

## **Appendix-3**

### **Format of Inventory Survey**

**Inventory Sheet 2-1 Selection of detailed inventory survey sections for SC**

|                |                   |     |
|----------------|-------------------|-----|
| Road Name      | 3                 |     |
| Station from   | km 0              | m 0 |
| Side of Survey | Left side of road |     |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**  
 Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

**FRCDa: Actual frequency of RCD**  
 Na: Number of RCDs  nos.  
 Ya: Period of disaster record  year  
 $FRCDa = Na/Ya$   nos. per year

**FRCDb: Actual frequency of road closure disaster before countermeasure (for statistical use only)**  
 Nbc: Number of RCDs before countermeasures  nos.  
 Ybc: Period of available disaster record before countermeasures  year  
 $FRCDbc = Nbc/Ybc$   nos. per year

**2. Evaluation by disturbance situation**  
 Yd: Visible disturbance is present  Yes

**3. Evaluation by potential frequency of RCD (FRCDp)**

| Factor items for FRCDp                                       | Factor categories for FRCDp |                   |                               |   | Frequency score for FRCDp |
|--|-----------------------------|-------------------|-------------------------------|---|---------------------------|
| <b>Geometry</b>  |                             |                   |                               |   |                           |
| <b>Length of survey site: L</b>                              | L >= 300 m                  | 300m > L >= 200 m | 200m > L >= 100 m             | 100m > L                                | a                         |
| Frequency score for FRCDp                                    | 0.16                        | 0.041             | -0.005                        | -0.028                                  | (0.028)                   |
| <b>Height of mountain side slope: H</b>                      | H >= 90 m                   | 90m > H >= 60 m   | 60m > H >= 30 m               | 30m > H                                 | b                         |
| Frequency score for FRCDp                                    | 0.019                       | 0.019             | 0.01                          | 0.01                                    | 0.000                     |
| <b>Gradient of slope: G</b>                                  | G >= 60°                    | 60° > G >= 40°    | 40° > G >= 20°                | 20° > G                                 | c                         |
| Frequency score for FRCDp                                    | 0.092                       | -0.019            | -0.019                        | -0.054                                  | 0.000                     |
| <b>Distance from road to toe of mountain side slope : D</b>  | 1 m > D                     | 3m >= D > 1m      | 5m >= D > 3m                  | D > 5 m                                 | d                         |
| Frequency score for FRCDp                                    | 0.089                       | 0.007             | -0.043                        | -0.043                                  | 0.000                     |
| <b>Slope shape</b>   | Valley type                 | Straight type     | Ridge type                    | Combined type                           | e                         |
| Frequency score for FRCDp                                    | 0.028                       | 0.028             | 0.002                         | 0.002                                   | 0.000                     |
| <b>Surface situation</b>                                     |                             |                   |                               |   |                           |
| <b>Dominant vegetation/ surface covering</b>                 | Bare                        | Grasses           | Trees                         | Surface protection (without vegetation) | f                         |
| Frequency score for FRCDp                                    | 0.051                       | 0.007             | 0.007                         | 0                                       | 0.000                     |
| <b>Dominant materials of slope surface</b>                   | Silt, Clay                  | Sand              | Gravels, Cobbles, or Boulders | Surface protection (without vegetation) | g                         |
| Frequency score for FRCDp                                    | 0.014                       | -0.005            | -0.005                        | 0                                       | 0.000                     |
| <b>Area ratio of bedrock exposure: AR</b>                    | AR > 40%                    | 40% >= AR > 20%   | 20% >= AR > 0%                | AR = 0%                                 | h                         |
| Frequency score for FRCDp                                    | 0.046                       | 0.017             | 0.003                         | 0.003                                   | 0.000                     |
| <b>Materials of Bedrock</b>                                  | Fractured rock              | Weathered rock    | Soft fresh rock               | Hard fresh rock                         | i                         |
| Frequency score for FRCDp                                    | 0.058                       | 0.014             | 0.014                         | 0.014                                   | 0.000                     |
| Frequency score for FRCDp                                    | -0.01                       |                   |                               |   |                           |
| <b>Spring/ Surface water</b>                                 | Present                     | None              |                               |   | j                         |
| Frequency score for FRCDp                                    | 0.297                       | -0.023            |                               |   | 0.000                     |
| <b>Disturbance</b>   |                             |                   |                               |   |                           |
| <b>Erosion on the slope</b>                                  | Erosion                     | Piping hole       |                               |   | k                         |
| Frequency score for FRCDp                                    | 0.072                       | 0.654             |                               |   | 0.000                     |
| <b>Deformation/ Collapse</b>                                 | Collapse/ Slump             | Cracks, Crevices  | Fallen/ Inclined trees        | Depression/ Upheaval                    | l                         |
| Frequency score for FRCDp                                    | 0.051                       | 0.229             | 0.12                          | 0.062                                   | 0.000                     |
| <b>FRCDp without existing countermeasure (nos. per year)</b> |                             |                   |                               |   |                           |
| <b>Countermeasure</b>  |                             |                   |                               |   |                           |
| <b>Existing countermeasure</b>                               | Guard fence                 | Catch wall        | Slope drainage                | Shotcrete                               | n                         |
| Coefficient of effectiveness of countermeasure               | 0.2                         | 0.2               | 0.1                           | 0.2                                     |                           |
|  | 0                           | 0                 | 0                             | 0                                       |                           |
|  | Retaining wall              | Vegetation        | Other                         | Specify countermeasure                  |                           |
| Coefficient of effectiveness of countermeasure               | 0.1                         | 0.4               | 0.9                           |   |                           |
|  | 0                           | 0                 | 0                             |   |                           |
| <b>FRCDp of survey slope (nos. per year)</b>                 |                             |                   |                               |   |                           |
| $o = \sum m \cdot n$ 0.000                                   |                             |                   |                               |   |                           |

**4 Comprehensive evaluation**

Note

- I should be inputted to selected category's cell.
- I should be inputted when corresponding to situation.
- Numerical value is automatically inputted.
- Numerical value or terms should be inputted.

RCD: Road closure disaster; It includes not only the whole road closure but also partial road closures.  
 Disturbance: deformation and collapses that do not close the road is not included in RCD and we called 'disturbance'.

**FRCDp >= 0.1** Yes → Select for detailed inventory survey

**Comprehensive Evaluation Necessity of Detailed Inventory Survey**

|                 |   |
|-----------------|---|
| yes = 1, no = 0 | 0 |
|-----------------|---|

**Inventory Sheet 2-2 Selection of detailed inventory survey sites for RC**

|                |      |   |   |
|----------------|------|---|---|
| Road Name      | 0    |   |   |
| Station from   | 0 km | 0 | m |
| Side of Survey | 0    |   |   |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**  
 Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

**FRCDa: Actual frequency of RCD**  
 Na: Number of RCDs after countermeasures have been installed  
 Ya: Period of available disaster record  
 FRCDa = Na/Ya

|  |                     |
|--|---------------------|
| Na: Number of RCDs after countermeasures have been installed | 0 nos.              |
| Ya: Period of available disaster record                      | 10 year             |
| FRCDa = Na/Ya  | 0.000 nos. per year |

**FRCDb: Actual frequency of road closure disaster before countermeasure**  
 Nb: Number of RCDs before countermeasure have been installed  
 Yb: Period of available disaster record  
 FRCDb = Nb/Yb

|  |                     |
|--|---------------------|
| Nb: Number of RCDs before countermeasure have been installed | 0 nos.              |
| Yb: Period of available disaster record                      | 10 year             |
| FRCDb = Nb/Yb  | 0.000 nos. per year |

**2. Evaluation by disturbance situation**  
 Yd: Visible disturbance is present

**3. Evaluation by potential frequency of RCD (FRCDp)**

| Factor items for FRCDp                                       | Factor categories for FRCDp |  |                               |   | Frequency score for FRCDp |         |
|--|-----------------------------|--|-------------------------------|---|---------------------------|---------|
| <b>Geometry</b>  |                             |  |                               |   |                           |         |
| <b>Length of survey site: L</b>                              | L >= 300 m                  | 300m > L >= 200 m                            | 200m > L >= 100 m             | 100m > L                                | a                         | (0.017) |
| Frequency score for FRCDp                                    | 0.195                       | 0.024  | 0.014                         | -0.017                                  |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Height of mountain side slope: H</b>                      | H >= 90 m                   | 90m > H >= 60 m                              | 60m > H >= 30 m               | 30m > H                                 | b                         | 0.000   |
| Frequency score for FRCDp                                    | 0.067                       | 0.067  | -0.013                        | -0.013                                  |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Gradient of slope: G</b>                                  | G >= 60°                    | 60° > G >= 40°                               | 40° > G >= 20°                | 20° > G                                 | c                         | 0.000   |
| Frequency score for FRCDp                                    | 0.019                       | 0.019  | 0.019                         | -0.235                                  |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Distance from road to toe of mountain side slope: D</b>   | 1 m > D                     | 3m >= D > 1m                                 | 5m >= D > 3m                  | D > 5m                                  | d                         | 0.000   |
| Frequency score for FRCDp                                    | 0.029                       | 0.029  | -0.058                        | -0.058                                  |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Slope shape</b>   | Valley type                 | Straight type                                | Ridge type                    | Combined type                           | e                         | 0.000   |
| Frequency score for FRCDp                                    | 0.018                       | 0.018  | 0.011                         | 0.011                                   |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Surface situation</b>                                     |                             |  |                               |   |                           |         |
| <b>Dominant vegetation/ surface covering</b>                 | Bare                        | Grasses                                      | Trees                         | Surface protection (without vegetation) | f                         | 0.000   |
| Frequency score for FRCDp                                    | 0.041                       | 0.041  | -0.068                        | 0                                       |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Dominant Materials of slope surface</b>                   | Fractured rock              | Weathered rock                               | Soft fresh rock               | Hard fresh rock                         | g                         | 0.000   |
| Frequency score for FRCDp                                    | 0.031                       | 0.031  | 0.031                         | -0.143                                  |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
| <b>Spring/ Surface water</b>                                 | Present                     | None   |                               |   | h                         | 0.000   |
| Frequency score for FRCDp                                    | 0.25                        | -0.013                                       |                               |   |                           |         |
|  | 0                           | 0  |                               |   |                           |         |
| <b>Disturbance</b>   |                             |  |                               |   |                           |         |
| <b>Deformation/ Collapse on the slope</b>                    | Fall, collapse              | Open crack below an overhang                 | Toppling                      |   | i                         | 0.000   |
| Frequency score for FRCDp                                    | 0.074                       | 0.044  | 0.116                         |   |                           |         |
|  | 0                           | 0  | 0                             |   |                           |         |
|  |                             | Cross open cracks to cause wedge shape slide | Sliding direction open cracks |   |                           |         |
| Frequency score for FRCDp                                    |                             | 0.121  | 0.077                         |   |                           |         |
|  |                             | 0  | 0                             |   |                           |         |
| <b>FRCDp without existing countermeasure (nos. per year)</b> |                             |  |                               |   | $\sum$ (a-i)              | 0.000   |
| <b>Countermeasure</b>  |                             |  |                               |   |                           |         |
| <b>Existing countermeasure</b>                               | Guard fence                 | Catch wall                                   | Shotcrete                     | Rock shed                               | k                         | 1.000   |
| Coefficient of effectiveness of countermeasure               | 0.5                         | 0.1  | 0.2                           | 0.01                                    |                           |         |
|  | 0                           | 0  | 0                             | 0                                       |                           |         |
|  | Other                       | Specify countermeasure                       |                               |   |                           |         |
| Coefficient of effectiveness of countermeasure               | 0.6                         |  |                               |   |                           |         |
|  | 0                           |  |                               |   |                           |         |
| <b>FRCDp of survey slope (nos. per year)</b>                 |                             |  |                               |   | $1 - j^*k$                | 0.000   |

**4 Comprehensive evaluation**

Note: 1 should be inputted to selected category's cell.  
 I should be inputted when corresponding to situation  
 Numerical value is automatically inputted.  
 Numerical value or terms should be inputted.

RCD: Road closure disaster; It includes not only the whole road closure but also partial road closures.  
 Disturbance: deformation and collapses that do not close the road is not included in RCD and are called 'disturbance'.

FRCDp >= 0.1 Yes

Select for detailed inventory survey

|  |          |   |
|--|----------|---|
| Comprehensive Evaluation<br>Necessity of Detailed<br>Inventory Surveys | yes = 1, |   |
|  | no = 0   | 0 |

**Inventory Sheet 2-3 Selection of detailed inventory survey sites for LS**

|                |                    |  |     |
|----------------|--------------------|--|-----|
| Road Name      | 0                  |  |     |
| Station from   | km 0               |  | m 0 |
| Side of Survey | Right side of road |  |     |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**  
 Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

FRCDa: Actual frequency of RCD  
 Na: Number of RCDs after countermeasures have been installed  
 Ya: Period of available disaster record  
 $FRCDa = Na/Ya$

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

FRCDbc: Actual frequency of RCD before countermeasure  
 Nbc: Number of RCDs before countermeasure  
 Ybc: Period of available disaster record  
 $FRCDbc = Nbc/Ybc$

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

**2. Evaluation by disturbance situation**  
 Yd: Visible disturbance is present

**3. Evaluation by potential frequency of road closure disaster (FRCDp)**

| Factor items for FRCDp                                       | Factor categories for FRCDp |                   |                               |   | Frequency Score for FRCDp |            |       |
|--|-----------------------------|-------------------|-------------------------------|---|---------------------------|------------|-------|
| <b>Geometry</b>  |                             |                   |                               |   |                           |            |       |
| Length of survey site: L                                     | L >= 300 m                  | 300m > L >= 200 m | 200m > L >= 100 m             | 100m > L                                | a                         | 0.010      |       |
| Frequency score for FRCDp                                    | 0.04                        | 0.03              | 0.02                          | 0.01                                    |                           |            |       |
| Gradient of slope: G   | G >= 60°                    | 60° > G >= 40°    | 40° > G >= 20°                | 20° > G                                 | b                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.04                        | 0.01              | 0.005                         | 0.001                                   |                           |            |       |
| Slope shape  | Valley type                 | Straight type     | Ridge type                    | Combined type                           | c                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.05                        | 0.02              | 0.01                          | 0.01                                    |                           |            |       |
| <b>Surface situation</b>                                     |                             |                   |                               |   |                           |            |       |
| Dominant vegetation/ surface covering                        | Bare                        | Grasses           | Trees                         | Surface protection (without vegetation) | d                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.02                        | 0.01              | 0.005                         | 0.001                                   |                           |            |       |
| Dominant materials of slope surface                          | Silt, Clay                  | Sand              | Gravels, Cobbles, or Boulders | Surface protection (without vegetation) | e                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.02                        | 0.01              | 0.005                         | 0.001                                   |                           |            |       |
| Spring/ Surface water  | Present                     | None              |                               |   | f                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.06                        | 0.001             |                               |   |                           |            |       |
| <b>Disturbance</b>   |                             |                   |                               |   |                           |            |       |
| Erosion on the slope   | Erosion                     | Piping hole       |                               |   | g                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.03                        | 0.02              |                               |   |                           |            |       |
| Deformation/ Collapse  | Collapse/ Slump             | Cracks, Crevices  | Fallen/ Inclined trees        | Depression/ Upheaval                    | h                         | 0.000      |       |
| Frequency score for FRCDp                                    | 0.06                        | 0.06              | 0.05                          | 0.05                                    |                           |            |       |
| <b>FRCDp without existing countermeasure (nos. per year)</b> |                             |                   |                               |   |                           | =SUM (a-h) | 0.010 |
| <b>Countermeasure</b>  |                             |                   |                               |   |                           |            |       |
| Existing countermeasure                                      | Slope/Road drainage         | Dewatering method | Cutwork of landslide head     | Embankment of landslide toe             |                           |            |       |
| Coefficient of effectiveness of countermeasure               | 0.2                         | 0.2               | 0.05                          | 0.05                                    |                           |            |       |
|  | Catch wall                  | Other             | Specify countermeasure        |   | j                         |            |       |
| Coefficient of effectiveness of countermeasure               | 0.5                         | 0.3               |                               |   |                           |            |       |
| <b>FRCDp of survey slope (nos. per year)</b>                 |                             |                   |                               |   |                           | k=i*j      | 0.010 |

**4 Comprehensive evaluation**

Note:

- 1 should be inputted to selected category's cell.
- 1 should be inputted when corresponding to situation
- Numerical value is automatically inputted.
- Numerical value or terms should be inputted.

RCD: Road closure disaster; It includes not only the whole road closure but also partial road closures  
 Disturbance: deformation and collapses that do not close the road is not included in RCD and are called 'disturbance'.

FRCDp >= 0.1

YES

Select for detailed inventory

**Comprehensive Evaluation Necessity of Detailed Inventory Survey**

|         |       |   |
|---------|-------|---|
| yes =1, | no =0 | 0 |
|---------|-------|---|

**Inventory Sheet 2-4 Selection of detailed inventory survey sites for RS**

|                |      |     |
|----------------|------|-----|
| Road Name      | 0    |     |
| Station from   | km 0 | m 0 |
| Side of Survey | 0    |     |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**  
 Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

**FRCDa: Actual frequency of RCD**  
 Na: Number of RCDs after countermeasures have been installed  
 Ya: Period of available disaster record  
 $FRCDa = Na/Ya$

|                     |              |
|---------------------|--------------|
| 0 nos.              | FRCDa >= 0.1 |
| 10 year             |              |
| 0.000 nos. per year |              |

**FRCDbc: Actual frequency of RCD before countermeasure**  
 Nbc: Number of RCDs before countermeasure  
 Ybc: Period of available disaster record  
 $FRCDbc = Nbc/Ybc$

|                     |              |
|---------------------|--------------|
| 0 nos.              | FRCDa >= 0.1 |
| 10 year             |              |
| 0.000 nos. per year |              |

**2. Evaluation by disturbance situation**  
 Yd: Visible disturbance is present

**3. Evaluation by potential frequency of road closure disaster**

| Factor Items for FRCDp                                       | Factor categories for FRCDp |                        |                                  |   | Frequency Score for FRCDp |       |
|--|-----------------------------|------------------------|----------------------------------|---|---------------------------|-------|
| <b>Geometry</b>  |                             |                        |                                  |   |                           |       |
| <b>Length of survey site: L</b>                              | L >= 300 m                  | 300m > L >= 200 m      | 200m > L >= 100 m                | 100m > L                                | a                         |       |
| Frequency score for FRCDp                                    | 0.199                       | 0.059                  | 0.022                            | -0.007                                  | (0.007)                   |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Height of Valley side slope: H</b>                        | H >= 90 m                   | 90m > H >= 60 m        | 60m > H >= 30 m                  | 30m > H                                 | b                         |       |
| Frequency score for FRCDp                                    | 0.115                       | 0.021                  | 0.004                            | -0.025                                  | 0.000                     |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Gradient of valley side slope</b>                         | G >= 60°                    | 60° > G >= 40°         | 40° > G >= 20°                   | 20° > G                                 | c                         |       |
| Frequency score for FRCDp                                    | 0.032                       | 0.015                  | -0.032                           | -0.032                                  | 0.000                     |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Distance from road to head of valley side slope</b>       | 1 m > D                     | 3m >= D > 1m           | 5m >= D > 3m                     | D > 5m                                  | d                         |       |
| Frequency score for FRCDp                                    | 0.048                       | 0.027                  | -0.045                           | -0.045                                  | 0.000                     |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Slope shape</b>   | Valley type                 | Straight type          | Ridge type                       | Combined type                           | e                         |       |
| Frequency score for FRCDp                                    | 0.029                       | 0.029                  | 0.029                            | -0.014                                  | 0.000                     |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Surface situation</b>                                     |                             |                        |                                  |   |                           |       |
| <b>Dominant vegetation/ surface covering</b>                 | Bare                        | Grasses                | Trees                            | Surface protection (without vegetation) | f                         |       |
| Frequency score for FRCDp                                    | 0.104                       | 0.016                  | -0.014                           | -0.07                                   | 0.000                     |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Slope type</b>  | Embankment slope            | Combined or unknown    | Natural slope                    |   | g                         |       |
| Frequency score for FRCDp                                    | 0.102                       | 0.013                  | -0.026                           |   | 0.000                     |       |
|  | 0                           | 0                      | 0                                |   |                           |       |
| <b>Dominant materials of slope surface</b>                   | Silt, Clay                  | Sand                   | Gravels, Cobbles, or Boulders    |   | h                         |       |
| Frequency score for FRCDp                                    | 0.015                       | 0.015                  | -0.036                           |   | 0.000                     |       |
|  | 0                           | 0                      | 0                                |   |                           |       |
|  | Fractured rock              | Weathered rock         | Soft fresh rock                  | Hard fresh rock                         |                           |       |
| Frequency score for FRCDp                                    | -0.063                      | -0.063                 | -0.063                           | -0.063                                  |                           |       |
|  | 0                           | 0                      | 0                                | 0                                       |                           |       |
| <b>Spring/ Surface water</b>                                 | Present                     | None                   |                                  |   | i                         |       |
| Frequency score for FRCDp                                    | 0.049                       | 0.003                  |                                  |   | 0.000                     |       |
|  | 0                           | 0                      |                                  |   |                           |       |
| <b>Rain water flows from road to valley side</b>             | Yes                         | No                     |                                  |   | j                         |       |
| Frequency score for FRCDp                                    | 0.021                       | -0.038                 |                                  |   | 0.000                     |       |
|  | 0                           | 0                      |                                  |   |                           |       |
| <b>Disturbance</b>   |                             |                        |                                  |   |                           |       |
| <b>Erosion in valley side slope</b>                          | Erosion is present          | Piping hole is present |                                  |   | k                         |       |
| Frequency score for FRCDp                                    | 0.017                       | 0.017                  |                                  |   | 0.000                     |       |
|  | 0                           | 0                      |                                  |   |                           |       |
| <b>Deformation/ Collapse on the slope</b>                    | Cracks/Crevices on road     | Depression on road     | Fall, Slump in valley side slope |   | l                         |       |
| Frequency score for FRCDp                                    | 0.044                       | 0.046                  | 0.061                            |   | 0.000                     |       |
|  | 0                           | 0                      | 0                                |   |                           |       |
| <b>FRCDp without existing countermeasure (nos. per year)</b> |                             |                        |                                  |   | $\sum (a-l)$              | 0.000 |
| <b>Countermeasure</b>  |                             |                        |                                  |   |                           |       |
| <b>Existing countermeasure</b>                               | Road drainage               | Retaining wall         | Other                            | Specify countermeasure                  | n                         |       |
| Coefficient of effectiveness of countermeasure               | 0.05                        | 0.05                   | 0.5                              |   | (0.00)                    |       |
|  | 0                           | 0                      | 0                                |   |                           |       |
| <b>FRCDp of survey slope (nos. per year)</b>                 |                             |                        |                                  |   | $\sigma = m * n$          | 0.000 |

**4 Comprehensive evaluation**

Note:  
 I should be inputted to selected category's cell.  
 I should be inputted when corresponding to situation.  
 Numerical value is automatically inputted.  
 Numerical value or terms should be inputted.

RCD: Road closure disaster; It include not only the whole road closure but also partial road closure.  
 Disturbance: deformation and collapses that do not close the road is not included in RCD and are called 'disturbance'.

FRCDp >= 0.1

Yes

Select for detailed inventory section

|   |               |   |
|---|---------------|---|
| Comprehensive Evaluation Necessity of Detailed Inventory Survey | yes =1, no =0 | 0 |
|---|---------------|---|

**Inventory Sheet 2-5**

**Selection of detailed inventory survey sites for DF**

|                |                    |     |
|----------------|--------------------|-----|
| Road Name      | 0                  |     |
| Station from   | km 0               | m 0 |
| Side of Survey | Right side of road |     |

**1. Evaluation by Actual Frequency of Road Closure Disaster (RCD)**

Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within the FRCDa: Actual Frequency of RCI last 10 years, the Number of RCDs after the provision of countermeasure should be inputted, with the years after the countermeasure's construction substituted for the 10 year disaster record period.

Na: Number of RCDs after countermeasures have been installed  
Ya: Period of available disaster record  
FRCDa = Na/Ya

|                     |              |
|---------------------|--------------|
| 0 nos.              | FRCDa >= 0.1 |
| 10 year             |              |
| 0.000 nos. per year |              |

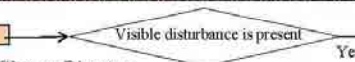
**FRCDb: Actual Frequency of Road Closure Disaster before Countermeasure**

Nbc: Number of RCDs before Countermeasure  
Ybc: Period of Available Disaster Record  
FRCDbc = Nbc/Ybc

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

**2. Evaluation by Disturbance Situation**

Yd: Visible disturbance is present

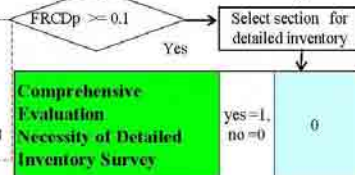


**3. Evaluation by Potential Frequency of Road Closure Disaster**

| Factor Items for FRCDp                                       | Factor Categories for FRCDp             |   |                          |                              | Frequency Score for FRCDp |                     |              |
|--|---|---|--------------------------|------------------------------|---------------------------|---------------------|--------------|
| <b>Geometry</b>  |   |   |                          |                              |                           |                     |              |
| Width of channel: W  | 3 >= W                                  | 5 >= W > 3                                      | 10 >= W > 5              | W > 10                       | a                         | 0.060               |              |
| Frequency score for FRCDp                                    | 0.06                                    | 0.06  | -0.004                   | -0.004                       |                           |                     |              |
| Area of drainage basin: A                                    | A >= 0.5 km <sup>2</sup>                | 0.5 km <sup>2</sup> > A >= 0.15 km <sup>2</sup> | 0.15 km <sup>2</sup> > A |                              | b                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.074                                   | 0.074   | -0.007                   |                              |                           |                     |              |
| Height from channel bottom to road: H                        | 1 m >= H                                | 2 m >= H > 1 m                                  | 5 m >= H > 2 m           | H > 5m                       | c                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.032                                   | 0.032   | -0.013                   | -0.013                       |                           |                     |              |
| <b>Surface situation</b>                                     |   |   |                          |                              |                           |                     |              |
| Dominant vegetation of drainage area                         | Bare                                    | Grasses   | Trees                    | Unknown                      | d                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.11                                    | 0.016   | 0.001                    | 0                            |                           |                     |              |
| Dominant materials of river sediment                         | Cobbles, Boulders                       | Gravel  | Sand, silt, clay         | bedrock                      | e                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.141                                   | 0.066   | -0.012                   | -0.016                       |                           |                     |              |
| <b>Disturbance</b>   |   |   |                          |                              |                           |                     |              |
| Slope failure situation in drainage area                     | More than 5 slope collapses             | 2-4 slope collapses                             | 1 slope collapse         | No slope collapse or Unknown | f                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.358                                   | 0.07  | -0.015                   | -0.015                       |                           |                     |              |
| Trace of debris on or beside the road                        | Present                                 | None  |                          |                              | g                         | 0.000               |              |
| Frequency score for FRCDp                                    | 0.133                                   | -0.054  |                          |                              |                           |                     |              |
| <b>FRCDp without existing countermeasure (nos. per year)</b> |   |   |                          |                              |                           | <b>h = 30M(x,d)</b> | <b>0.060</b> |
| <b>Countermeasure</b>  |   |   |                          |                              |                           |                     |              |
| Existing countermeasure                                      | Small check dam (less than 10 m height) | Sabo dam (equal to more than 10 m height)       | Other                    | Specify countermeasure       | i                         | 1.000               |              |
| Coefficient of effectiveness of countermeasure               | 0.05                                    | 0.01  | 0.1                      |                              |                           |                     |              |
| <b>FRCDp of survey slope (nos. per year)</b>                 |   |   |                          |                              |                           | <b>j = h * i</b>    | <b>0.060</b> |

**4 Comprehensive evaluation**

Note:  
 1 should be inputted to selected category's cell.  
 1 should be inputted when corresponding to situation  
 Numerical value is automatically inputted.  
 Numerical value or terms should be inputted.  
 RCD: Road closure disaster; It includes not only the whole road but also partial road closures  
 Disturbance: Deformation and collapses that do not result to the road closure is not considered RCD but only called 'disturbance'.



**Inventory Sheet 2-6**

**Selection of detailed inventory survey sites for RE**

|                |          |
|----------------|----------|
| Road Name      | 0        |
| Station from   | km 0 m 0 |
| Side of Survey | 0        |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**

Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

FRCDa: Actual frequency of RCD

Na: Number of RCDs after countermeasures have been installed  
Ya: Period of available disaster record  
FRCDa = Na/Ya

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

FRCDa ≥ 0.1

FRCDbc: Actual frequency of RCD before countermeasure

Nbc: Number of RCDs before countermeasure  
Ybc: Period of available disaster record  
FRCDbc = Nbc/Ybc

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

**2. Evaluation by disturbance situation**

Yd: Visible disturbance is present

Yd: Visible disturbance is

**3. Evaluation by potential frequency of road closure disaster (FRCDp)**

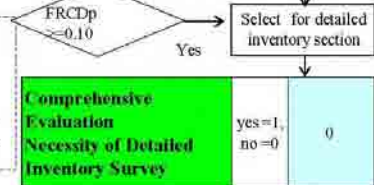
| Factor Items for FRCDp  | Factor categories for FRCDp |   |  |                        | Frequency Score for FRCDp |                       |              |
|---|-----------------------------|---|--|------------------------|---------------------------|-----------------------|--------------|
| <b>Geometry</b>   |                             |   |  |                        |                           |                       |              |
| Length of survey site: L  | L ≥ 300 m                   | 300m > L ≥ 200 m                          | 200m > L ≥ 100 m                         | 100m > L               | a                         | 0.009                 |              |
| Frequency score for FRCDp   | 0.141                       | 0.141                                     | 0.009                                    | 0.009                  |                           |                       |              |
| Distance from low water to road: D                                  | 0.5 m ≥ D                   | 1 m ≥ D > 0.5 m                           | 2 m ≥ D > 1 m                            | D > 2 m                | b                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.057                       | 0   | -0.034                                   | -0.034                 |                           |                       |              |
| Width of river stream at low water discharge: W                     | W ≥ 10 m                    | 10 m > W ≥ 5 m                            | 5 m > W ≥ 3 m                            | 3 m > W                | c                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.045                       | 0.009                                     | 0.009                                    | 0                      |                           |                       |              |
| Height from high water to road surface or head of revetment: H      | 0 m ≥ H                     | 1 m > H ≥ 0 m                             | 2 m > H ≥ 1 m                            | H ≥ 2 m                | d                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.322                       | 0.322                                     | 0.013                                    | -0.056                 |                           |                       |              |
| <b>Surface situation</b>  |                             |   |  |                        |                           |                       |              |
| Dominant materials of river bank                                    | Cobbles, Boulders           | Gravel                                    | Sand                                     | Silt, Clay             | e                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.051                       | -0.009                                    | -0.009                                   | -0.009                 |                           |                       |              |
|   | Bedrock                     | Artificial structure (without vegetation) |  |                        |                           |                       |              |
| Frequency score for FRCDp   | -0.009                      | 0   |  |                        |                           |                       |              |
| Dominant materials of river bed                                     | Cobbles, Boulders           | Gravel                                    | Sand                                     | Silt, Clay             | f                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.043                       | 0.043                                     | -0.069                                   | -0.069                 |                           |                       |              |
|   | bedrock                     |   |  |                        |                           |                       |              |
| Frequency score for FRCDp   | -0.069                      |   |  |                        |                           |                       |              |
| <b>Disturbance</b>  |                             |   |  |                        |                           |                       |              |
| Deformation/ Collapse / Erosion                                     | Cracks, Crevices on road    | Depression on road                        | Fall, Slump, Erosion in river side slope |                        | g                         | 0.000                 |              |
| Frequency score for FRCDp   | 0.071                       | 0.071                                     | 0.071                                    |                        |                           |                       |              |
| <b>FRCDp without existing countermeasure effect (nos. per year)</b> |                             |   |  |                        |                           | <b>h = 0.7M (4.0)</b> | <b>0.609</b> |
| <b>Countermeasure</b>   |                             |   |  |                        |                           |                       |              |
| Existing countermeasure   | Revetment                   | Groin/ spur dike                          | Other                                    | Specify Countermeasure | i                         | 1.000                 |              |
| Coefficient of effectiveness of countermeasure                      | 0.05                        | 0.05                                      | 0.1                                      |                        |                           |                       |              |
| <b>FRCDp of survey slope (nos. per year)</b>                        |                             |   |  |                        |                           | <b>j = h * i</b>      | <b>0.009</b> |

**4 Comprehensive evaluation**

Note

- 1 should be inputted to selected category's cell.
- 1 should be inputted when corresponding to situation
- Numerical value is automatically inputted.
- Numerical value or terms should be inputted.

RCD: Road closure disaster; It includes not only the whole road closure but also partial road closures  
Disturbance: deformation and collapses that do not close the road is not included in RCD and are called 'disturbance'.



**Inventory Sheet 2-7 Selection of detailed inventory survey sites for CE**

|                |                    |     |
|----------------|--------------------|-----|
| Road Name      | 0                  |     |
| Station from   | km 0               | m 0 |
| Side of Survey | Right side of road |     |

**1. Evaluation by actual frequency of Road Closure Disaster (RCD)**  
 Number of RCDs in last 10 years should be inputted. However, in case countermeasures were done within last 10 years, Numbers of RCDs after countermeasures should be inputted. And the years after the countermeasures should be substituted for 10 years as period of disaster record.

FRCDa: Actual frequency of RCD  
 Na: Number of RCDs after countermeasures have been installed  
 Ya: Period of available disaster record  
 FRCDa = Na/Ya

|                     |              |
|---------------------|--------------|
| 0 nos.              | FRCDa >= 0.1 |
| 10 year             |              |
| 0.000 nos. per year |              |

Yes

FRCDbc: Actual frequency of RCD before countermeasure  
 Nb: Number of RCDs before countermeasure (if countermeasure is installed)  
 Ybc: Period of available disaster record  
 FRCDbc = Nb/Ybc

|                     |
|---------------------|
| 0 nos.              |
| 10 year             |
| 0.000 nos. per year |

**2. Evaluation by disturbance situation**  
 Yd: Visible disturbance is present

Yes

**3. Evaluation by potential frequency of road closure disaster**

| Factor items for FRCDp  | Factor categories for FRCDp       |   |  |            | Frequency Score for FRCDp |         |
|---|-----------------------------------|---|--|------------|---------------------------|---------|
| <i>Geometry</i>   |                                   |   |  |            |                           |         |
| Length of survey site: L  | L >= 300 m                        | 300m > L >= 200 m                       | 200m > L >= 100 m                                    | 100m > L   | a                         | (0.024) |
| Frequency score for FRCDp   | 0.149                             | 0.05                                    | 0.05   | -0.024     |                           |         |
|   | 0                                 | 0                                       | 0  | 0          |                           |         |
| Distance from high water coastal line to road : D                 | 0.5 m >= D                        | 1 m >= D > 0.5 m                        | 2 m >= D > 1 m                                       | D > 2 m    | b                         | 0.000   |
| Frequency score for FRCDp   | 0.027                             | 0.027                                   | 0.019  | 0.019      |                           |         |
|   | 0                                 | 0                                       | 0  | 0          |                           |         |
| Height from high water to road formation or head of revetment : H | 0 m >= H                          | 1 m > H >= 0 m                          | 2 m > H >= 1 m                                       | H >= 2 m   | c                         | 0.000   |
| Frequency score for FRCDp   | 0                                 | 0.045                                   | -0.145   | -0.145     |                           |         |
|   | 0                                 | 0                                       | 0  | 0          |                           |         |
| <i>Surface situation</i>  |                                   |   |  |            |                           |         |
| Dominant materials of coastal bank                                | Cobbles, Boulders                 | Gravel                                  | Sand   | Silt, Clay | d                         | 0.000   |
| Frequency score for FRCDp   | 0.053                             | 0.053                                   | 0.046  | 0.004      |                           |         |
|   | 0                                 | 0                                       | 0  | 0          |                           |         |
|   | bedrock                           | Artificial structure without vegetation |  |            | e                         | 0.000   |
| Frequency score for FRCDp   | 0.004                             | -0.121                                  |  |            |                           |         |
|   | 0                                 | 0                                       |  |            |                           |         |
| Dominant materials of coast                                       | Cobbles, Boulders                 | Gravel                                  | Sand   | Silt, Clay | e                         | 0.000   |
| Frequency score for FRCDp   | 0.177                             | 0.012                                   | -0.005   | -0.005     |                           |         |
|   | 0                                 | 0                                       | 0  | 0          |                           |         |
|   | Bedrock                           |   |  |            | f                         | 0.000   |
| Frequency score for FRCDp   | -0.005                            |   |  |            |                           |         |
|   | 0                                 |   |  |            |                           |         |
| <i>Disturbance</i>  |                                   |   |  |            |                           |         |
| Erosion of coastal side slope                                     | Collapse of revetment             | Erosion of revetment foot               | Erosion of coastal side slope or revetment back fill |            | f                         | 0.000   |
| Frequency score for FRCDp   | 0.036                             | 0.031                                   | 0.031  |            |                           |         |
|   | 0                                 | 0                                       | 0  |            |                           |         |
| Deformation/ Collapse   | Cracks, Crevices on road          | Depression on road                      |  |            | g                         | 0.000   |
| Frequency score for FRCDp   | 0.236                             | 0.16                                    |  |            |                           |         |
|   | 0                                 | 0                                       |  |            |                           |         |
| <b>FRCDp without existing countermeasure (nos. per year)</b>      |                                   |   |  |            | h = 2.004 (a g)           | 0.000   |
| <i>Countermeasure</i>   |                                   |   |  |            |                           |         |
| Existing countermeasure   | Revetment without foot foundation | Revetment with foot foundation          | Wave-absorbing works                                 |            | i                         | 1.000   |
| Coefficient of effectiveness of countermeasure                    | 0.1                               | 0.05                                    | 0.05   |            |                           |         |
|   | 0                                 | 0                                       | 0  |            |                           |         |
|   | Other                             | Specify countermeasure                  |  |            | j = h * i                 | 0.000   |
| Coefficient of effectiveness of countermeasure                    | 0.1                               |   |  |            |                           |         |
|   | 0                                 |   |  |            |                           |         |
| <b>FRCDp of survey slope (nos. per year)</b>                      |                                   |   |  |            | j = h * i                 | 0.000   |

**4 Comprehensive evaluation**

Note

- 1 should be inputted to selected category's cell.
- 1 should be inputted when corresponding to situation
- Numerical value is automatically inputted.
- Numerical value or terms should be inputted.

RCD: Road closure disaster; It includes not only the whole road closure but also partial road closures  
 Disturbance: deformation and collapses that do not close the road is not included in RCD and are called 'disturbance'.

FRCDp >= 0.10

Yes

Select for detailed inventory section

|  |          |   |
|--|----------|---|
| <b>Comprehensive Evaluation Necessity of Detailed Inventory Survey</b> | yes = 1, | 0 |
|  | no = 0   |   |



**Inventory Sheet 3      Sketches**

|   |      |      |                     |
|---|------|------|---------------------|
| Road Name   | 0    |      |                     |
| Station from  | km 0 | m 0  | Side of survey      |
| Name of Inspector/ Coordinator for detailed inventory survey; sheet 3, 4, 5 |      |      | Survey date (d/m/y) |
| Name of surveyor  |      | Date | Month Year          |
| 3-1 Front view sketches   |      |      |                     |
|   |      |      | scale:              |
| 3-2 Cross section sketches  |      |      |                     |
|   |      |      | scale:              |

NOTE

|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

**Inventory Sheet 4-1 Planning of Countermeasures Alternative I**

| Road Name  | 3    |      |          |                    |                                    |
|--|------|------|----------|--------------------|------------------------------------|
| Station from   | km   | 0    | m        | 0                  | Side of survey   Left side of road |
| 4-1 Plan of countermeasures (plan layout and descriptions) |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-2 Section of countermeasures                             |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-3 Cost estimation with 20 years maintenance              |      |      |          |                    |                                    |
| No.  | Work | Unit | Quantity | Unit price (pesos) | Amount (pesos)                     |
| 1  |      |      |          |                    | 0                                  |
| 2  |      |      |          |                    | 0                                  |
| 3  |      |      |          |                    | 0                                  |
| 4  |      |      |          |                    | 0                                  |
| 5  |      |      |          |                    | 0                                  |
| 6  |      |      |          |                    | 0                                  |
| 7  |      |      |          |                    | 0                                  |
| Total Cost   |      |      |          |                    | 0                                  |

Note:

|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

**Inventory Sheet 4-2 Planning of Countermeasures Alternative II**

| Road Name  | 3    |      |          |                    |                                    |
|--|------|------|----------|--------------------|------------------------------------|
| Station from   | km   | 0    | m        | 0                  | Side of survey   Left side of road |
| 4-1 Plan of countermeasures (plan layout and descriptions) |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-2 Section of countermeasures                             |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-3 Cost estimation with 20 years maintenance              |      |      |          |                    |                                    |
| No.  | Work | Unit | Quantity | Unit price (pesos) | Amount (pesos)                     |
| 1  |      |      |          |                    | 0                                  |
| 2  |      |      |          |                    | 0                                  |
| 3  |      |      |          |                    | 0                                  |
| 4  |      |      |          |                    | 0                                  |
| 5  |      |      |          |                    | 0                                  |
| 6  |      |      |          |                    | 0                                  |
| 7  |      |      |          |                    | 0                                  |
| Total Cost   |      |      |          |                    | 0                                  |

Note:

|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

**Inventory Sheet 4-3 Planning of Countermeasures Alternative III**

| Road Name  | 3    |      |          |                    |                                    |
|--|------|------|----------|--------------------|------------------------------------|
| Station from   | km   | 0    | m        | 0                  | Side of survey   Left side of road |
| 4-1 Plan of countermeasures (plan layout and descriptions) |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-2 Section of countermeasures                             |      |      |          |                    |                                    |
|  |      |      |          |                    |                                    |
| 4-3 Cost estimation with 20 years maintenance              |      |      |          |                    |                                    |
| No.  | Work | Unit | Quantity | Unit price (pesos) | Amount (pesos)                     |
| 1  |      |      |          |                    | 0                                  |
| 2  |      |      |          |                    | 0                                  |
| 3  |      |      |          |                    | 0                                  |
| 4  |      |      |          |                    | 0                                  |
| 5  |      |      |          |                    | 0                                  |
| 6  |      |      |          |                    | 0                                  |
| 7  |      |      |          |                    | 0                                  |
| Total Cost   |      |      |          |                    | 0                                  |

Note:

|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

| Inventory Sheet 5-1   |                   | Indicative Feasibility Assessment for SC |                          |           |  |
|---|-------------------|--|--------------------------|-----------|--|
| Road Name   | 0                 |  |                          |           |  |
| Km station from   | km                | 0  | m                        | 0         |  |
| Side of Survey  | Left side of road |  |                          |           |  |
| Items   | symbol            | equation                                 | Unit                     | Quantity  | Remarks  |
| <b>(1) Disaster Frequency and Magnitude</b>   |                   |  |                          |           |  |
| <b>1-1) Potential frequency of road closure disasters</b>   | FRCDp             |  | nos. per year            | 0.000     | evaluated in sheet 2   |
| 1-2-1) Coefficient for volume estimation (method of dimension setting for collapsible material)   | a                 |  |                          |           | 1-2-1) When dimensions of collapsible materials cannot be predicted, no input should be selected. And "Volume of collapsible material" is estimated by Figure 3.15 in the Guide and is directly inputted in the yellow cell below. |
| 1-2-2) Length of collapsible materials  | b                 |  | m                        |           |  |
| 1-2-3) Width of collapsible materials   | c                 |  | m                        |           |  |
| 1-2-4) Depth of collapsible materials   | d                 |  | m                        |           |  |
| 1-2-5) Volume of collapsible materials per RCD  | e                 | $e=a*b*c*d$                              | m <sup>3</sup> per RCD   | 0         |  |
| 1-2-6) Ratio of accumulation to collapsible materials   | f                 |  | ratio                    |           | 1-2-6) Evaluated by the Figure 3.16 of the Guide   |
| <b>1-2) Accumulation volume on the road per RCD</b>   | g                 | $g=e*f$                                  | m <sup>3</sup> per RCD   | 0         |  |
| <b>(2) Annual Losses without Countermeasure</b>   |                   |  |                          |           |  |
| 2-1-1) Reopening cost per accumulation volume of road closure site (excluding fixed cost)   | h                 |  | pesos per m <sup>3</sup> |           | refer 3.4.2 (2) 1-1) of the Guide  |
| Fixed cost for reopening per RCD  | i                 |  | pesos per RCD            |           |  |
| <b>2-1) Annual reopening cost</b>   | j                 | $j=FRCDp*(h+i)$                          | pesos per year           | 0         | refer 3.4.2 (2) 1-1) of the Guide  |
| 2-2-1) Average number of human deaths per RCD   | k                 | $k=g*oos$                                | ave. deaths per RCD      | 0.006     | refer 3.4.2 (2) 2-1) of the Guide  |
| 2-2-2) Unit value of human life lost (death)  | l                 |  | pesos per human life     | 2,300,000 | refer 3.4.2 (2) 2-2) of the Guide  |
| <b>2-2) Annual value of human lives lost</b>  | m                 | $m=FRCDp*k*l$                            | pesos per year           | 0         | refer 3.4.2 (2) 2-2) of the Guide  |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road)  | n                 |  | km                       |           | refer 3.4.2 (2) 3-1) of the Guide  |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)   | o                 |  | km                       |           | refer 3.4.2 (2) 3-2) of the Guide  |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site  | p                 |  | vehicles per day         |           | refer 3.4.2 (2) 3-3) of the Guide  |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD   | q                 |  | days                     |           | refer 3.4.2 (2) 3-4) of the Guide  |
| 2-3-4) Average Vehicle Operating Cost per km on survey road   | r                 |  | pesos per vehicle*km     |           | refer 3.4.2 (2) 3-5) of the Guide  |
| Average Vehicle Operating Cost per km on detour road  | s                 |  | pesos per vehicle*km     |           | refer 3.4.2 (2) 3-5) of the Guide  |
| <b>2-3) Annual detour cost</b>  | t                 | $t=FRCDp*p*q*(o*s+n*r)$                  | pesos per year           | 0         | refer 3.4.2 (2) 3-5) of the Guide  |
| <b>Total Annual Loss</b>  | u                 | $u=j+m+t$                                | pesos per year           | 0         | refer 3.4.2 (2) of the Guide   |
| <b>(3) Feasibility Indicators of Countermeasures</b>  |                   |  |                          |           |  |
| <b>Countermeasure alternative I</b>   |                   |  |                          |           |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v I               |  | pesos                    | 0         | evaluated in sheet 4   |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w I               |  | ratio                    |           | refer 3.4.2 (3) 2-2) of the Guide  |
| 3-3) Decrease in annual loss due to countermeasure  | x I               | $x I = u * w I$                          | pesos per year           | 0         | refer 3.4.2 (3) 2-3) of the Guide  |
| <b>Potential frequency of road closure disaster with countermeasure</b>   | FRCDpwc I         | $FRCDpwc I = FRCDp*(1 - w I)$            | ratio                    | 0.000     |  |
| <b>Benefit/cost ratio at 15% discount rate</b>  | BCR I             |  | ratio                    | #DIV/0!   | refer 3.4.2 (3) 3-4) of the Guide  |
| <b>Economic net present value at 15% discount rate</b>  | ENPV I            |  | pesos                    | 0         |  |
| <b>Economic internal rate of return</b>   | EIRR I            |  | percent                  | #NUM!     |  |
| <b>Countermeasure alternative II</b>  |                   |  |                          |           |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v II              |  | pesos                    | 0         | evaluated in sheet 4   |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w II              |  | ratio                    |           | refer 3.4.2 (3) 2-2) of the Guide  |
| 3-3) Decrease in annual loss due to countermeasure  | x II              | $x II = u * w II$                        | pesos per year           | 0         | refer 3.4.2 (3) 2-3) of the Guide  |
| <b>Potential frequency of road closure disaster with countermeasure</b>   | FRCDpwc II        | $FRCDpwc II = FRCDp*(1 - w II)$          | nos. per year            | 0.000     |  |
| <b>Benefit/cost ratio at 15% discount rate</b>  | BCR II            |  | ratio                    | #DIV/0!   | refer 3.4.2 (3) 3-4) of the Guide  |
| <b>Economic net present value at 15% discount rate</b>  | ENPV II           |  | pesos                    | 0         |  |
| <b>Economic internal rate of return</b>   | EIRR II           |  | percent                  | #NUM!     |  |
| <b>Countermeasure alternative III</b>   |                   |  |                          |           |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v III             |  | pesos                    | 0         | evaluated in sheet 4   |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w III             |  | ratio                    |           | refer 3.4.2 (3) 2-2) of the Guide  |
| 3-3) Decrease in annual loss due to countermeasure  | x III             | $x III = u * w III$                      | pesos per year           | 0         | refer 3.4.2 (3) 2-3) of the Guide  |
| <b>Potential frequency of road closure disaster with countermeasure</b>   | FRCDpwc III       | $FRCDpwc III = FRCDp*(1 - w III)$        | nos. per year            | 0.000     |  |
| <b>Benefit/cost ratio at 15% discount rate</b>  | BCR III           |  | ratio                    | #DIV/0!   | refer 3.4.2 (3) 3-4) of the Guide  |
| <b>Economic net present value at 15% discount rate</b>  | ENPV III          |  | pesos                    | 0         |  |
| <b>Economic internal rate of return</b>   | EIRR III          |  | percent                  | #NUM!     |  |
| <p>Note</p> <p><span style="background-color: #FFDAB9; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Numerical value or terms should be inputted</p> <p><span style="background-color: #D9F7D9; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Numerical value is automatically inputted</p> |                   |  |                          |           |  |

Inventory Sheet 5-2

Indicative Feasibility Assessment for RC

| Items   | symbol                                       | equation                          | Unit                     | Quantity  | Remarks  |  |  |  |  |
|---|--|-----------------------------------|--------------------------|-----------|--|--|--|--|--|
| Road Name   |  |                                   |                          | 0         |  |  |  |  |  |
| Km station from   |  |                                   | km                       | 0         | m  |  |  |  |  |
| Side of Survey  |  |                                   |                          | 0         |  |  |  |  |  |
| <b>(1) Disaster Frequency and Magnitude</b>   |  |                                   |                          |           |  |  |  |  |  |
| <b>1-1) Potential frequency of road closure disasters</b>   | FRCDp  |                                   | nos. per year            | 0.000     | evaluated in sheet 2   |  |  |  |  |
| 1-2-1) Coefficient for volume estimation (method of dimension setting for collapsible material)   | a  |                                   |                          |           | 1-2-1) When dimensions of collapsible materials cannot be predicted, 'no input' should be selected. And 'Volume of collapsible material' is estimated by Figure 3.11 in the Guide and is directly inputted in the yellow cell below. |  |  |  |  |
| 1-2-2) Length of collapsible materials  | b  |                                   | m                        |           |  |  |  |  |  |
| 1-2-3) Width of collapsible materials   | c  |                                   | m                        |           |  |  |  |  |  |
| 1-2-4) Depth of collapsible materials   | d  |                                   | m                        |           |  |  |  |  |  |
| 1-2-5) Volume of collapsible materials per RCD  | e  | $e=a*b*c*d$                       | m <sup>3</sup> per RCD   | 0         |  |  |  |  |  |
| 1-2-6) Ratio of accumulation to collapsible materials   | f  |                                   | ratio                    |           | 1-2-6) Evaluated by the Figure 3.16 of the Guide   |  |  |  |  |
| 1-2) Accumulation volume on the road per RCD  | g  | $g=e*f$                           | m <sup>3</sup> per RCD   | 0         |  |  |  |  |  |
| <b>(2) Annual Losses without Countermeasure</b>   |  |                                   |                          |           |  |  |  |  |  |
| 2-1-1) Reopening cost per accumulation volume of road closure site (excluding fixed cost)   | h  |                                   | pesos per m <sup>3</sup> |           | refer 3.4.2.2(1-1) of the Guide  |  |  |  |  |
| Fixed cost for reopening per RCD  | i  |                                   | pesos per RCD            |           |  |  |  |  |  |
| 2-1) Annual reopening cost  | j  | $j=FRCDp*(h*i)$                   | pesos per year           | 0         | refer 3.4.3(2-1) of the Guide  |  |  |  |  |
| 2-2-1) Average number of human deaths per RCD   | k  | $k=0.006$                         | ave. death per RCD       | 0.006     | refer 3.4.2(2) 2-2-1) of the Guide   |  |  |  |  |
| 2-2-2) Unit value of human life lost (death)  | l  |                                   | pesos per human life     | 2,300,000 | refer 3.4.2(2) 2-2-2) of the Guide   |  |  |  |  |
| 2-2) Annual value of human lives lost   | m  | $m=FRCDp*k*l$                     | pesos per year           | 0         | refer 3.4.2(2) 2-2) of the Guide   |  |  |  |  |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road)  | n  |                                   | km                       |           | refer 3.4.2(2) 2-3-1) of the Guide   |  |  |  |  |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)   | o  |                                   | km                       |           | refer 3.4.2(2) 2-3-2) of the Guide   |  |  |  |  |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site  | p  |                                   | vehicles per day         |           | refer 3.4.2(2) 2-3-3) of the Guide   |  |  |  |  |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD   | q  |                                   | days                     |           | refer 3.4.2(2) 2-3-4) of the Guide   |  |  |  |  |
| 2-3-4) Average Vehicle Operating Cost per km on survey road   | r  |                                   | pesos per vehicle*km     |           | refer 3.4.2(2) 2-3-5) of the Guide   |  |  |  |  |
| Average Vehicle Operating Cost per km on detour road  | s  |                                   | pesos per vehicle*km     |           |  |  |  |  |  |
| 2-3) Annual detour cost   | t  | $t=FRCDp*p*q*(o*s+n*r)$           | pesos per year           | 0         | refer 3.4.2(2) 2-3) of the Guide   |  |  |  |  |
| <b>Total Annual Loss</b>  | u  | $u=j+m+t$                         | pesos per year           | 0         | refer 3.4.3(2) of the Guide  |  |  |  |  |
| <b>(3) Feasibility Indicators of Countermeasures</b>  |  |                                   |                          |           |  |  |  |  |  |
| <b>Countermeasure alternative I</b>   |  |                                   |                          |           |  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v I  |                                   | pesos                    | 0         | evaluated in sheet 4   |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w I  |                                   | ratio                    |           | refer 3.4.2(3) 3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x I  | $x I = u * w I$                   | pesos per year           | 0         | refer 3.4.2(3) 3-3) of the Guide   |  |  |  |  |
| Potential frequency of road closure disaster with countermeasure  | FRCDpwc I                                    | $FRCDpwc I = FRCDp*(1 - w I)$     | ratio                    | 0.000     | refer 3.4.2(3) 3-4) of the Guide   |  |  |  |  |
| Benefit/cost ratio at 15% discount rate   | BCR I  |                                   | ratio                    | #DIV/0!   |  |  |  |  |  |
| Economic net present value at 15% discount rate   | ENPV I                                       |                                   | pesos                    | 0         | refer 3.4.2(3) of the Guide  |  |  |  |  |
| Economic internal rate of return  | EIRR I                                       |                                   | percent                  | #NUM!     |  |  |  |  |  |
| <b>Countermeasure alternative II</b>  |  |                                   |                          |           |  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v II   |                                   | pesos                    | 0         | evaluated in sheet 4   |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w II   |                                   | ratio                    |           | refer 3.4.2(3) 3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x II   | $x II = u * w II$                 | pesos per year           | 0         | refer 3.4.2(3) 3-3) of the Guide   |  |  |  |  |
| Potential frequency of road closure disaster with countermeasure  | FRCDpwc II                                   | $FRCDpwc II = FRCDp*(1 - w II)$   | ratio                    | 0.000     |  |  |  |  |  |
| Benefit/cost ratio at 15% discount rate   | BCR II                                       |                                   | ratio                    | #DIV/0!   | refer 3.4.2(3) 3-4) of the Guide   |  |  |  |  |
| Economic net present value at 15% discount rate   | ENPV II                                      |                                   | pesos                    | 0         |  |  |  |  |  |
| Economic internal rate of return  | EIRR II                                      |                                   | percent                  | #NUM!     |  |  |  |  |  |
| <b>Countermeasure alternative III</b>   |  |                                   |                          |           |  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v III  |                                   | pesos                    | 0         | evaluated in sheet 4   |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w III  |                                   | ratio                    |           | refer 3.4.2(3) 3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x III  | $x III = u * w III$               | pesos per year           | 0         | refer 3.4.2(3) 3-3) of the Guide   |  |  |  |  |
| Potential frequency of road closure disaster with countermeasure  | FRCDpwc III                                  | $FRCDpwc III = FRCDp*(1 - w III)$ | ratio                    | 0.000     |  |  |  |  |  |
| Benefit/cost ratio at 15% discount rate   | BCR III                                      |                                   | ratio                    | #DIV/0!   | refer 3.4.2(3) of the Guide  |  |  |  |  |
| Economic net present value at 15% discount rate   | ENPV III                                     |                                   | pesos                    | 0         |  |  |  |  |  |
| Economic internal rate of return  | EIRR III                                     |                                   | percent                  | #NUM!     |  |  |  |  |  |
| <p>Note</p> <table border="1"> <tr> <td style="background-color: #cccccc;"></td> <td>Numerical value or terms should be inputted.</td> </tr> <tr> <td style="background-color: #e0e0e0;"></td> <td>Numerical value is automatically inputted.</td> </tr> </table> |  |                                   |                          |           |  |  | Numerical value or terms should be inputted. |  | Numerical value is automatically inputted. |
|   | Numerical value or terms should be inputted. |                                   |                          |           |  |  |  |  |  |
|   | Numerical value is automatically inputted.   |                                   |                          |           |  |  |  |  |  |

**Inventory Sheet 5-3**

**Indicative Feasibility Assessment for LS**

| Items   | symbol                                       | equation                          | Unit                 | Quantity  | Remark                              |   |  |   |  |
|---|--|-----------------------------------|----------------------|-----------|-------------------------------------|---|--|---|--|
| Road Name   | 0  |                                   |                      |           |                                     |   |  |   |  |
| Km station from   |  |                                   | km                   | 0         | m 0                                 |   |  |   |  |
| Side of survey  |  |                                   |                      |           | Right side of road                  |   |  |   |  |
| <b>(1) Disaster Frequency and Magnitude</b>   |  |                                   |                      |           |                                     |   |  |   |  |
| <i>1-1) Potential frequency of road closure disaster</i>  | FRCDp  |                                   | nos. per year        | 0.010     | sheet 2                             |   |  |   |  |
| <i>1-2) Length of road closure site</i>   | LRC  |                                   | m                    |           | refer 3.4.2 1-2) of the Guide       |   |  |   |  |
| <b>(2) Annual Losses Without Countermeasure</b>   |  |                                   |                      |           |                                     |   |  |   |  |
| 2-1-1) Reopening cost per length of road closure site (excluding fixed cost)  | h  |                                   | pesos per m          |           | refer 3.4.2 2-1-1) of the Guide     |   |  |   |  |
| Fixed cost for reopening per RCD  | i  |                                   | pesos per RCD        |           |                                     |   |  |   |  |
| 2-1) Annual reopening cost  | j  | $j=FRCDp*(h*LRC+i)$               | pesos per year       | 0         | refer 3.4.3 2-1) of the Guide       |   |  |   |  |
| 2-2-1) Average number of human deaths per RCD   | k  | $k=0.006$                         | ans. death per RCD   | 0.006     | refer 3.4.2 (2) 2-2-1) of the Guide |   |  |   |  |
| 2-2-2) Unit value of human life lost (death)  | l  |                                   | pesos per human life | 2,300,000 | refer 3.4.2 (2) 2-2-2) of the Guide |   |  |   |  |
| 2-2) Annual value of human lives lost   | m  | $m=FRCDp*k*l$                     | pesos per year       | 138       | refer 3.4.2 (2) 2-2) of the Guide   |   |  |   |  |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road)  | n  |                                   | km                   |           | refer 3.4.2 (2) 2-3-1) of the Guide |   |  |   |  |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)   | o  |                                   | km                   |           | refer 3.4.2 (2) 2-3-2) of the Guide |   |  |   |  |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site  | p  |                                   | vehicles per day     |           | refer 3.4.2 (2) 2-3-3) of the Guide |   |  |   |  |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD   | q  |                                   | days                 |           | refer 3.4.2 (2) 2-3-4) of the Guide |   |  |   |  |
| 2-3-4) Average Vehicle Operating Cost per km on survey road   | r  |                                   | pesos per vehicle*km |           | refer 3.4.2 (2) 2-3-5) of the Guide |   |  |   |  |
| Average Vehicle Operating Cost per km on detour road  | s  |                                   | pesos per vehicle*km |           |                                     |   |  |   |  |
| 2-3) Annual detour cost   | t  | $t=FRCDp*p*q*(o*s+n*r)$           | pesos per year       | 0         | refer 3.4.2 (2) 2-3) of the Guide   |   |  |   |  |
| <b>Total Annual Loss</b>  | u  | $u=j+m+t$                         | pesos per year       | 138       | refer 3.4.2 (2) of the Guide        |   |  |   |  |
| <b>(3) Feasibility Indicators of Countermeasures</b>  |  |                                   |                      |           |                                     |   |  |   |  |
| <i>Countermeasure alternative I</i>   |  |                                   |                      |           |                                     |   |  |   |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v I  |                                   | pesos                | 0         | evaluated in sheet 4                |   |  |   |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w I  |                                   | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |   |  |   |  |
| 3-3) Decrease in annual loss due to countermeasure  | x I  | $x I = u * w I$                   | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |   |  |   |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc I                                    | $FRCDpwc I = FRCDp*(1 - w I)$     | nos. per year        | 0.010     |                                     |   |  |   |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR I  |                                   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |   |  |   |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV I                                       |                                   | pesos                | 0         |                                     |   |  |   |  |
| <i>Economic internal rate of return</i>   | EIRR I                                       |                                   | percent              | #NUM!     |                                     |   |  |   |  |
| <i>Countermeasure alternative II</i>  |  |                                   |                      |           |                                     |   |  |   |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v II   |                                   | pesos                | 0         | evaluated in sheet 4                |   |  |   |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w II   |                                   | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |   |  |   |  |
| 3-3) Decrease in annual loss due to countermeasure  | x II   | $x II = u * w II$                 | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |   |  |   |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc II                                   | $FRCDpwc II = FRCDp*(1 - w II)$   | nos. per year        | 0.010     |                                     |   |  |   |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR II                                       |                                   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |   |  |   |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV II                                      |                                   | pesos                | 0         |                                     |   |  |   |  |
| <i>Economic internal rate of return</i>   | EIRR II                                      |                                   | percent              | #NUM!     |                                     |   |  |   |  |
| <i>Countermeasure alternative III</i>   |  |                                   |                      |           |                                     |   |  |   |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v III  |                                   | pesos                | 0         | evaluated in sheet 4                |   |  |   |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w III  |                                   | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |   |  |   |  |
| 3-3) Decrease in annual loss due to countermeasure  | x III  | $x III = u * w III$               | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |   |  |   |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc III                                  | $FRCDpwc III = FRCDp*(1 - w III)$ | nos. per year        | 0.010     |                                     |   |  |   |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR III                                      |                                   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |   |  |   |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV III                                     |                                   | pesos                | 0         |                                     |   |  |   |  |
| <i>Economic internal rate of return</i>   | EIRR III                                     |                                   | percent              | #NUM!     |                                     |   |  |   |  |
| <p>Note</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><div style="background-color: #f0f0f0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div></td> <td style="border: none;">Numerical value or terms should be inputted.</td> </tr> <tr> <td style="border: none;"><div style="background-color: #e0ffe0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div></td> <td style="border: none;">Numerical value is automatically inputted.</td> </tr> </table> |  |                                   |                      |           |                                     | <div style="background-color: #f0f0f0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> | Numerical value or terms should be inputted. | <div style="background-color: #e0ffe0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> | Numerical value is automatically inputted. |
| <div style="background-color: #f0f0f0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>   | Numerical value or terms should be inputted. |                                   |                      |           |                                     |   |  |   |  |
| <div style="background-color: #e0ffe0; border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>   | Numerical value is automatically inputted.   |                                   |                      |           |                                     |   |  |   |  |

Inventory Sheet 5-4

Indicative Feasibility Assessment for RS

| Items  | symbol      | equation                              | Unit                 | Quantity  | Remark                             |
|--|-------------|---------------------------------------|----------------------|-----------|------------------------------------|
| Road Name  | 0           |                                       |                      |           |                                    |
| Km station from  |             |                                       | km                   | 0         | m 0                                |
| Side of survey   | 0           |                                       |                      |           |                                    |
| <b>(1) Disaster Frequency and Magnitude</b>  |             |                                       |                      |           |                                    |
| 1-1) Potential frequency of road closure disaster  | FRCDp       |                                       | nos. per year        | 0.000     | sheet 2                            |
| 1-2) Length of road closure site   | LRC         |                                       | m                    |           | refer 3.4.2.1-2) of the Guide      |
| <b>(2) Annual Losses Without Countermeasure</b>  |             |                                       |                      |           |                                    |
| 2-1-1) Reopening cost per length of road closure site (excluding fixed cost)                                     | h           |                                       | pesos per m          |           | refer 3.4.2.2-1-1) of the Guide    |
| Fixed cost for reopening per RCD   | i           |                                       | pesos per RCD        |           |                                    |
| 2-1) Annual reopening cost   | j           | $j = FRCDp * (h * LRC + i)$           | pesos per year       | 0         | refer 3.4.3.2-1) of the Guide      |
| 2-2-1) Average number of human deaths per RCD  | k           | $k = 0.006$                           | ave. death per RCD   | 0.006     | refer 3.4.2(2) 2-2-1) of the Guide |
| 2-2-2) Unit value of human life lost (death)   | l           |                                       | pesos per human life | 2,300,000 | refer 3.4.2(2) 2-2-2) of the Guide |
| 2-2) Annual value of human lives lost  | m           | $m = FRCDp * k * l$                   | pesos per year       | 0         | refer 3.4.2(2) 2-2-3) of the Guide |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road) | n           |                                       | km                   |           | refer 3.4.2(2) 2-3-1) of the Guide |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)        | o           |                                       | km                   |           | refer 3.4.2(2) 2-3-2) of the Guide |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site   | p           |                                       | vehicles per day     |           | refer 3.4.2(2) 2-3-3) of the Guide |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD                  | q           |                                       | days                 |           | refer 3.4.2(2) 2-3-4) of the Guide |
| 2-3-4) Average Vehicle Operating Cost per km on survey road  | r           |                                       | pesos per vehicle*km |           | refer 3.4.2(2) 2-3-5) of the Guide |
| Average Vehicle Operating Cost per km on detour road   | s           |                                       | pesos per vehicle*km |           |                                    |
| 2-3) Annual detour cost  | t           | $t = FRCDp * p * q * (o * s - n * r)$ | pesos per year       | 0         | refer 3.4.2(2) 2-3-6) of the Guide |
| <b>Total Annual Loss</b>   | u           | $u = j + m + t$                       | pesos per year       | 0         | refer 3.4.2(2) of the Guide        |
| <b>(3) Feasibility Indicators of Countermeasures</b>   |             |                                       |                      |           |                                    |
| <b>Countermeasure alternative I</b>  |             |                                       |                      |           |                                    |
| 3-1) Cost of countermeasure with 20 years maintenance  | v I         |                                       | pesos                | 0         | evaluated in sheet 4               |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w I         |                                       | ratio                |           | refer 3.4.2(3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x I         | $x I = u * w I$                       | pesos per year       | 0         | refer 3.4.2(3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwe I   | $FRCDpwe I = FRCDp * (1 - w I)$       | nos. per year        | 0.000     |                                    |
| Benefit/cost ratio at 15% discount rate  | BCR I       |                                       | ratio                | #DIV/0!   | refer 3.4.2(3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV I      |                                       | pesos                | 0         |                                    |
| Economic internal rate of return   | EIRR I      |                                       | percent              | #NUM!     |                                    |
| <b>Countermeasure alternative II</b>   |             |                                       |                      |           |                                    |
| 3-1) Cost of countermeasure with 20 years maintenance  | v II        |                                       | pesos                | 0         | evaluated in sheet 4               |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w II        |                                       | ratio                |           | refer 3.4.2(3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x II        | $x II = u * w II$                     | pesos per year       | 0         | refer 3.4.2(3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwe II  | $FRCDpwe II = FRCDp * (1 - w II)$     | nos. per year        | 0.000     |                                    |
| Benefit/cost ratio at 15% discount rate  | BCR II      |                                       | ratio                | #DIV/0!   | refer 3.4.2(3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV II     |                                       | pesos                | 0         |                                    |
| Economic internal rate of return   | EIRR II     |                                       | percent              | #NUM!     |                                    |
| <b>Countermeasure alternative III</b>  |             |                                       |                      |           |                                    |
| 3-1) Cost of countermeasure with 20 years maintenance  | v III       |                                       | pesos                | 0         | evaluated in sheet 4               |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w III       |                                       | ratio                |           | refer 3.4.2(3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x III       | $x III = u * w III$                   | pesos per year       | 0         | refer 3.4.2(3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwe III | $FRCDpwe III = FRCDp * (1 - w III)$   | nos. per year        | 0.000     |                                    |
| Benefit/cost ratio at 15% discount rate  | BCR III     |                                       | ratio                | #DIV/0!   | refer 3.4.2(3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV III    |                                       | pesos                | 0         |                                    |
| Economic internal rate of return   | EIRR III    |                                       | percent              | #NUM!     |                                    |

Note

|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |



**Inventory Sheet 5-5**

**Indicative Feasibility Assessment for DF**

|                 |                    |   |   |
|-----------------|--------------------|---|---|
| Road Name       | 0                  |   |   |
| Km station from | km                 | 0 | m |
| Side of survey  | Right side of road |   |   |

| Items  | symbol      | equation  | Unit                 | Quantity  | Remark                           |
|--|-------------|---|----------------------|-----------|----------------------------------|
| <b>(1) Disaster Frequency and Magnitude</b>  |             |   |                      |           |                                  |
| 1-1) Potential frequency of road closure disaster  | FRCDp       |   | nos. per year        | 0.060     | sheet 2                          |
| 1-2) Length of road closure site   | LRC         |   | m                    |           | refer 3.4.2 (1-2) of the Guide   |
| <b>(2) Annual Losses Without Countermeasure</b>  |             |   |                      |           |                                  |
| 2-1-1) Reopening cost per length of road closure site (excluding fixed cost)                                     | h           |   | pesos per m          |           | refer 3.4.2 (2-1-1) of the Guide |
| Fixed cost for reopening per RCD   | i           |   | pesos per RCD        |           |                                  |
| 2-1) Annual reopening cost   | j           | $j = \text{FRCDp} * (h * \text{LRC} + i)$         | pesos per year       |           | refer 3.4.2 (2-1) of the Guide   |
| 2-2-1) Average number of human deaths per RCD  | k           | $k = 0.006$                                       | ave. death per RCD   | 0.006     | refer 3.4.2 (2-2-1) of the Guide |
| 2-2-2) Unit value of human life lost (death)   | l           |   | pesos per human life | 2,300,000 | refer 3.4.2 (2-2-2) of the Guide |
| 2-2) Annual value of human lives lost  | m           | $m = \text{FRCDp} * k * l$                        | pesos per year       | 828       | refer 3.4.2 (2-2) of the Guide   |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road) | n           |   | km                   |           | refer 3.4.2 (2-3-1) of the Guide |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)        | o           |   | km                   |           | refer 3.4.2 (2-3-2) of the Guide |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site   | p           |   | vehicles per day     |           | refer 3.4.2 (2-3-3) of the Guide |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD                  | q           |   | days                 |           | refer 3.4.2 (2-3-4) of the Guide |
| 2-3-4) Average Vehicle Operating Cost per km on survey road  | r           |   | pesos per vehicle*km |           | refer 3.4.2 (2-3-5) of the Guide |
| Average Vehicle Operating Cost per km on detour road   | s           |   | pesos per vehicle*km |           |                                  |
| 2-3) Annual detour cost  | t           | $t = \text{FRCDp} * p * q * (o * s - n * r)$      | pesos per year       | 0         | refer 3.4.2 (2-3) of the Guide   |
| <b>Total Annual Loss</b>   | <b>u</b>    | $u = j + m + t$                                   | pesos per year       | 828       | refer 3.4.2 (2) of the Guide     |
| <b>(3) Feasibility Indicators of Countermeasures</b>   |             |   |                      |           |                                  |
| <b>Countermeasure alternative I</b>  |             |   |                      |           |                                  |
| 3-1) Cost of countermeasure with 20 years maintenance  | v I         |   | pesos                | 0         | evaluated in sheet 4             |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w I         |   | ratio                |           | refer 3.4.2 (3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x I         | $x I = u * w I$                                   | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc I   | $\text{FRCDpwc I} = \text{FRCDp} * (1 - w I)$     | nos. per year        | 0.060     |                                  |
| Benefit/cost ratio at 15% discount rate  | BCR I       |   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |
| Economic net present value at 15% discount rate  | ENPV I      |   | pesos                | 0         |                                  |
| Economic internal rate of return   | EIRR I      |   | percent              | #NUM!     |                                  |
| <b>Countermeasure alternative II</b>   |             |   |                      |           |                                  |
| 3-1) Cost of countermeasure with 20 years maintenance  | v II        |   | pesos                | 0         | evaluated in sheet 4             |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w II        |   | ratio                |           | refer 3.4.2 (3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x II        | $x II = u * w II$                                 | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc II  | $\text{FRCDpwc II} = \text{FRCDp} * (1 - w II)$   | nos. per year        | 0.060     |                                  |
| Benefit/cost ratio at 15% discount rate  | BCR II      |   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |
| Economic net present value at 15% discount rate  | ENPV II     |   | pesos                | 0         |                                  |
| Economic internal rate of return   | EIRR II     |   | percent              | #NUM!     |                                  |
| <b>Countermeasure alternative III</b>  |             |   |                      |           |                                  |
| 3-1) Cost of countermeasure with 20 years maintenance  | v III       |   | pesos                | 0         | evaluated in sheet 4             |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w III       |   | ratio                |           | refer 3.4.2 (3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x III       | $x III = u * w III$                               | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc III | $\text{FRCDpwc III} = \text{FRCDp} * (1 - w III)$ | nos. per year        | 0.060     |                                  |
| Benefit/cost ratio at 15% discount rate  | BCR III     |   | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |
| Economic net present value at 15% discount rate  | ENPV III    |   | pesos                | 0         |                                  |
| Economic internal rate of return   | EIRR III    |   | percent              | #NUM!     |                                  |

Note

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|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

**Inventory Sheet 5-6**

**Indicative Feasibility Assessment for RE**

|                 |    |   |   |
|-----------------|----|---|---|
| Road Name       | 0  |   |   |
| Km station from | km | 0 | m |
| Side of survey  | 0  |   |   |

| Items  | symbol      | equation                              | Unit                 | Quantity  | Remark                              |
|--|-------------|---------------------------------------|----------------------|-----------|-------------------------------------|
| <b>(1) Disaster Frequency and Magnitude</b>  |             |                                       |                      |           |                                     |
| 1-1) Potential frequency of road closure disaster  | FRCDp       |                                       | nos. per year        | 0.009     | sheet 2                             |
| 1-2) Length of road closure site   | LRC         |                                       | m                    |           | refer 3.4.2 1-2) of the Guide       |
| <b>(2) Annual Losses Without Countermeasure</b>  |             |                                       |                      |           |                                     |
| 2-1-1) Reopening cost per length of road closure site (excluding fixed cost)                                     | h           |                                       | pesos per m          |           | refer 3.4.2 2-1-1) of the Guide     |
| Fixed cost for reopening per RCD   | i           |                                       | pesos per RCD        |           |                                     |
| 2-1) Annual reopening cost   | j           | $j = FRCDp * (h * LRC + i)$           | pesos per year       | 0         | refer 3.4.3 2-1) of the Guide       |
| 2-2-1) Average number of human deaths per RCD  | k           | $k = 0.006$                           | nos. death per RCD   | 0.006     | refer 3.4.2 (2) 2-2-1) of the Guide |
| 2-2-2) Unit value of human life lost (death)   | l           |                                       | pesos per human life | 2,300,000 | refer 3.4.3 (2) 2-2-2) of the Guide |
| 2-2) Annual value of human lives lost  | m           | $m = FRCDp * k * l$                   | pesos per year       | 124       | refer 3.4.2 (2) 2-2) of the Guide   |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road) | n           |                                       | km                   |           | refer 3.4.2 (2) 2-3-1) of the Guide |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)        | o           |                                       | km                   |           | refer 3.4.2 (2) 2-3-2) of the Guide |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site   | p           |                                       | vehicles per day     |           | refer 3.4.2 (2) 2-3-3) of the Guide |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD                  | q           |                                       | days                 |           | refer 3.4.2 (2) 2-3-4) of the Guide |
| 2-3-4) Average Vehicle Operating Cost per km on survey road  | r           |                                       | pesos per vehicle*km |           | refer 3.4.2 (2) 2-3-5) of the Guide |
| Average Vehicle Operating Cost per km on detour road   | s           |                                       | pesos per vehicle*km |           |                                     |
| 2-3) Annual detour cost  | t           | $t = FRCDp * p * q * (o * s + n * r)$ | pesos per year       | 0         | refer 3.4.2 (2) 2-3) of the Guide   |
| <b>Total Annual Loss</b>   | <b>u</b>    | $u = j + m + t$                       | pesos per year       | 124       | refer 3.4.2 (2) of the Guide        |
| <b>(3) Feasibility Indicators of Countermeasures</b>   |             |                                       |                      |           |                                     |
| <b>Countermeasure alternative I</b>  |             |                                       |                      |           |                                     |
| 3-1) Cost of countermeasure with 20 years maintenance  | v I         |                                       | pesos                | 0         | evaluated in sheet 4                |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w I         |                                       | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x I         | $x I = u * w I$                       | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc I   | $FRCDpwc I = FRCDp * (1 - wI)$        | nos. per year        | 0.009     |                                     |
| Benefit/cost ratio at 15% discount rate  | BCR I       |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV I      |                                       | pesos                | 0         |                                     |
| Economic internal rate of return   | EIRR I      |                                       | percent              | #NUM!     |                                     |
| <b>Countermeasure alternative II</b>   |             |                                       |                      |           |                                     |
| 3-1) Cost of countermeasure with 20 years maintenance  | v II        |                                       | pesos                | 0         | evaluated in sheet 4                |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w II        |                                       | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x II        | $x II = u * w II$                     | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc II  | $FRCDpwc II = FRCDp * (1 - wII)$      | nos. per year        | 0.009     |                                     |
| Benefit/cost ratio at 15% discount rate  | BCR II      |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV II     |                                       | pesos                | 0         |                                     |
| Economic internal rate of return   | EIRR II     |                                       | percent              | #NUM!     |                                     |
| <b>Countermeasure alternative III</b>  |             |                                       |                      |           |                                     |
| 3-1) Cost of countermeasure with 20 years maintenance  | v III       |                                       | pesos                | 0         | evaluated in sheet 4                |
| 3-2) Risk reduction ratio in RCD due to countermeasure   | w III       |                                       | ratio                |           | refer 3.4.2 (3) 3-2) of the Guide   |
| 3-3) Decrease in annual loss due to countermeasure   | x III       | $x III = u * w III$                   | pesos per year       | 0         | refer 3.4.2 (3) 3-3) of the Guide   |
| Potential frequency of road closure disaster with countermeasure   | FRCDpwc III | $FRCDpwc III = FRCDp * (1 - wIII)$    | nos. per year        | 0.009     |                                     |
| Benefit/cost ratio at 15% discount rate  | BCR III     |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide        |
| Economic net present value at 15% discount rate  | ENPV III    |                                       | pesos                | 0         |                                     |
| Economic internal rate of return   | EIRR III    |                                       | percent              | #NUM!     |                                     |

Note



|  |  |
|--|--|
|  | Numerical value or terms should be inputted. |
|  | Numerical value is automatically inputted.   |

**Inventory Sheet 5-7**

**Indicative Feasibility Assessment for CE**

| Items   | symbol                                       | equation                              | Unit                 | Quantity  | Remark                           |  |  |  |  |
|---|--|---------------------------------------|----------------------|-----------|----------------------------------|--|--|--|--|
| Road Name   | 0  |                                       |                      |           |                                  |  |  |  |  |
| Km station from   |  |                                       | km                   | 0         | m 0                              |  |  |  |  |
| Side of survey  | Right side of road                           |                                       |                      |           |                                  |  |  |  |  |
| <b>(1) Disaster Frequency and Magnitude</b>   |  |                                       |                      |           |                                  |  |  |  |  |
| <i>1-1) Potential frequency of road closure disaster</i>  | FRCDp  |                                       | nos. per year        | 0.000     | sheet 2                          |  |  |  |  |
| <i>1-2) Length of road closure site</i>   | LRC  |                                       | m                    |           | refer 3.4.2 (1-2) of the Guide   |  |  |  |  |
| <b>(2) Annual Losses Without Countermeasure</b>   |  |                                       |                      |           |                                  |  |  |  |  |
| 2-1-1) Reopening cost per length of road closure site (excluding fixed cost)  | h  |                                       | pesos per m          |           | refer 3.4.2 (2-1-1) of the Guide |  |  |  |  |
| Fixed cost for reopening per RCD  | i  |                                       | pesos per RCD        |           |                                  |  |  |  |  |
| 2-1) Annual reopening cost  | j  | $j = FRCDp * (h * LRC + i)$           | pesos per year       | 0         | refer 3.4.2 (2-1) of the Guide   |  |  |  |  |
| 2-2-1) Average number of human deaths per RCD   | k  | $k = 0.006$                           | ave. death per RCD   | 0.006     | refer 3.4.2 (2-2-1) of the Guide |  |  |  |  |
| 2-2-2) Unit value of human life lost (death)  | l  |                                       | pesos per human life | 2,300,000 | refer 3.4.2 (2-2-2) of the Guide |  |  |  |  |
| 2-2) Annual value of human lives lost   | m  | $m = FRCDp * k * l$                   | pesos per year       | 0         | refer 3.4.2 (2-2-2) of the Guide |  |  |  |  |
| 2-3-1) Length of survey road (from entry to exit point of detour road to avoid road closure site on survey road)  | n  |                                       | km                   |           | refer 3.4.2 (2-3-1) of the Guide |  |  |  |  |
| Length of detour road (from entry to exit point of survey road to avoid road closure site on survey road)   | o  |                                       | km                   |           | refer 3.4.2 (2-3-2) of the Guide |  |  |  |  |
| 2-3-2) AADT: Annual Average Daily Traffic on the survey site  | p  |                                       | vehicles per day     |           | refer 3.4.2 (2-3-2) of the Guide |  |  |  |  |
| 2-3-3) Nos. of predicted closure days of the whole width of the road on the survey site per RCD   | q  |                                       | days                 |           | refer 3.4.2 (2-3-3) of the Guide |  |  |  |  |
| 2-3-4) Average Vehicle Operating Cost per km on survey road   | r  |                                       | pesos per vehicle*km |           | refer 3.4.2 (2-3-4) of the Guide |  |  |  |  |
| Average Vehicle Operating Cost per km on detour road  | s  |                                       | pesos per vehicle*km |           |                                  |  |  |  |  |
| 2-3) Annual detour cost   | t  | $t = FRCDp * p * q * (o * s + n * r)$ | pesos per year       | 0         | refer 3.4.2 (2-3) of the Guide   |  |  |  |  |
| <b>Total Annual Loss</b>  | u  | $u = j + m + t$                       | pesos per year       | 0         | refer 3.4.2 (2) of the Guide     |  |  |  |  |
| <b>(3) Feasibility Indicators of Countermeasures</b>  |  |                                       |                      |           |                                  |  |  |  |  |
| <b>Countermeasure alternative I</b>   |  |                                       |                      |           |                                  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v I  |                                       | pesos                | 0         | evaluated in sheet 4             |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w I  |                                       | ratio                |           | refer 3.4.2 (3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x I  | $x I = u * w I$                       | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |  |  |  |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc I                                    | $FRCDpwc I = FRCDp * (1 - wI)$        | nos. per year        | 0.000     |                                  |  |  |  |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR I  |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |  |  |  |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV I                                       |                                       | pesos                | 0         |                                  |  |  |  |  |
| <i>Economic internal rate of return</i>   | EIRR I                                       |                                       | percent              | #NUM!     |                                  |  |  |  |  |
| <b>Countermeasure alternative II</b>  |  |                                       |                      |           |                                  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v II   |                                       | pesos                | 0         | evaluated in sheet 4             |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w II   |                                       | ratio                |           | refer 3.4.2 (3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x II   | $x II = u * w II$                     | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |  |  |  |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc II                                   | $FRCDpwc II = FRCDp * (1 - wII)$      | nos. per year        | 0.000     |                                  |  |  |  |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR II                                       |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |  |  |  |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV II                                      |                                       | pesos                | 0         |                                  |  |  |  |  |
| <i>Economic internal rate of return</i>   | EIRR II                                      |                                       | percent              | #NUM!     |                                  |  |  |  |  |
| <b>Countermeasure alternative III</b>   |  |                                       |                      |           |                                  |  |  |  |  |
| 3-1) Cost of countermeasure with 20 years maintenance   | v III  |                                       | pesos                | 0         | evaluated in sheet 4             |  |  |  |  |
| 3-2) Risk reduction ratio in RCD due to countermeasure  | w III  |                                       | ratio                |           | refer 3.4.2 (3-2) of the Guide   |  |  |  |  |
| 3-3) Decrease in annual loss due to countermeasure  | x III  | $x III = u * w III$                   | pesos per year       | 0         | refer 3.4.2 (3-3) of the Guide   |  |  |  |  |
| <i>Potential frequency of road closure disaster with countermeasure</i>   | FRCDpwc III                                  | $FRCDpwc III = FRCDp * (1 - wIII)$    | nos. per year        | 0.000     |                                  |  |  |  |  |
| <i>Benefit/cost ratio at 15% discount rate</i>  | BCR III                                      |                                       | ratio                | #DIV/0!   | refer 3.4.2 (3) of the Guide     |  |  |  |  |
| <i>Economic net present value at 15% discount rate</i>  | ENPV III                                     |                                       | pesos                | 0         |                                  |  |  |  |  |
| <i>Economic internal rate of return</i>   | EIRR III                                     |                                       | percent              | #NUM!     |                                  |  |  |  |  |
| <p>Note</p> <table border="1"> <tr> <td style="background-color: #FFC0CB;"></td> <td>Numerical value or terms should be inputted.</td> </tr> <tr> <td style="background-color: #ADD8E6;"></td> <td>Numerical value is automatically inputted.</td> </tr> </table> |  |                                       |                      |           |                                  |  | Numerical value or terms should be inputted. |  | Numerical value is automatically inputted. |
|   | Numerical value or terms should be inputted. |                                       |                      |           |                                  |  |  |  |  |
|   | Numerical value is automatically inputted.   |                                       |                      |           |                                  |  |  |  |  |

| Inventory Sheet 6                                 |   | Disaster Record |  |              |
|---|---|-----------------|--|--------------|
| Road Name   | 3   |                 |  |              |
| Station from                                      | km  | 0               | m 0  |              |
| Side of survey                                    | Left side of road   |                 |  |              |
| Name of inspector for disaster record, sheet 6    |   |                 | Survey date (d/m/y)                              |              |
| Name of surveyor                                  |   |                 | Date Month Year                                  |              |
| Disaster Occurrence Date, Hour                    | Hour  | Date            | Month Year                                       |              |
| Length of road closure site                       | Road closure type (Full width/At least one lane is secured) |                 |  |              |
| Disaster station                                  | from  | km              | m until km m                                     |              |
| Reopen Date, Hour at least one lane is secured    | Hour  | Date            | Month Year                                       |              |
| Disaster station                                  | Number of days of full width road closure (days)            |                 |  |              |
| Probable provoking cause of the disaster          |   |                 |  |              |
| Collapsed materials                               |   |                 | Collapsed volume (m <sup>3</sup> )               |              |
| Accumulation volume on the road (m <sup>3</sup> ) | Total reopening cost (pesos)                                |                 | Estimated Actual                                 |              |
| Reopening method (Select from drop down list)     | Soil/Rock removal by manual labour                          |                 |  |              |
| Number of dead persons due to disaster (nos.)     |   |                 | Number of injured persons by the disaster (nos.) |              |
| Existing countermeasure                           | Countermeasure type   | Station         |  |              |
|   |   | from            | km   | m until km m |
|   |   | from            | km   | m until km m |
|   |   | from            | km   | m until km m |
|   |   | from            | km   | m until km m |
|   |   | from            | km   | m until km m |
| Rehabilitation plan (planned, not yet planned)    | Outline of the plan   |                 |  |              |
| Photos/ Sketches and other data                   |   |                 |  |              |

 Numerical value or terms should be inputted.  
 Numerical value is automatically inputted.

Checking and approval of sheet-6

Checked by \_\_\_\_\_

Approved by \_\_\_\_\_