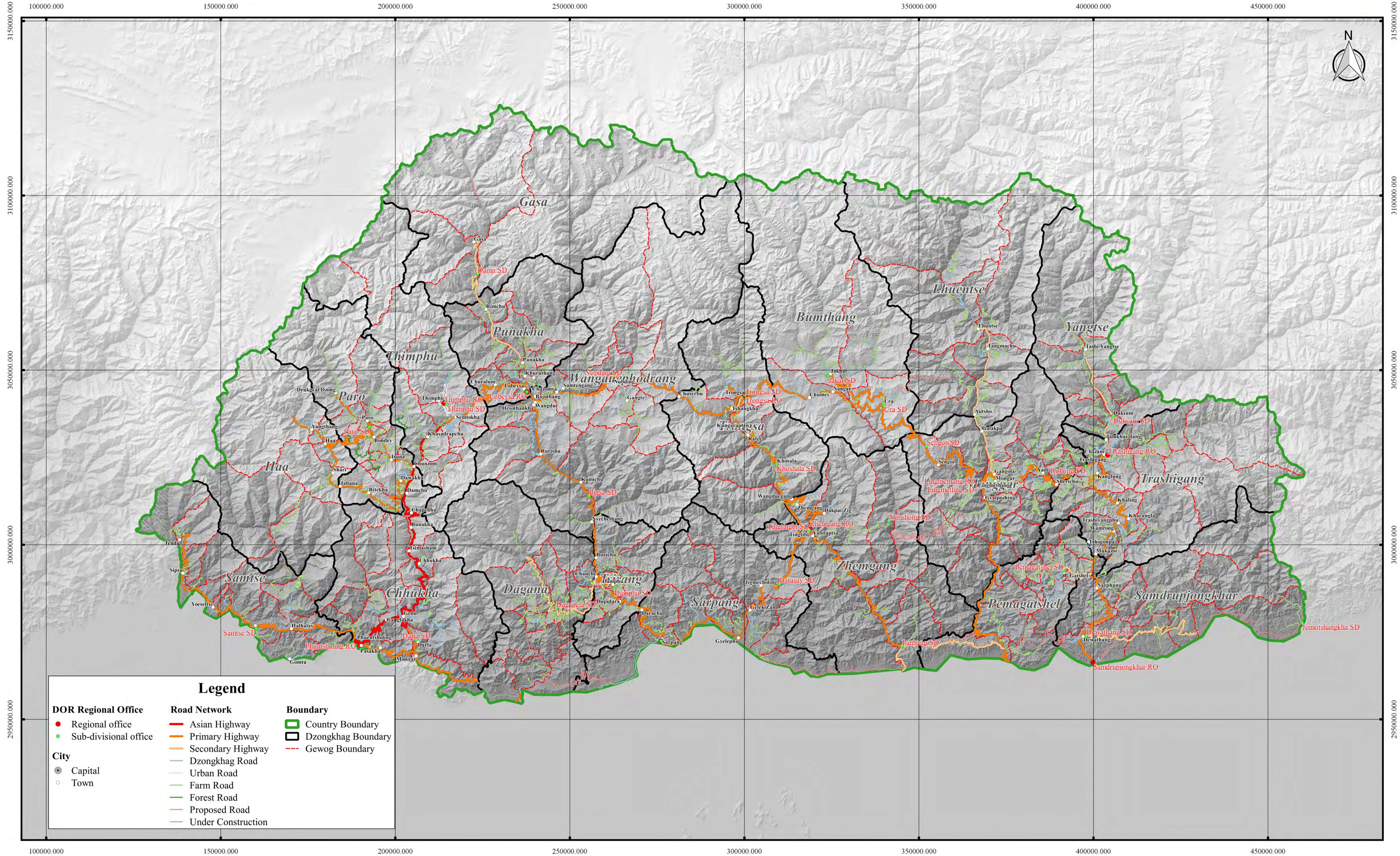
Appendix 16

道路基図

Road Base Map



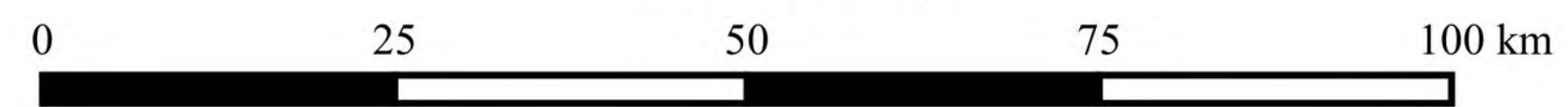
Road Network in Bhutan



Legend

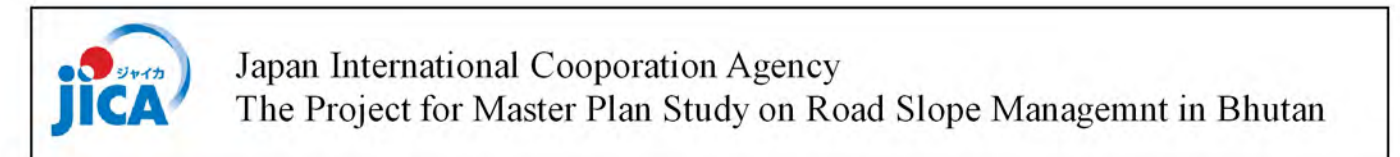
DOR Regional Office	Road Network	Boundary
● Regional office	— Asian Highway	▭ Country Boundary
● Sub-divisional office	— Primary Highway	▭ Dzongkhag Boundary
	— Secondary Highway	— Gewog Boundary
City	— Dzongkhag Road	
● Capital	— Urban Road	
○ Town	— Farm Road	
	— Forest Road	
	— Proposed Road	
	— Under Construction	

Scale 1: 500,000



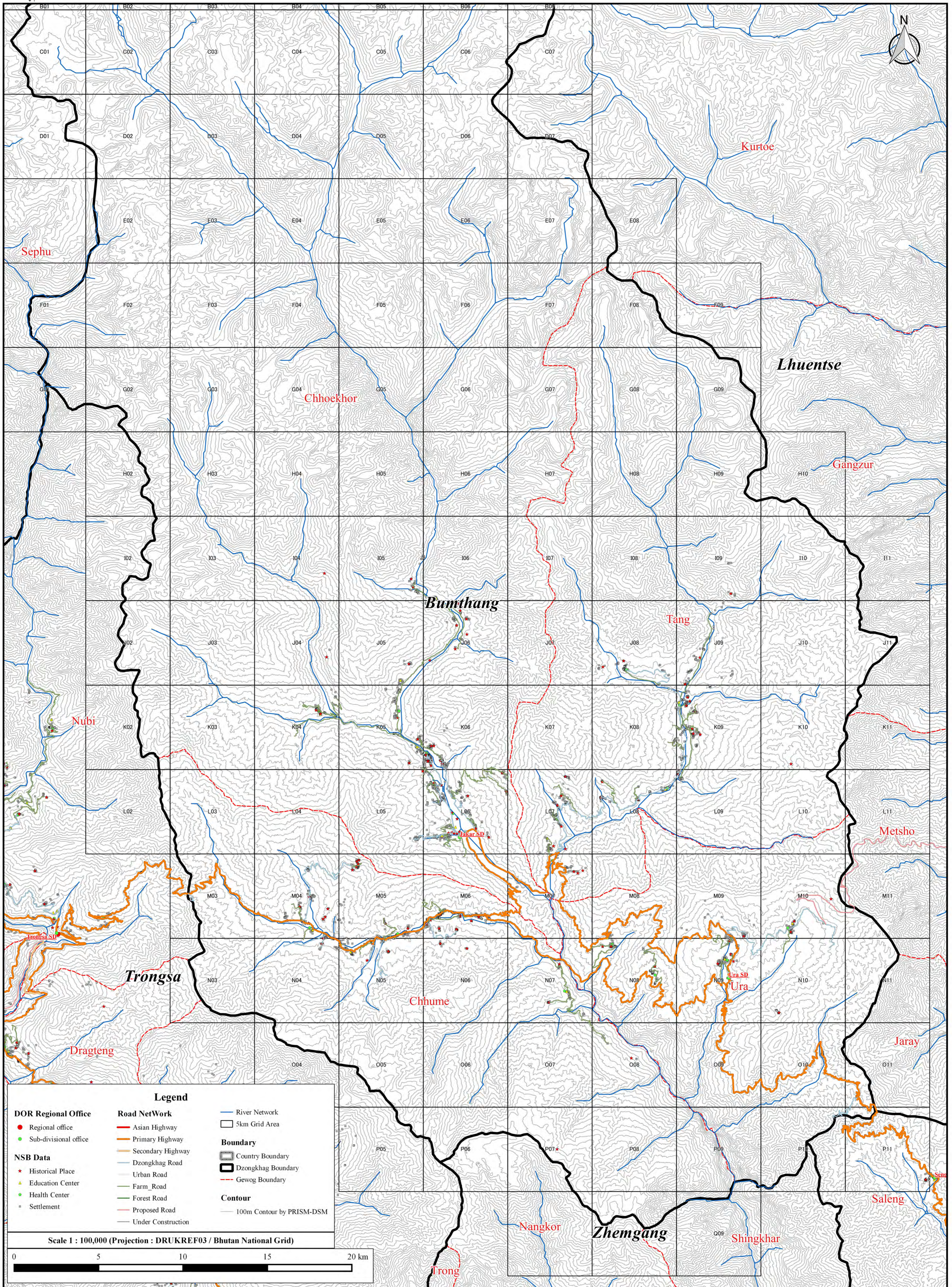
Coordination Systems :
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 Projection : Transverse Mercator
 False Easting : 250,000.000
 False Northing : 0.000
 Central Meridian : 90.000
 Scale Factor : 1.000
 Units : Meter

Data Sources :
 -Boundary, Road, Cities and DOR Regional Office has been provided from Department of Road, Ministry of Works and Human, Settlement, Bhutan.
 -Road Network data was defined in 2013 by DOR.
 -Topographic data and Relief has been generated from PRISM-DSM (10m mesh).





Road Network in Bumthang Dzongkhag



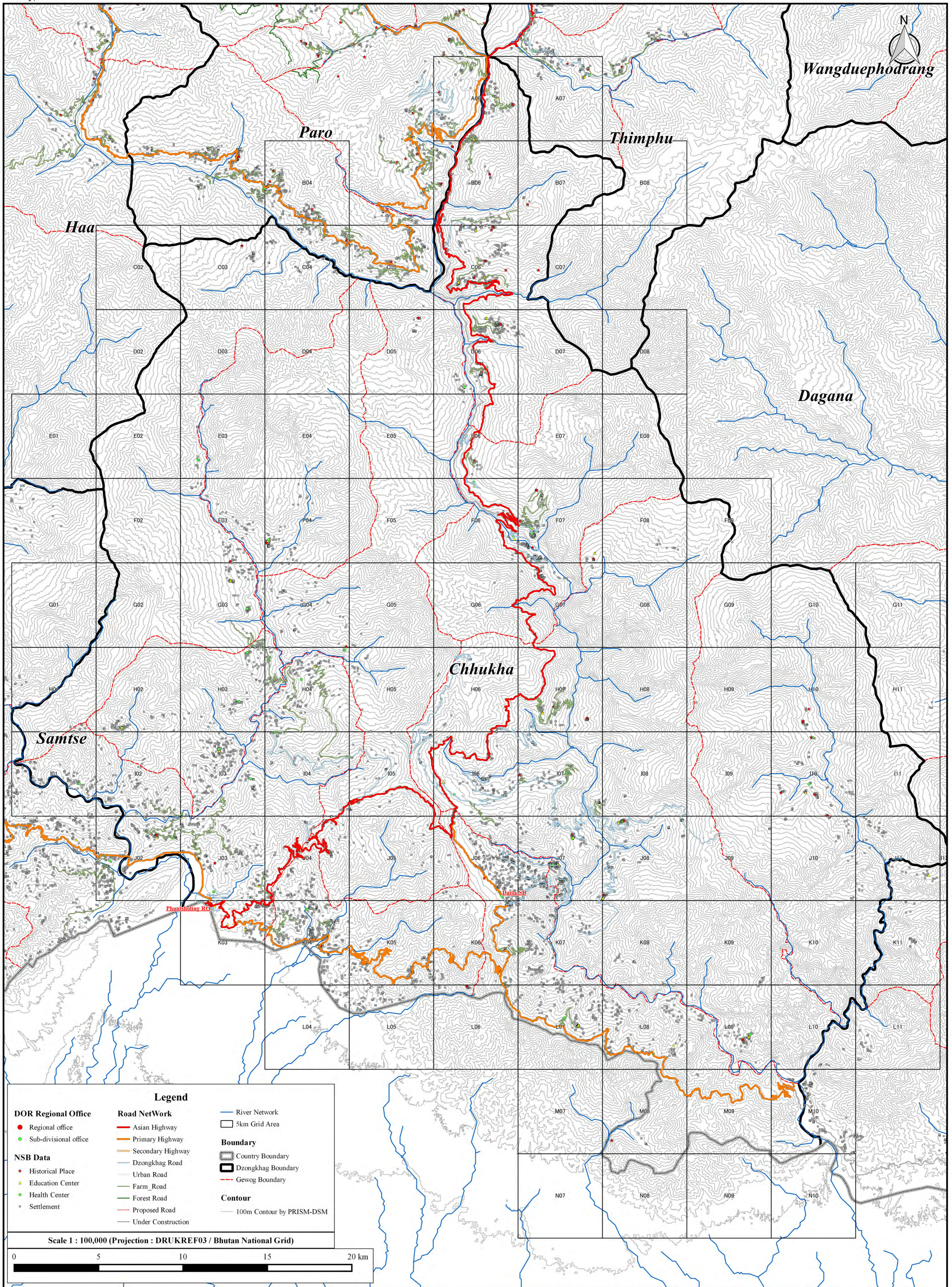
Legend

DOR Regional Office	Road Network	River Network
● Regional office	— Asian Highway	— River Network
● Sub-divisional office	— Primary Highway	□ 5km Grid Area
NSB Data	— Secondary Highway	Boundary
★ Historical Place	— Dzongkhag Road	▭ Country Boundary
▲ Education Center	— Urban Road	▭ Dzongkhag Boundary
▲ Health Center	— Farm Road	— Gewog Boundary
■ Settlement	— Forest Road	Contour
	— Proposed Road	— 100m Contour by PRISM-DSM
	— Under Construction	

Scale 1 : 100,000 (Projection : DRUKREF03 / Bhutan National Grid)



Road Network in Chhukha Dzongkhag



Legend

DOR Regional Office	Road Network	River Network
● Regional office	— Asian Highway	— River Network
● Sub-divisional office	— Primary Highway	□ 5km Grid Area
NSB Data	— Secondary Highway	Boundary
★ Historical Place	— Dzongkhag Road	— Country Boundary
▲ Education Center	— Urban Road	— Dzongkhag Boundary
▲ Health Center	— Farm Road	— Gewog Boundary
■ Settlement	— Forest Road	Contour
	— Proposed Road	— 100m Contour by PRISM-DSM
	— Under Construction	

Scale 1 : 100,000 (Projection : DRUKREF03 / Bhutan National Grid)

