Bio/Geotechnical Engineering Diagnostic Tool (BDT)

Mobile App

User Manual

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1. Introduction

The web android/iOS-based, upgraded version of Bio/Geotechnical Engineering Diagnostic Tool is developed with real time-monitoring enabled dashboard, role-based system login feature, and report generation capabilities.

1.1 Purpose

The purpose of the document is to instruct Field Assessment Personnel on the functionalities of BDT App that is used for reporting the details of the landslide sites. It details the step-by-step procedure of all implemented facilities within the App. It is to be noted that details related to the actual landslide report can also be entered into the system through the Web as well. The main purpose of this application is to provide the user with a mobile interface to fill in the details of the landslide site as well as view the reports submitted. It provides an easy-to-use interface that directly connects the Field Assessor with the BDT web application.

1.2 Target Audience

The Target Audiences of this manual are the *Field Assessment Personnel* of the Department of Roads who will be actively using the developed system to input data and carry out the subsequent analysis. This manual has been prepared to provide step by step instructions to operate the system and the details related to reporting of the landslide site.

2. Login

On opening the app for the first time, the user is asked for their login credentials. The login credentials are saved in the app unless the user logs out of the app. It is to be noted that GPS needs to be turned on while using the mobile application.

- Enter username and password.
- Click on ***Login*** button.

Figure 2-1 Login Page

3. Dashboard

After a successful login, a user is redirected to the dashboard page where they can see the uploaded reports. On the dashboard, a map icon displays the pinned location of the reported landslide.

On the lower section, there is a navigation panel where users can navigate between 'Add New Report' and 'View Map.'

- Click on the ***Form*** button to add new reports.
- Click on the ***Submitted/Verified*** button to view the uploaded forms
- Click on the Three horizontal bar located at the top-right corner to sync the submitted reports and logout of the app.

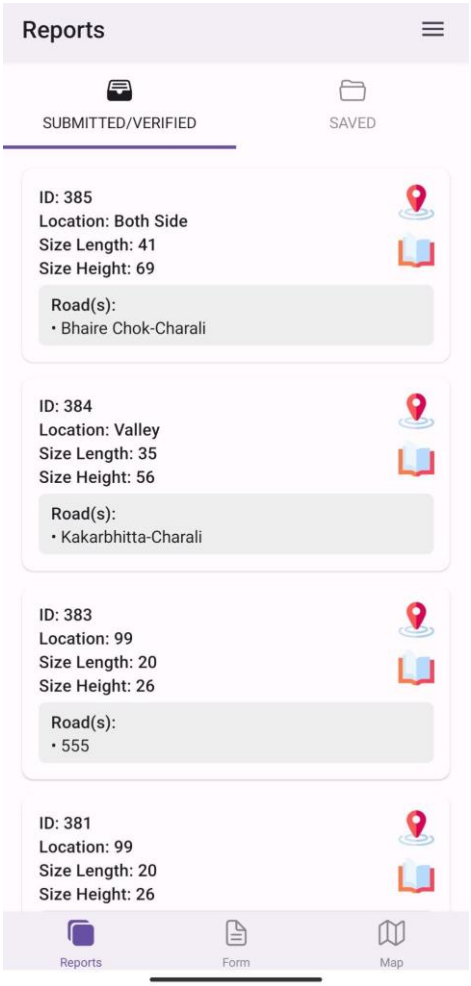


Figure 3-1 Mobile App Dashboard

4. Add Report

- Click on the ***Form*** button.
- The form consists of four pages. Below are the page titles and their respective blocks.

Form 1- *Road Details*

Road Details

Geographical Location

Rainfall

Preliminary Problem Identification

Impacts

Vegetation & Hydrology

Form 2- *Slope Problem*

Failure Geometry

Failure Condition

Form 3- *Erosion Problem*

Sheet/Rill Erosion

Gully Erosion

River Scour

Form 4- *Engineering Environment*

Site Definition, Geomorphology- Geology

LandForm

Geological Zone

Engineering Environment, Existing Bio-Engineering Work

Engineering Work

Testing

Insitu Testing

Laboratory Testing

Pictures/Sketch

- The user has to fill out the "***Road Details***" form on the first page before proceeding to the next page. If the user tries to proceed without filling out all the required fields, a "***Required***" message will appear below the missed field.

- The user can also go back to the next or previous page by clicking on the ***Next*** button or ***Previous*** button.
- To obtain the geographical location, the user needs to stand at the location and click the icon beside the ***latitude and longitude*** form field.
- The input sum of ***Vegetation Cover*** fields must be 100% value. Failure to do so will prevent proceeding to the next page.
- To input multiple blocks of information in the following sections, click on the ***+Add*** button**.**

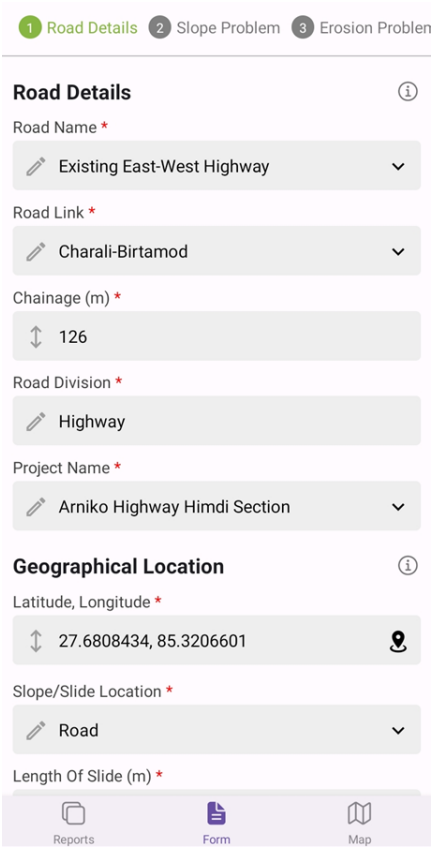
  Preliminary Problem Identification

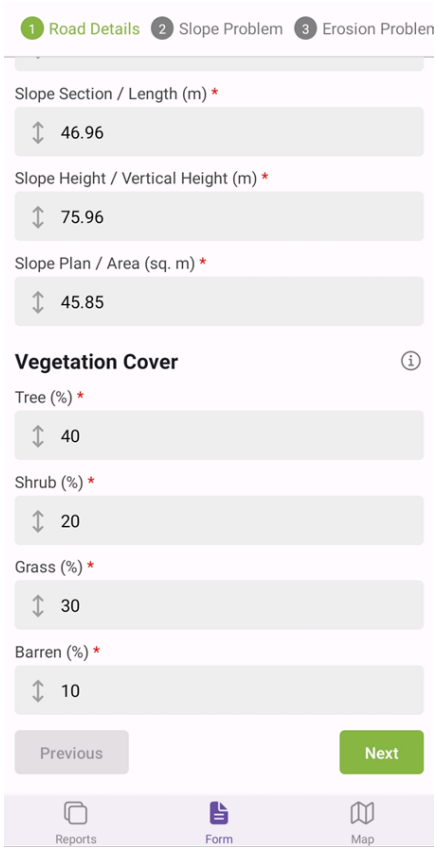
  Discontinuities

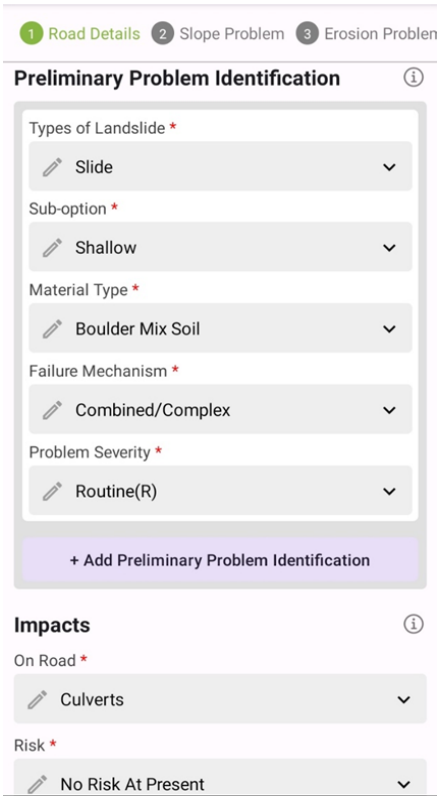
  Engineering Work

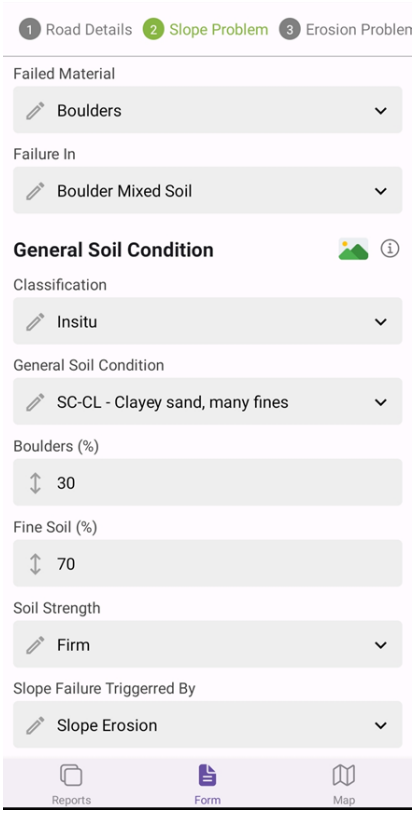
  Insitu Testing

  Laboratory Testing
- The user must enter a 100% value for the **General Soil Condition block Boulders, Fine Soil** fields**,** and ***Soil Matrix block*** fields.
- Users can upload a photo from their camera or gallery by tapping on the ***Slope Pictures/Sketch and References*** field. The user can also write a description in the designated field of the "***Pictures/Sketch***" block.
- Click on the ***Submit Report*** button to save the reported landslide details.
- The newly reported landslide will be saved to the user's local device, and it can be viewed on the **Saved** page.


1 Road Details
2 Slope Problem
3 Erosion Problen
Road Details
Road Name *
Existing East-West Highway
Road Link *
Charali-Birtamod
Chainage (m) *
126
Road Division *
Highway
Project Name *
Arniko Highway Himdi Section
Geographical Location
Latitude, Longitude *
27.6808434, 85.3206601
Slope/Slide Location *
Road
Length Of Slide (m) *
Reports
Form
Map


1 Road Details
2 Slope Problem
3 Erosion Problen
Slope Section / Length (m) *
46.96
Slope Height / Vertical Height (m) *
75.96
Slope Plan / Area (sq. m) *
45.85
Vegetation Cover
Tree (%) *
40
Shrub (%) *
20
Grass (%) *
30
Barren (%) *
10
Previous
Next
Reports
Form
Map


1 Road Details
2 Slope Problem
3 Erosion Problen
Preliminary Problem Identification
Types of Landslide *
Slide
Sub-option *
Shallow
Material Type *
Boulder Mix Soil
Failure Mechanism *
Combined/Complex
Problem Severity *
Routine(R)
+ Add Preliminary Problem Identification
Impacts
On Road *
Culverts
Risk *
No Risk At Present


1 Road Details
2 Slope Problem
3 Erosion Problen
Failed Material
Boulders
Failure In
Boulder Mixed Soil
General Soil Condition
Classification
Insitu
General Soil Condition
SC-CL - Clayey sand, many fines
Boulders (%)
30
Fine Soil (%)
70
Soil Strength
Firm
Slope Failure Triggerred By
Slope Erosion
Reports
Form
Map

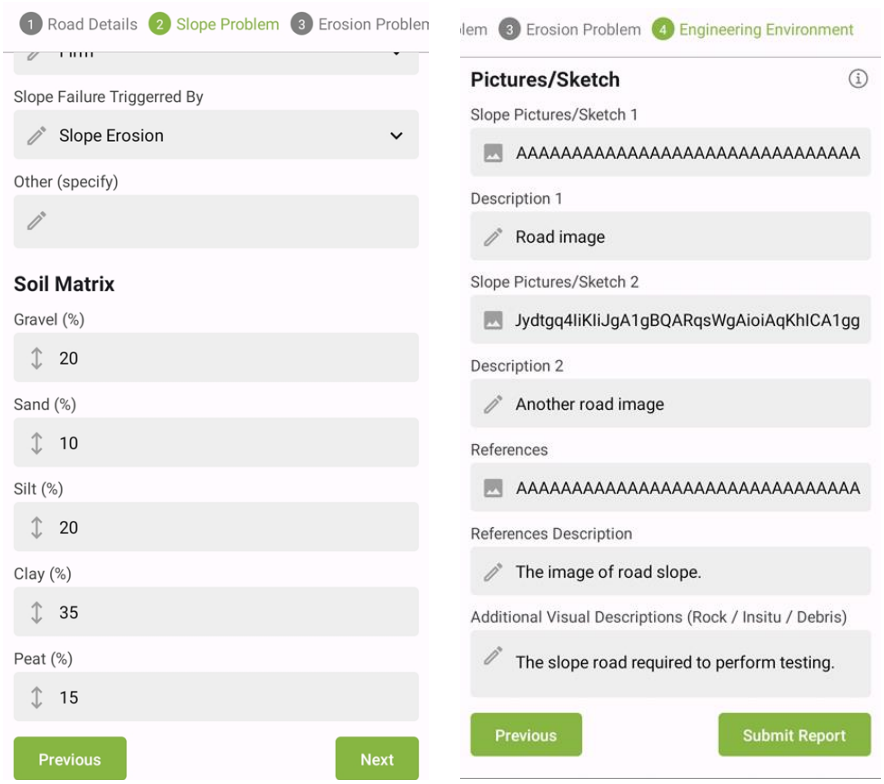


Figure 4-1 Add Report

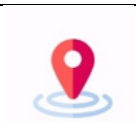
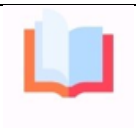
5. Saved

This module includes locally saved records for a landslide that has been reported.

Figure 5-1 Saved Report

There are three distinct actions available in a "**Saved**" module. They are mentioned below:

ICON	Name	Task that will be performed
	Upload	Upload the locally saved report to the BDT server.

	Edit	Open form to edit the landslide record.
	Delete	Delete the form.
	Map	Locate the reported landslide that has been collected by the user.
	Recommendations	Displays the recommendations of the measures that should be applied to the reported landslide.

It consists of an upload button on the bottom right corner which uploads the saved forms to a web application.

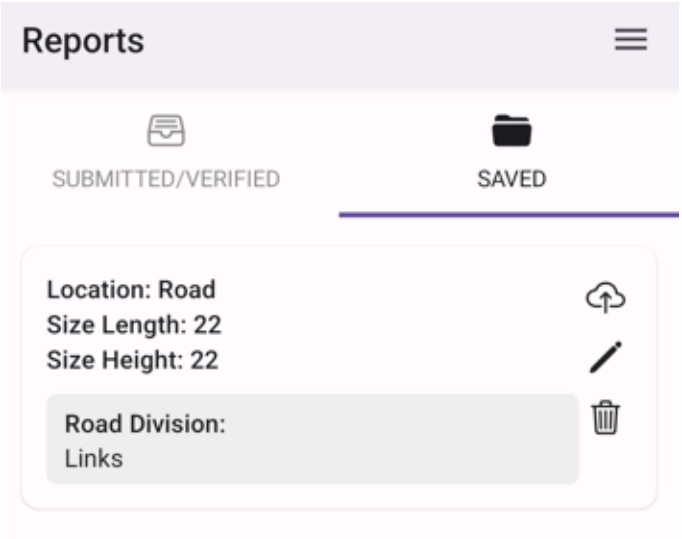


Figure 5-2 Upload Report

Action: Edit

- Click on the ***Edit*** button in the column.
- In the Edit page, users can change/modify already added fields.
- Users can click on the ***Next*** button to view the next page until the ***Submit Report*** button appears.
- Users can also go back to the previous page by clicking on the ***Previous*** button.

- Click on **Back Arrow Icon** to go to the locally saved reports page.
- After Completely filling out the form, the user should click on the ***Submit Report*** button to save the changes made.

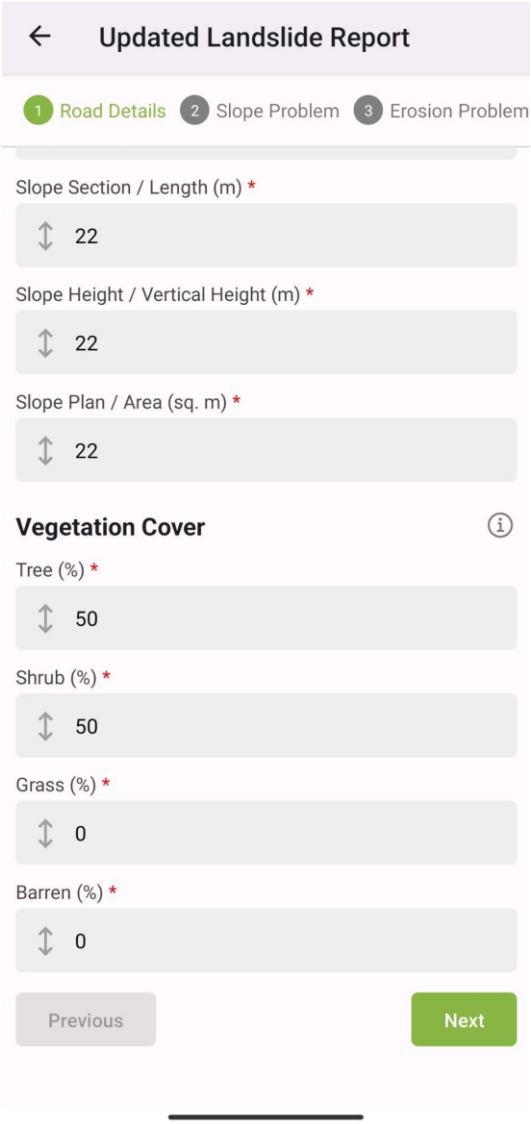


Figure 5-3 Edit Report

Action: View

- On the Dashboard of the **Submitted/Verified** module, to view the submitted reports, the user should click on the perimeter of the report. This will prompt the **Submitted Landslide Report** page to appear.
- Click on the **Back Arrow Icon** to go to the Reported Landslide List page

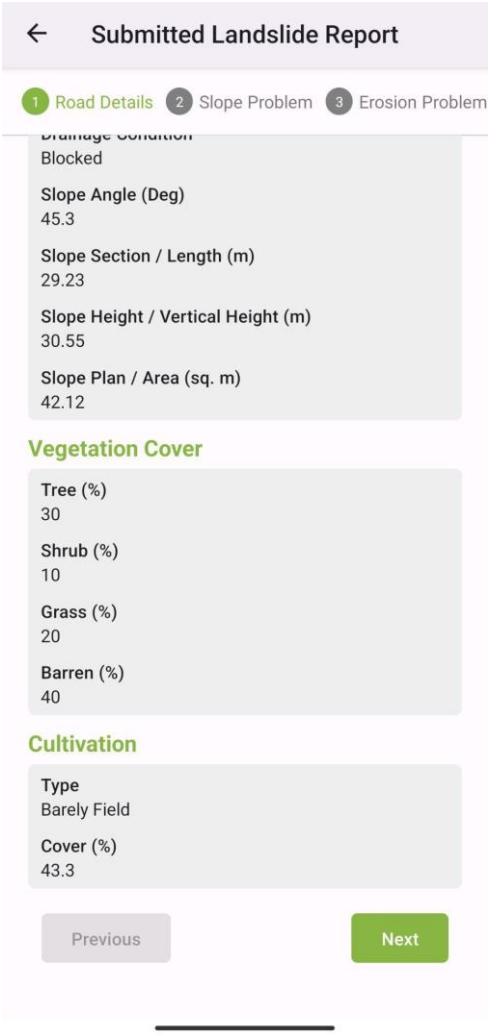


Figure 5-4 View Report

Action: Delete

If the user wants to delete the locally saved report, they can take the following action:

- Navigate to the 'Locally Saved Reports' section that is "**Saved**".
- Locate the report which the user wishes to delete.
- Click on the **Delete** icon associated with the specific report.
- Again, click on the delete to confirm the deletion of the report.

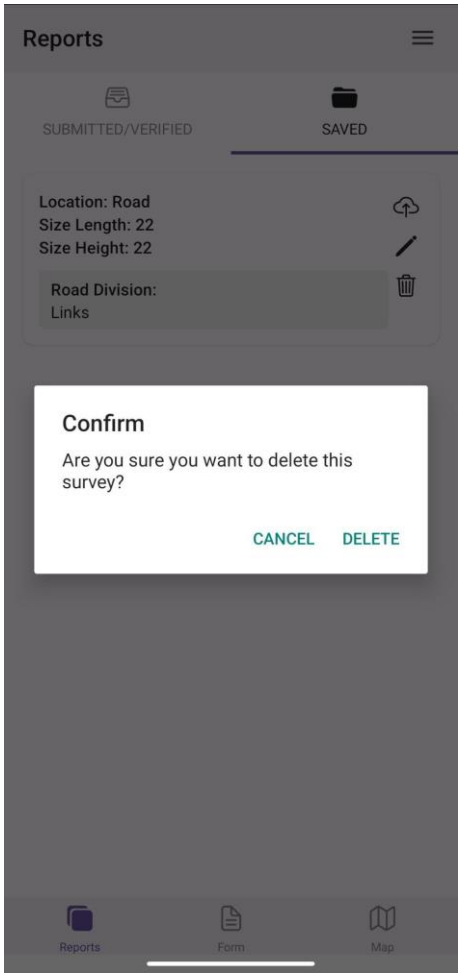


Figure 5-5 Delete Report

Action: Recommendations

The procedures recommend the measures that should be applied to the reported landslide. It suggests what measure should be taken in order to minimize the landslide in the reported area.

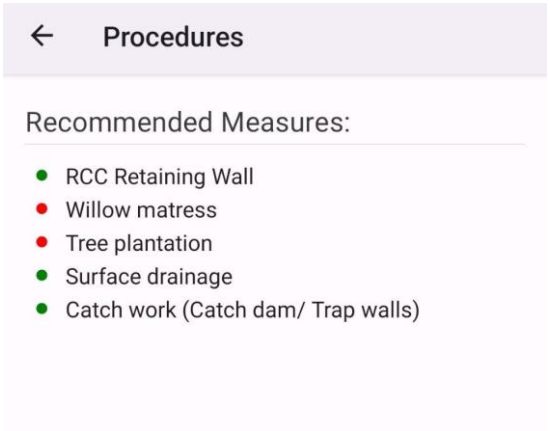


Figure 5-6 Recommended Measures on reported landslide

6. Map

The map interface displays the marked area of the project area. Users can Zoom-in and Zoom-out the map or users can simply pinch-zoom in and out as well.

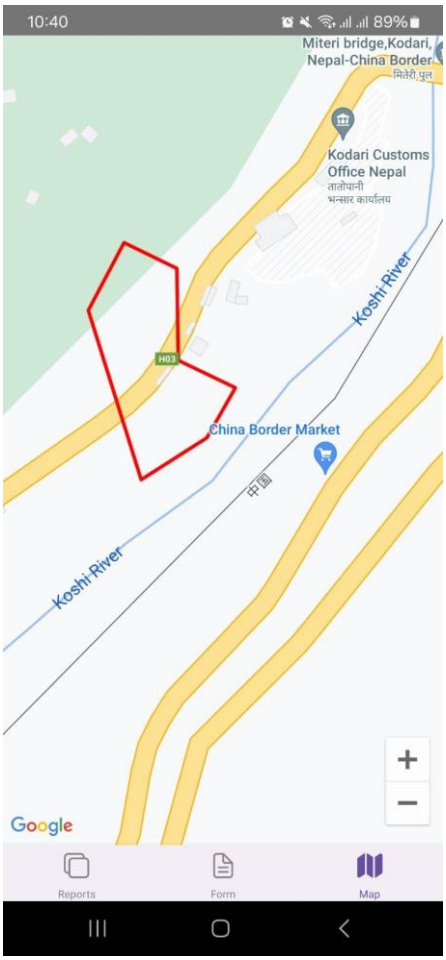


Figure 6-1 Photo Displaying the Project Area

- The map icon which is available in the dashboard, displays the pinned location of the reported landslide that has been collected by the user.

Figure 6-2 Photo Displaying the pinned location of the reported landslide

7. Miscellaneous (Permissions)

When the user is accessing the mobile app for the first time, the user is prompted to allow device location access as “Allow BDT(Beta) to access this device’s location.” The user should select “**While using the app”** to grant access to the location. The user is also prompted to turn on location services at all times while using the mobile application.

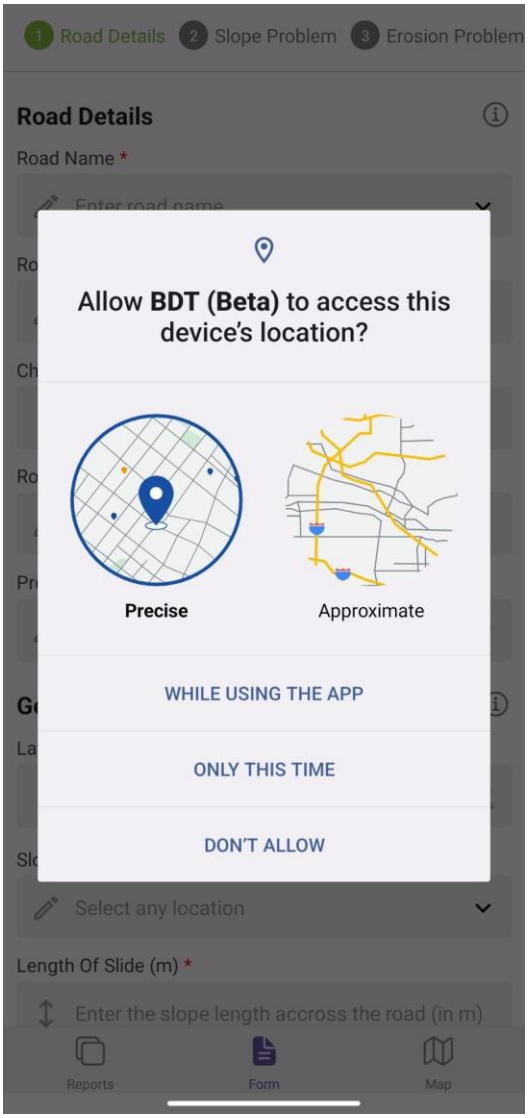


Figure 7-1 Location permissions needed by the App

Allowing photo and media access

Upon accessing the mobile app, the user is prompted to allow device photos and media access as “Allow BDT(Beta) to take pictures and record video”. The user should select **“While Using The App”** to grant access to the photos and media.

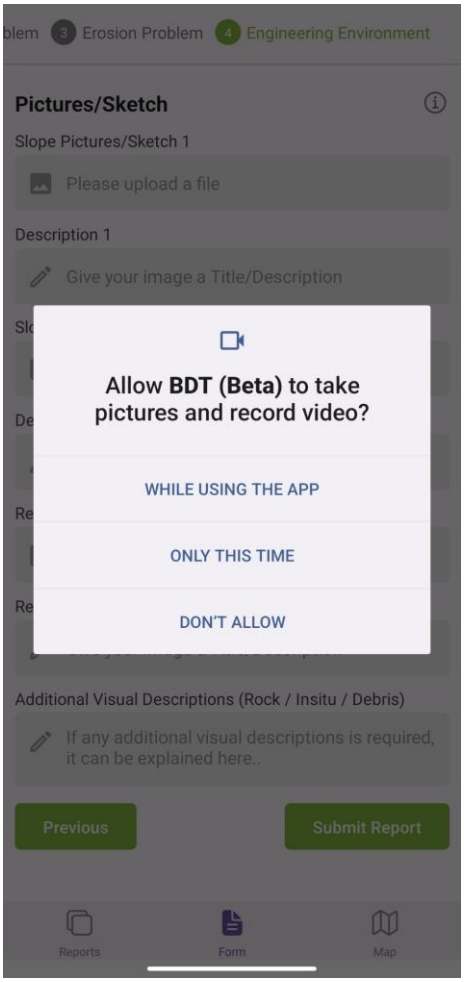


Figure 7-2 Allowing Photo and Media Access

Bio/Geotechnical Engineering Diagnostic Tool (BDT)

Developed by:

Innovative Solution, Pvt. Ltd. Lalitpur, Nepal, 977-1-5546880,

info@innovativesolution.com.np